

2013

Proceedings of the 5th Sacro Occipital Technique Research Conference

Atlanta, Georgia

May 2, 2013

Sacro Occipital Technique Research Conference

Atlanta, Georgia
May 2, 2013

Hosted by:

Sacro Occipital Technique Organization – USA

CONFERENCE PROCEEDINGS



Conference Chair
Charles L. Blum, DC
Research Director: Sacro Occipital Technique Organization – USA

Acknowledgements:

It is with the utmost gratitude I wish to thank all the various authors of these submitted abstracts and papers. Only with their selfless efforts can we share what we are finding in clinical practice and help build our evidence base of literature. I also wish to thank those who have donated to the Sacro Occipital Technique Organization – USA Research Fund which has helped pay for the printing of this conference's proceedings. A special thanks also goes to the SOT Research Conference Peer Review Committee: Drs. William Boro, Fabio Dal Bello, Rex Eaton, Rod Floyd, Glenn Frieder, Marilyn Holbeck, Anne Jensen, Brian Mouch, Vincent Perri, Henry Pollard, Anthony Rosner, David Rozeboom, Albert Salem, Jonathan Smith, Jean Thompson, Stephanie Willis, and Pamela Woodward.

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Publisher

Sacro Occipital Technique Organization – USA

PO Box 1357, Sparta, NC 28675 Telephone: 335-793-6524
Fax: 336-372-1541 Web: www.soto-usa.org E-mail: drcblum@aol.com

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Proceedings of the Sacro Occipital Technique Research Conference

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Introduction



For Major Bertrand DeJarnette, DO, DC, research was an essential part of being a chiropractor and essential to the future of the chiropractic profession. As early as July 1935 Major Bertrand DeJarnette was a featured speaker at the 40th Anniversary Convention 1895-1935 of the National Chiropractic Association presenting clinical research. Always research was his passion and in an interview in 1982 DeJarnette reiterated, "as far back as chiropractic college, I saw the need for a more scientific basis for chiropractic theory. My own personal physical problems had not been solved by medicine, osteopathy, or chiropractic; so I began experimenting on myself. I'm still at it, and I can see no end of the need for continuous research in chiropractic [1]."

Dr. DeJarnette saw the importance of sharing clinical experience through case report and self-analysis. This started as he first began to find that things he instinctively did for a patient would disappear from his memory if he did not outline them carefully. So before our day and age of computers, he recommended that to begin the first step in research, you would need to buy a notebook, an eraser and long pencil. He emphasized that, "those would be your first three pieces of research equipment. You use your notebook because it is not expensive. You use a pencil because it can be erased, and of course mistakes will be made so you must own an eraser [2]." With those three pieces of equipment he sat down one evening and wrote his first case report of an unusual patient presentation and his treatment rendered. He recollected that he did not sit down to write until perhaps three months after that patient's presentation. Dr. DeJarnette could not believe how much he had forgotten about the details. The lesson he learned was "write the unusual down now [2]".

When Dr. DeJarnette began to study the treatment he had rendered he realized that if any meaningful information were to evolve from his experience, he would have to resolve it himself. Dr. DeJarnette suggested that research has to be a free agency. Basically he saw a need and worked to fulfill that need. He realized that explaining how his discoveries evolved was more difficult than the process of developing new diagnostic and therapeutic interventions [2].

Chiropractic techniques, innovative integrative collaborations, and methods such as sacro occipital technique, temporomandibular disorder co-management, chiropractic manipulative reflex technique, and cranial techniques need an arena to share clinical and other forms of research. Critical study of techniques and innovative methods are what will help propel healthcare forward in this era of evidence informed practice and best practice research.

The SOT Research Conference looks to offer a venue for research papers; specifically those, which investigate sacro occipital technique, dental chiropractic co-treatment, cranial techniques, viscerosomatic/somatovisceral, reflex techniques, and new ground-breaking creative ways of helping humanity without necessarily the use of drugs or surgical intervention. This year's proceedings of the second annual SOT research conference will be shared with the chiropractic profession, for review, dissemination, and in-depth study.

> "*Research is a study of what you have, and what you need to make it better, and how to make it better is the final research step. S.O.T. never wants to be just good. It always wants to be better and best and greatest and most dependable* [3]."

> "*Research in Chiropractic must go on forever. Someone must do this type work, for it simply will not take care of itself. A profession cannot stand still. Momentum must constantly be generated.Chiropractic research needs many things it does not now have* [4]."""*Sacro Occipital Technic, like all Chiropractic Technics, needs further study. We certainly do not have all the answers to all of man's problems, and neither does any other group of people* [4]."

As a parting comment for his chiropractic colleagues Dr. DeJarnette said, "We must respect each other's beliefs. We must support our colleges and associations. We must work together and unite as a profession. And we must at all times be proud of chiropractic and proud of our calling as chiropractors [1]."

---

1. DeJarnette MB. **Cornerstone**. *The American Chiropractor*. Jul/Aug 1982; 82: 22,23,28,34.

2. DeJarnette MB. **The Sacro Occipital Technique Bulletin**. Mar 1975.

3. DeJarnette MB. **The Sacro Occipital Technique Bulletin**. Mar 1978: 2-3.

4. DeJarnette MB. **The History of Sacro Occipital Technic**. Private Practice: Nebraska City, NB. 1958:27.

Evidence-Based Practice

Evidence-based practice (EBP) refers to a decision-making process which integrates the best available research, clinician expertise, and client characteristics. EBP is an approach to treatment rather than a specific treatment.

Evidence-based practice (EBP) involves complex and conscientious decision-making which is based not only on the available evidence but also on patient characteristics, situations, and preferences. It recognizes that care is individualized and ever changing and involves uncertainties and probabilities [1].

EBP develops individualized guidelines of best practices to inform the improvement of whatever professional task is at hand. Evidence-based practice is a philosophical approach that is in opposition to rules of thumb, folklore, and tradition. Examples of a reliance on "the way it was always done" can be found in almost every profession, even when those practices are contradicted by new and better information [1].

> "*It's about integrating individual clinical expertise and the best external evidence* [2]."

However, in spite of the enthusiasm for EBP evinced over the last decade or two, some authors have redefined EBP in ways that add other factors to, the original emphasis on empirical research foundations. For example, EBP may be defined as treatment choices based not only on outcome research but also on practice wisdom (the experience of the clinician) and on family values (the preferences and assumptions of a client and his or her family or subculture) [1].

---

1. Buysse V, Wesley PW. **Evidence-based practice: How did it emerge and what does it really mean for the early childhood field?** *Zero to Three*. 2006;27(2), 50-55.

2. Sackett DL, Rosenberg WMC, Muir Gray JA, Haynes RB, Richardson WS. **Evidence based medicine: what it is and what it isn't.** *BMJ.* 1996;312:71-72.

Evidence Based Practice: The Hierarchy of Evidence

In biomedical science there is general agreement over an evidence based hierarchy: the higher up a methodology is ranked, the more robust and closer to objective truth it is assumed to be. The orthodox hierarchy looks something like the following table:

Rank:	Methodology	Description
1	Systematic reviews and meta-analyses	Systematic review: review of a body of data that uses explicit methods to locate primary studies, and explicit criteria to assess their quality. Meta-analysis: A statistical analysis that combines or integrates the results of several independent clinical trials considered by the analyst to be "combinable" usually to the level of re-analyzing the original data, also sometimes called: pooling, quantitative synthesis.
2	Randomized controlled trials	Individuals are randomly allocated to a control group and a group who receive a specific intervention. Otherwise the two groups are identical for any significant variables. They are followed up for specific end points.
3	Cohort studies	Groups of people are selected on the basis of their exposure to a particular agent and followed up for specific outcomes.
4	Case-control studies	"Cases" with the condition are matched with "controls" without, and a retrospective analysis used to look for differences between the two groups.
5	Cross sectional surveys	Survey or interview of a sample of the population of interest at one point in time
6	Case reports.	A report based on a single patient or subject; sometimes collected together into a short series
7	Expert opinion	A consensus of experience from the “good and the great.”
8	Anecdotal	An interesting story.

Evidence Informed Practice

The term evidence based medicine (EBM) has traditionally been used to describe a means of treating patients based on research published in biomedical journals. Even though EBM also incorporated expert opinions and a doctor's clinical experience, it was common that insurance companies and other agencies - presumably seeking to protect patients or save money - would focus solely on the randomized controlled trial as the backbone of EBM.

When EBM appeared to be too restrictive or just clearly misinterpreted new terms such as Evidence Based Practice and now Evidence Informed Practice (EIP) have appeared. The value of EIP is that it takes research into account when making a clinical descision but also utilizes patient values and preferences, risk benefit ratio of related or chosen therapy, and the doctor's clinical experience. Because this represents a clearer depiction of an actual clinical experience and at the same time seeks to offer the patient the highest level of care, the belief is that EIP is the best of what EBM has to offer.

It is important that a practitioner is aware of the current research on effectiveness of their care so that they do not inadvertently make false or exagerated claims regarding the potential benefits of the treatment rendered. Therefore keeping up to date on the research and literature, while time consuming, is an ethical obligation of doctors in practice.

Ideally doctors practicing EIP would best be able to predict and provide outcome expectations against which progress could be measured. In essence we all, as patients or doctors, should receive or offer treatment based on research and clinical experience. New research can uncover therapeutic interventions or benefits of certain types of care that were never before discovered. Also this research may determine that prior care that was customarily rendered is now inappropriate.

The challenge with chiropractic and its various techniques is that we are functioning from a situation where we have limited funds and limited methods to adequately study our innovative therapeutic applications. This conference attempts to offer a tempered and reasonable voice for practitioners on the forefront of care, such as has been the case with Sacro Occipital Technique (SOT) for years. Incorporating current research performed in the patient's best interest with one's own clinical experience is the hallmark of a responsible and ethical physician. Allied healthcare practitioners, chiropractors, and particularly SOT doctors have a responsibility to lead the way with EIP and focus first and foremost on patient based care.

Major Bertrand DeJarnette DO, DC developed SOT with outcome based assessment protocols and with research accountability as its backbone. The onus is upon us, those who learn and utilize his methods to be informed of the evidence and evolving research, and utilize this in the clinical application of SOT and its related methods.

The Case Report: How the Doctor in Practice Communicates to the Research Community

While low on the evidence-based practice hierarchy of evidence the case report is an extremely valuable manner for doctors in clinical practice or "in the trenches" to communicate what is taking place in their practices. Until the doctors in clinical practice publish their case reports, researchers in a college setting can only attempt to guess what is taking place out there in the field.

There are significant limitations to case reports, such as no control subjects, the doctor and subjects are not blinded to the study, and the doctor's bias may cloud the study. So while the case report is an important tool for communication, the doctor authoring these studies needs to exercise caution to not over-interpret his or her findings. Dr. Robert Ward of Southern University of Health Sciences and past editor of *The Journal of Chiropractic Education* answers the question:

"Why it is important to write a case report?"

"Most persons believe that the case report is used to describe unique, or at least highly rare, clinical presentations or diagnostic entities (e.g., "prostatic hypertrophy mimicking as ingrown toenail"). This is the most common use of the case report. However, equally important is the use of the case report to describe novel management approaches to more ordinary conditions.

"Another aspect of why case reports are written involves the audience. Case reports are generally considered as a communication from clinicians to scientists. The pointy-headed ivory tower population doesn't get to see the interesting things that happen in clinical practice. They often rely on case reports from the field in deciding what sorts of pilot studies to run, and those often lead to real full-scale clinical trials (the sort of research that field clinicians generally don't have the time, resource or interest to undertake).

"Case reports are a vital aspect of our literature base, and more of our practitioners need to write them. Until you write up that wonderful method that works in your office, the rest of the world cannot share in its benefits. Without publication, when you die or retire, your discoveries die with you [1]."

1. Ward RW. **Why it is Important to Write a Case Report**. *Dural Connection Internet Edition*. 2006;3(3). [http://www.sotousa.com/wp/?page_id=716] Last accessed September 26, 2010.

What is plagiarism?

First published on the University of Oxford Student Gateway website. Reproduced with the permission of the Chancellor, Master and Scholars of the University of Oxford. [http://www.myofunctional-therapy.com/courses.html] Last accessed April 22, 2013.

What is plagiarism?

Plagiarism is the copying or paraphrasing of other people's work or ideas into your own work without full acknowledgement. All published and unpublished material, whether in manuscript, printed or electronic form, is covered under this definition. Collusion is another form of plagiarism involving the unauthorized collaboration of students (or others) in a piece of work.

Why does plagiarism matter?

Plagiarism is a breach of academic integrity. It is a principle of intellectual honesty that all members of the academic community should acknowledge their debt to the originators of the ideas, words, and data which form the basis for their own work. Passing off another's work as your own is not only poor scholarship, but also means that you have failed to complete the learning process. Deliberate plagiarism is unethical and can have serious consequences for your future career; it also undermines the standards of your institution and of the degrees it issues.

Why should you avoid plagiarism?

There are many reasons to avoid plagiarism. You have come to university to learn to know and speak your own mind, not merely to parrot the opinions of others - at least not without attribution. At first it may seem very difficult to develop your own views, and you will probably find yourself paraphrasing the writings of others as you attempt to understand and assimilate their arguments. However it is important that you learn to develop your own voice. You are not necessarily expected to become an original thinker, but you are expected to be an independent one - by learning to assess critically the work of others, weigh up differing arguments and draw your own conclusions. Students who plagiarize undermine the ethos of academic scholarship while avoiding an essential part of the learning process.

You should not avoid plagiarism for fear of disciplinary consequences, but because you aspire to produce work of the highest quality. Once you have grasped the principles of source use and citation, you should find it relatively straightforward to steer clear of plagiarism. Moreover, you will reap the additional benefits of improvements to both the lucidity and quality of your writing. It is important to appreciate that mastery of the techniques of academic writing is not merely a practical skill, but one that lends both credibility and authority to your work, and demonstrates your commitment to the principle of intellectual honesty in scholarship.

What to avoid

The necessity to reference applies not only to text, but also to other media, such as computer code, illustrations, graphs etc. It applies equally to published text drawn from books and journals, and to unpublished text, whether from lecture handouts, theses or other students' essays. You must also attribute text or other resources downloaded from web sites. An example of plagiarism has also been set out to illustrate how to avoid plagiarism.

There are various forms of plagiarism and it is worth clarifying the ways in which it is possible to plagiarize:

Verbatim quotation without clear acknowledgement

Quotations must always be identified as such by the use of either quotation marks or indentation, with adequate citation. It must always be apparent to the reader which parts is your own independent work and where you have drawn on someone else's ideas and language.

Paraphrasing

Paraphrasing the work of others by altering a few words and changing their order or by closely following the structure of their argument, is plagiarism because you are deriving your words and ideas from their work without giving due acknowledgement. Even if you include a reference to the original author in your own text you are still creating a misleading impression that the paraphrased wording is entirely your own. It is better to write a brief summary of the author's overall argument in your own words than to paraphrase particular sections of his or her writing. This will ensure you have a genuine grasp of the argument and will avoid the difficulty of paraphrasing without plagiarizing. You must also properly attribute all material you derive from lectures.

Cutting and pasting from the Internet

Information derived from the Internet must be adequately referenced and included in the bibliography. It is important to evaluate carefully all material found on the Internet, as it is less likely to have been through the same process of scholarly peer review as published sources.

Inaccurate citation

It is important to cite correctly, according to the conventions of your discipline. Additionally, you should not include anything in a footnote or bibliography that you have not actually consulted. If you cannot gain access to a primary source you must make it clear in your citation that your knowledge of the work has been derived from a secondary text (e.g. Bradshaw, D. Title of Book, discussed in Wilson, E., Title of Book (London, 2004), p. 189).

Failure to acknowledge

You must clearly acknowledge all assistance which has contributed to the production of your work, such as advice from fellow students, laboratory technicians, and other external sources. This need not apply to the assistance provided by your tutor or supervisor, or to ordinary proofreading, but it is necessary to acknowledge other guidance which leads to substantive changes of content or approach.

Professional agencies

You should neither make use of professional agencies in the production of your work nor submit material which has been written for you. It is vital to your intellectual training and development that you should undertake the research process unaided.

Does this mean that I shouldn't use the work of other authors?

On the contrary, it is vital that you situate your writing within the intellectual debates of your discipline. Academic essays almost always involve the use and discussion of material written by others, and, with due acknowledgement and proper referencing, this is clearly distinguishable from plagiarism. The knowledge in your discipline has developed cumulatively as a result of years of research, innovation and debate. You need to give credit to the authors of the ideas and observations you cite. Not only does this accord recognition to their labors, it also helps you to strengthen your argument by making clear the basis on which you make it. Moreover, good citation practice gives your reader the opportunity to follow up your references, or check the validity of your interpretation.

Does every statement in my essay have to be backed up with references?

You may feel that including the citation for every point you make will interrupt the flow of your essay and make it look very unoriginal. At least initially, this may sometimes be inevitable. However, by employing good citation practice from the start, you will learn to avoid errors such as sloppy paraphrasing or unreferenced quotation. It is important to understand the reasons behind the need for transparency of source use. All academic texts, even student essays, are multi-voiced, which means they are filled with references to other texts. Rather than attempting to synthesize these voices into one narrative account, you should make it clear whose interpretation or argument you are employing at any one time (whose 'voice' is speaking). If you are substantially indebted to a particular argument in the formulation of your own, you should make this clear both in footnotes and in the body of your text, before going on to describe how your own views develop or diverge from this influence. On the other hand, it is not necessary to give references for facts that are common knowledge in your discipline. If you are unsure as to whether something is considered to be common knowledge or not, it is safer to cite it anyway and seek clarification. You do need to document facts that are not generally known and ideas that are interpretations of facts.

Examples of plagiarism

The following examples demonstrate some of the common pitfalls to avoid; they should be of use even to non-historians. However, you should consult your subject handbook and course tutor for specific advice relevant to your discipline. The referencing system used here is that prescribed by the History Faculty for the use of writers of theses.

Source text

From a class perspective this put them [highwaymen] in an ambivalent position. In aspiring to that proud, if temporary, status of 'Gentleman of the Road', they did not question the inegalitarian hierarchy of their society. Yet their boldness of act and deed, in putting them outside the law as rebellious fugitives, revivified the 'animal spirits' of capitalism and became an essential part of the oppositional culture of working-class London, a serious obstacle to the formation of a tractable, obedient labour force. Therefore, it was not enough to hang them – the values they espoused or represented had to be challenged.

(Linebaugh, P., The London Hanged: Crime and Civil Society in the Eighteenth Century (London, 1991), p. 213. [You should give the reference in full the first time you use it in a footnote; thereafter it is acceptable to use an abbreviated version, e.g. Linebaugh, The London Hanged, p. 213.]

Plagiarized

1. Although they did not question the inegalitarian hierarchy of their society, highwaymen became an essential part of the oppositional culture of working-class London, posing a serious threat to the formation of a biddable labour force. (This is a patchwork of phrases copied verbatim from the source, with just a few words changed here and there. There is no reference to the original author and no indication that these words are not the writer's own.)

2. Although they did not question the inegalitarian hierarchy of their society, highwaymen exercised a powerful attraction for the working classes. Some historians believe that this hindered the development of a submissive workforce. (This is a mixture of verbatim copying and acceptable paraphrase. Although only one phrase has been copied from the source, this would still count as plagiarism. The idea expressed in the first sentence has not been attributed at all, and the reference to 'some historians' in the second is insufficient. The writer should use clear referencing to acknowledge all ideas taken from other people's work.)

3. Although they did not question the inegalitarian hierarchy of their society, highwaymen 'became an essential part of the oppositional culture of working-class London [and] a serious obstacle to the formation of a tractable, obedient labour force'.[1] (This contains a mixture of attributed and unattributed quotation,

which suggests to the reader that the first line is original to this writer. All quoted material must be enclosed in quotation marks and adequately referenced.)

4. Highwaymen's bold deeds 'revivified the "animal spirits" of capitalism' and made them an essential part of the oppositional culture of working-class London.[1] Peter Linebaugh argues that they posed a major obstacle to the formation of an obedient labour force. (Although the most striking phrase has been placed within quotation marks and correctly referenced, and the original author is referred to in the text, there has been a great deal of unacknowledged borrowing. This should have been put into the writer's own words instead.)

5. By aspiring to the title of 'Gentleman of the Road', highwaymen did not challenge the unfair taxonomy of their society. Yet their daring exploits made them into outlaws and inspired the antagonistic culture of labouring London, forming a grave impediment to the development of a submissive workforce. Ultimately, hanging them was insufficient – the ideals they personified had to be discredited.[1] (This may seem acceptable on a superficial level, but by imitating exactly the structure of the original passage and using synonyms for almost every word, the writer has paraphrased too closely. The reference to the original author does not make it clear how extensive the borrowing has been. Instead, the writer should try to express the argument in his or her own words, rather than relying on a 'translation' of the original.)

Non-plagiarized

1. Peter Linebaugh argues that although highwaymen posed no overt challenge to social orthodoxy – they aspired to be known as 'Gentlemen of the Road' – they were often seen as anti-hero role models by the unruly working classes. He concludes that they were executed not only for their criminal acts, but in order to stamp out the threat of insubordinacy.[1] (This paraphrase of the passage is acceptable as the wording and structure demonstrate the reader's interpretation of the passage and do not follow the original too closely. The source of the ideas under discussion has been properly attributed in both textual and footnote references.)

2. Peter Linebaugh argues that highwaymen represented a powerful challenge to the mores of capitalist society and inspired the rebelliousness of London's working class.[1] (This is a brief summary of the argument with appropriate attribution.)

[1] Linebaugh, P., The London Hanged: Crime and Civil Society in the Eighteenth Century (London, 1991), p. 213.

2013 SOT Research Conference Schedule

May 2, 2013 · Atlanta, Georgia

1:00 – 1:50 PM	**Case Reports, Health Promotion, and SOT Case Studies**
	The Case Study Report: *The Individual's Experience* *Matthew McCoy DC, MPH*
	Health promotion and prevention practice in a chiropractic teaching outpatient clinic: A continuing study to determine if patient file auditing reflects active health and wellness advice? *Rod Floyd, DC, MSPH, Dr PH*
	Review of Cases using SOT/CMRT on Equine and Canine *Jean E. Thompson, DC*
	Rotator cuff conservative care utilizing sacro occipital technique Chiropractic Intervention of Zenker's Diverticulum Case Report *William J. Boro, DC*
2:00 – 2:50 PM	**Temporomandibular Joint Disorders and Orofacial Therapies**
	Chiropractic and Dentistry: A Case Report Illustrating The Need for Mutual Understanding of TMD Co-Treatment. *Charles L. Blum, DC, Rebecca L. Griffiths, DDS*
	Neuromuscular Dentistry *Ira L. Shapira, DDS*
	Orofacial myofunctional therapy: A case report. *Joy L. Moeller, BS, RDH*
	The Relationship of Cranial Facial Growth and Development to the Sacı Occipital Technique (SOT) Category System: Three Case Studies. *Harvey Getzoff, DC*
3:10 – 4:00 PM	**Tramatic Brain Trauma, Stroke, and Upper Cervical Disorders**
	The role of the atlas vertebrae in the Sacro Occipital Technique (SOT) category system. *Harvey Getzoff, DC*
	Chiropractic cranial treatment protocol increases successful outcome of the multidisciplinary care model for traumatic brain injury (TBI) patients: A case series. *Esther M. Remeta, DC, Charles L. Blum, DC*
	Chiropractic sacro occipital technique (SOT) and cranial treatment model for traumatic brain injury along with monitoring and supplementing for neurotransmitter balance: A case report. *Esther M. Remeta, DC, Charles L. Blum, DC*
	Chiropractic care and its effects on a patient with a moderate traumatic brain injury. *Ryan Pollard*

4:10 – 5:00 PM	**Conjugate Gaze, STO, and Pediatrics**
	Conjugate gaze visceral release in female chronic pelvic pain: A case study. *Vincent L. Perri, DC, PhD*
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	Improvement in the Quality of Life of a Patient with Aicardi Syndrome Undergoing Multiple Forms of Chiropractic Care: A Retrospective Case Study. *Joseph D. Heinecke*
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Chiropractic and Dentistry: A Case Report Illustrating The Need for Mutual Understanding of TMD Co-Treatment.

Charles L. Blum, DC, Rebecca L. Griffiths, DDS

Introduction

The fields of dentistry and chiropractic are realizing the need for collaborative interdisciplinary care as a means to help patients. [1-4] A quick review of dental and chiropractic literature concerning the treatment of the temporomandibular joint (TMJ) and its related disorders (TMD) illustrates how dentists and chiropractors commonly see their roles in the treatment of TMD as being independent.

It is commonly understood within the chiropractic community that there are many different chiropractic techniques, all of which claim that they have the answer for most conditions. [5] Chiropractic care is considered helpful, regardless of the technique, and most practitioners utilize a conglomeration of techniques.[6] It is likely that each chiropractic technique has something valuable to offer.

As a means to build a bridge between the professions, [7-10] Steigerwald and Maher developed an outcome assessment tool for chiropractors to determine when a patient might have a TMD condition warranting a dental referral. [11] Blum and Globe developed a preliminary outcome assessment tool for dentists to use to determine if a patient might have myofascial postural influences affecting a patient's TMD condition and warranting a chiropractic referral. [12]

The purpose of this case report is to illustrate how a patient presenting for chiropractic care clearly needed dental co-treatment for his chronic TMD/bruxism condition. Bruxism is characterized by the grinding of the teeth and is considered an oral parafunctional activity that often occurs during sleep. Bruxism may be mild enough not to be a health problem for many people. However, in some cases bruxism may be related to other underlying conditions, which are emotional, stress related, airway related, or related to a myriad of other triggers.

The following case history illustrates the limitations of chiropractic techniques for the treatment of a patient with an acute, trauma induced cervical sprain/strain, and chronic bruxism.

Chiropractic Assessment

A 19-year-old male presented to my office with a history of attempting to do a back flip on a trampoline when he landed on his head and compressed his neck. His parent divulged during the case history that the patient also had persistent and intense bruxism at night, creating significant sounds that would awaken others near his room. The patient reported upon questioning that he has had multiple orthodontic procedures and had a mandibular metal bridge bonded lingually along his incisors, which was described by the patient as a retainer. The orthodontic care the patient received began initially with a

transverse expander to widen his hard palate and then proceeded with routine orthodontic treatment for what was believed to be aesthetic reasons.

Chiropractic Methods/Intervention

Evaluation revealed decreased cervical range of motion with some sensitivity to palpation at the right C3 transverse process, sacroiliac joint sprain with pelvic torsion (left short leg), and significant TMJ related findings. [13] It was noted upon examination of his TMJ range of motion that when closing, his incisors contacted end to end. This is typical of a dental Class III (maxillary retrusion/mandibular protrusion) presentation. Palpation of his retro-condylar space (between the mandibular condyle and mastoid) revealed that there was very minimal space in this area, which is typical of a dental Class II (mandibular condylar retrusion) TM condyle position. He exhibited an opening deviation to the left; opening first at the midline, shifting to the left, and ending at the midline at full opening. This path is typical of disc displacement with reduction internal derangement of the TMJ.

Chiropractic Treatment

The patient was treated initially with sacro occipital technique (SOT) orthopedic blocking to treat the L3 right rotation until the swelling and sensitivity at the C3 transverse subsided, [14] pelvic supine block placement to reduce pelvic torsion, [15-17] treating the cervical spine with cervical stairstep, [18] HVLA adjusting based on cervical stairstep findings, and DeJarnette step one sutural cervical cranial releases. [19] Some attempt was made to expand manually the maxillary and mandibular dental arches by releasing the cruciate suture sagittally and the mandible transversely. The goal was to determine whether this might help to allow the mandibular incisors to recede to a more ideal position behind the maxillary incisors, as well as to increase the retro-condylar space.

The patient was given an exercise to perform during which he placed his tongue in the region behind his front teeth and pressed firmly as he opened and closed, which normalized his TM joint translation and eliminated the deviation. [20] He was told to do this exercise in 3 sets of 10, 5 times per day, and be re-evaluated in 2-4 weeks concerning whether there was continued deviation of his TMJ translation.

Chiropractic Results

The cervical spine range of motion and pain improved immediately following the treatment. The TMJ translation relating to the deviation was improved by approximately 50%, but it was evident that this patient would need to continue with the exercise daily for 2-4 weeks. While the improved translation indicated better TM disc and joint motion due to habit and tissue tension patterns, it has been found clinically that this exercise is continued necessarily to sustain opening along the midline.

However, it was clear that there was no improvement in the dental occlusion or condylar position, which warranted a referral to a dentist trained in functional orthodontics and trained within the dental chiropractic co-treatment methodology. [**Figure 1**] At his last

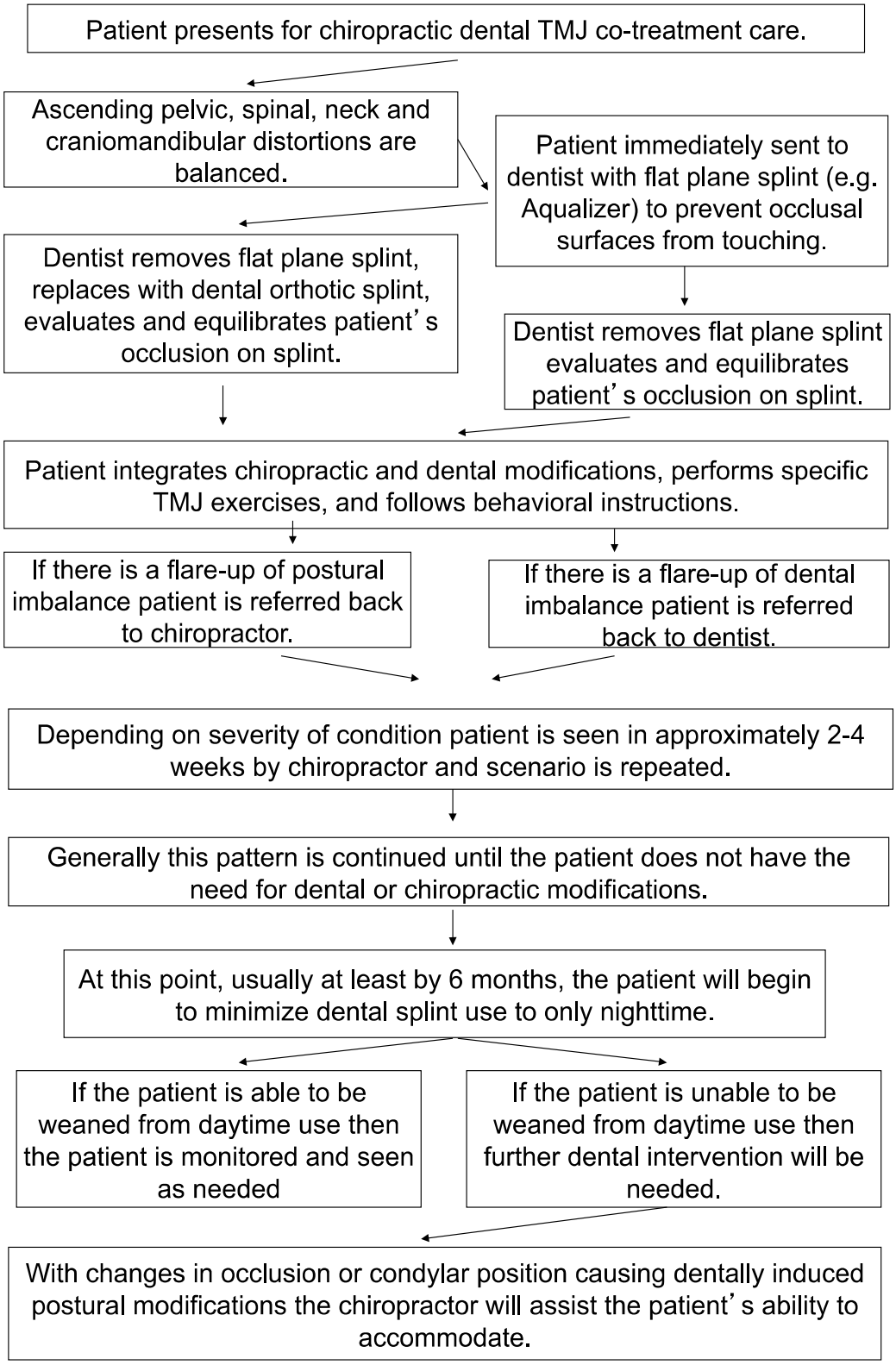


Figure 1. A sample chiropractic dental co-treatment

office visit (August 29, 2012) he indicated that for the first time in years he doesn't worry about his "jaw locking" every morning, he is sleeping better, doesn't seem to be grinding his teeth, and his related headaches have subsided.

Dental Assessment

The patient presented for dental care in December 2011 with chief complaints of jaw locking, migraine headaches, jaw pain, limited mouth opening, and tooth grinding. He has had prior orthodontic treatment and has developed TMD with joint locking. He was being treated locally for his TMD and has had several appliances. The most current TMD treatment involved the use of both daytime and nighttime orthotic appliances. The daytime orthotic was a maxillary appliance with an anterior ramp that advanced his mandible into a 6 mm underbite when occluding on it. The nighttime orthotic added vertical support, but it supported his mandible 3 mm to left of his skeletal midline. The patient did not wear any appliance while eating. He said his bite had changed from wearing the appliances and he began occluding end to end on his anterior teeth.

The patient presented with Class III molar and canine dental relationships bilaterally. He exhibited a tongue thrust during swallowing, lisp type speech impediment, mouth-breathing, forward head posture, and facial asymmetry. Displacement and reduction of the disc in his left TMJ was palpable through the left external auditory meatus when opening and closing his mouth. A bonded mandibular lingual arch orthodontic retainer was present lingual to the mandibular anterior teeth.

Dental Methods/Intervention

Examination of the maxillary arch form revealed bilateral internal rotations of the premaxillae and maxillae. Examination of the maxillary teeth revealed lack of alignment of the dental midline with the maxillary skeletal midline.

Examination of the mandibular arch revealed depressed vertical development of alveolar bone of the mandibular left quadrant. The patient's mandibular posterior teeth are tipped more lingually on his right than his left due to greater vertical alveolar bone development on his right. These findings are directly related to the adaptive closure pattern of the mandible and most likely occurred during the exchange of primary with permanent dentition. Examination of the mandibular teeth revealed lack of alignment of the dental midline with the mandibular skeletal midline.

Imaging examination revealed: flattening of the lateral poles of the mandibular condyles bilaterally; hypertrophied inferior, middle, and superior nasal turbinates; morphologic bending of the left mandibular condyle; pharyngeal and nasal airway impingement; posterior and superior displacement of the left condyle; medial subluxation of the disc of the left temporomandibular joint in centric occlusion; asymmetry of the glenoid fossae; the left orbit, left mastoid, left lesser wing of sphenoid, and the left side of the hard palate are all superior in position to the same structures on the right; the right gonial angle is superior to the left; mandibular deviation from skeletal midline to the left; retrognathic

maxillae; short and pointed tooth roots; rotated cervical vertebrae at C1, C2; compression of the cervical intervertebral spaces at C1/C2, C2/C3; slight compression of the atlantoaxial joint; and loss of normal cervical spine curvature.

The patient exhibited cranial and dental asymmetry, maxillary retrognathism, and bilateral premaxillary and maxillary internal rotation. These issues are causative to the deviation of the nasal septum, hypertrophied nasal turbinates via decreased lymphatic drainage in the midface, and to the mandibular closure to his left of his skeletal midline. His compensatory mandibular closure to the left causes medial displacement of the disc of the left temporomandibular joint and rotation of the upper cervical vertebrae. The internal rotations of the premaxillae and maxillae and the lingual tipping of the patient's mandibular teeth have rendered insufficient tongue space for the proper function of the tongue during breathing, swallowing, and speech. The forward head posture exhibited by the patient is believed to be an adaptation to his airway restrictions. The tongue thrust during swallowing and the lisp type speech impediment are believed to be an adaptation to the decreased airway and lack of sufficient functional tongue space.

Dental Treatment

ALF (Alternative Light Force) appliances [21, 22] were delivered to this patient on 3 February 2012 and as of this writing, he has had 14 adjustments at 2-3 week intervals. The maxillary ALF was designed for correction of the internal rotations of the maxillae and premaxillae and to achieve anterior movement of the patient's underdeveloped midface. It is non-removable by the patient.

The mandibular Omni ALF was designed with shells to fit over the mandibular posterior teeth. The shells are adjusted and balanced to allow repositioning of the mandible in alignment with the skeletal midline. The Omni supports the mandible where there is no disc displacement upon closure of the mouth. It is used also to begin the correction of the lingual tilt of the mandibular teeth and bone that occurred in adaptation to the maxillary architecture and possibly the prior orthodontia. It is removable for hygiene only and is worn continually, especially while eating. This treatment protocol is necessary to re-train the myofunctional adaptations of the muscles of mastication and to sustain the correction of the myofunctional airway compensations.

Dental Results

The patient's progress reports document 50% symptom improvement within the first 3 weeks (by 24 February 2012), 75% symptom improvement within the first month (by 1 March 2012), and 100% symptom improvement in 3 ½ months (by 18 May 2012). **[Figure 2]**

Orthodontics will be necessary to reposition the patient's teeth for proper occlusion in the corrected bite and for support of the TMJs and cervical spine. That phase of treatment may take up to 2 years, due to tooth root morphology and the speed at which teeth may be moved safely.

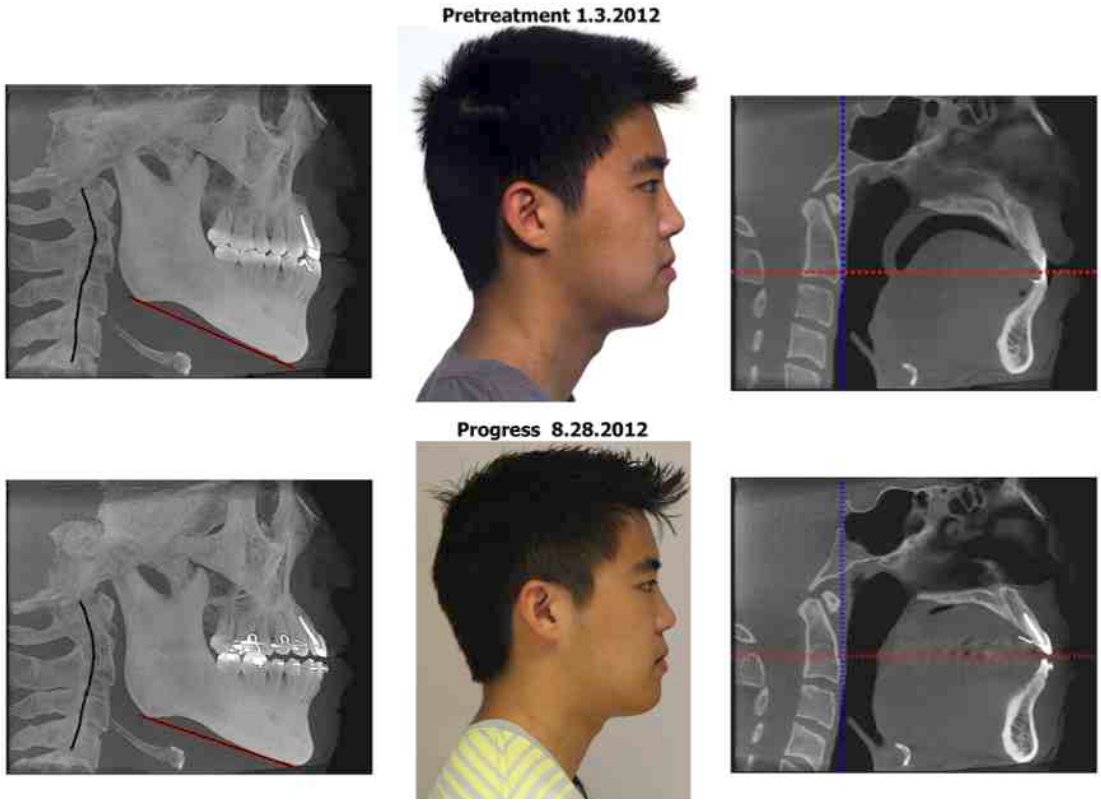


Figure 2. Mandibular position and forward head posture pre and post treatment relationships

The patient's prognosis and ultimate stability is excellent from a dental perspective. However, incorporating chiropractic, myofunctional therapy, [23, 24] and the Buteyko Breathing Method [25] may be necessary for an optimal outcome and long-term stability. Clinically, and with similar cases, posture, breathing, and tongue habits will need to readapt functionally as dental orthopedic/orthodontic structures are modified.

Discussion

Although the response to the treatment for the presenting complaints of cervical pain and decreased range of motion was improved following the initial chiropractic office visit, what became a greater concern was this patient's chronic bruxism and mandibular position. The bruxism appeared to be related to a dysfunctional relationship between the osseous shape of his upper and lower dental arches, which had a direct effect on his occlusion and condylar position. Typically, patients with a Class II position will have some degree of obstructive airway compromise, [26-29] which is found frequently to occur at night, and leads to bruxism. One theory for night-time bruxism is that the body attempts to open the airway space by advancing the lower jaw and tongue forward. When the lower jaw returns to its resting position backward, it draws the tongue with it, and this

closes the airway space. This process repeats itself the entire night, leading to chronic bruxism [30].

The challenge with this particular case is that the common orthodontic treatment for a mandible protruded with respect to the maxillae and incisors that occlude end to end involves retrusion of the mandibular condyles posteriorly within the condylar fossae. The dental occlusion needed to be optimal, with Class I positioning, but the patient presented with his left condyle already retruded to the point where there was virtually no space for palpation between the ramus of the mandible and the mastoid. Common treatment for cases with this type of condylar position involves advancing the mandible to increase joint space in the TMJs and bring the tongue anteriorly, which opens the oro-pharyngeal airway space. This patient's mandibular teeth were already positioned too far forward relative to the upper dental arch; hence, the dental challenge of treating this case.

Dental chiropractic co-treatment [31-33] can be a part of a rapidly growing field of interdisciplinary care. [34, 35] [**Figure 1**] Since postural changes have been found to have an ascending effect on dental occlusion, condylar position, and airway space, [36-41] treatment of postural influences prior to irreversible dental procedures is preferred. Likewise, dental occlusion, condylar position, and airway space has a descending effect on posture. [36-41] So, following any changes to those regions by the dentist, should the patient have a myofascial response (e.g., increased neck or back pain), a referral to a chiropractor may be indicated to facilitate the patient's accommodation to the descending postural influences.

Nocturnal bruxism [42] is not a condition that can be ignored, particularly when it is chronic and associated with unusual dental and skeletal morphological patterns, such as with this patient. Aside from the noise associated with bruxism, there is often related masticatory muscle tension leading to long-term effects on the dentition and airway space that can lead to serious sequelae. [43, 44]

Conclusion

SOT chiropractic analysis and treatment allowed for a relatively quick and easy resolution to this patient's neck trauma. However, resolution of his bruxism was much more complex than the result expected to be gained by chiropractic care alone. Therefore, he was referred to a dentist who could assess accurately and co-treat this patient successfully. The purpose of this case report was to illustrate a working treatment paradigm in which both chiropractic and dentistry play integral roles in improving patient care and outcomes.

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Chiropractic Intervention of Zenker's Diverticulum Case Report

William J. Boro, DC

Introduction:

Pharyngoesophageal or Zenker's diverticulum (ZD) was first described in 1769 by Ludlow as a "preternatural dilatation" [1] of the pharynx. The esophagus, a tube, approximately 25 centimeters in length, consists of an inner layer of circular muscle and an outer layer of longitudinal muscle. Functionally the esophagus consists of three parts: the proximal sphincter at the upper end of the tubular esophagus, the distal sphincter at the lower end and the tube in between. Ingested materials are transported from the oropharynx, identified at the cricoid cartilage, to the stomach, 2 or 3 centimeters below the diaphragm. Successive contraction and relaxation of the esophagus propels the bolus. Normally this highly integrated sequence of muscle activity moves the bolus to the stomach and at the same time prevents the reflux of gastric contents into the esophagus. Zenker's diverticulum is a blind sac (pouch) that branches off the esophagus at the upper esophageal sphincter. It is the most common type of esophageal diverticulum. Although its precise etiology is uncertain, it is thought that increased intraluminal pressure caused by dyscoordination of pharyngeal contraction and cricopharyngeal relaxation[2-4]. An area of anatomic weakness known as Killian's dehiscence located between the lower pharyngeal constrictor and the cricopharyngeus muscle (CPM) is its most common area of occurrence.

Zenker's diverticulum is always found on the posterior wall of the pharynx.



As it enlarges, it tends to flop to one side, more commonly the left[5]. The diverticulum also tends to sag inferiorly as it enlarges trapping partially digested food. This often results in halitosis as a presenting symptom. Other signs and symptoms include: dysphagia, regurgitation of undigested food hours after eating, sensation of food sticking in the throat, special maneuvers needed to dislodge food, coughing after eating, aspiration of food particles, unexplained weight loss, and borborygmi in the neck.

The role of gastroesophageal reflux disease in the pathogenesis of ZD is unclear [6,7]. However, most patients with ZD have other radiographic abnormalities associated with reflux disease (i.e., hiatal hernia, gastroesophageal reflux, Schatzki ring, and/or an acid-sensitive esophagus).

Swallowing in the pharynx and esophagus is a reflexive involuntary mechanism[6,8] stimulated by afferent receptors sensitive to touch , taste, and pressure. It is initiated by glossopharyngeal (IX) and vagus (X) nerves to the nucleus (n) solitarius in the brainstem. The motor nuclei, which lie in close proximity to the n. solitarius, are triggered by a specific afferent input or sensory pattern. The sensory system is connected to the motor nuclei in the brainstem by interneurons, the somatic motor components of the cranial nerves originating in the n. ambiguous. The cranial motor nuclei involved in deglutition include those of the trigeminal (V), facial (VI), glossopharyngeal (IX), vagus (X), and hypoglossal (XII) nerves. All intrinsic muscles of the pharynx, larynx, and soft palate receive motor fibers from the glossopharyngeal and vagus nerves, except for tensor veli palatine, which is innervated by trigeminal (V) nerve. The support muscles are innervated by the accessory (XI) nerve and the first three cervical nerves. The cricopharyngeus muscle receives dual innervation from the vagus nerve and the sympathetic nervous system, both of which contribute to the tonic activity of the cricopharyngeus that is characteristic of a sphincter[9].

Standard treatment of ZD depends on its size and symptomatology. Many patients learn to empty the diverticulum by applying gentle manual pressure to the side of the neck. Others adjust their dietary intake to exclude foods such as peas or corn kernels that easily lodge in the diverticulum. Surgery, however, may be required for some symptomatic diverticula, especially when progressive enlargement occurs. The surgical treatment may vary from diverticulopexy to simple excision or excision combined with cricopharyngeal myotomy.

While surgery is a common treatment for ZD, the purpose of this paper was to investigate whether conservative care which utilized Sacro-Occipital Technique (SOT) chiropractic care and soft tissue therapies could facilitate recovery of a patient without the need for surgical intervention.

Methods/Intervention:

A 71 year old male, 6'1", weighing 191 pounds presented at this office with chief complaint of difficulty swallowing, associated with coughing when swallowing, and a diagnosis of ZD. Postural exam revealed high ilium and low shoulder on right, ear low on left; Trendelenburg was positive on right, three finger test for jaw opening was positive, jaw opening was difficult and painful when doctor's index fingers were placed behind angle of mandible. Soft tissues in laryngeal section of the neck were taut and the mobility of the larynx was limited and somewhat uncomfortable.

Treatment consisted of: steps 1-5 of DeJarnette's sutural protocol[10,11], adjustment to the cervical spine (cervical stairstep), shoulder girdle, category II block placement (treatment 3), lumbar adjustment (treatment 4), soft tissue release to the pharynx/larynx area and modified Van Rumpt hiatal hernia release. Chin to chest exercises were recommended to stretch cervical spine and relax the soft tissues of the throat and neck areas.

Steps 1-5 of DeJarnette's sutural protocol that were used included:

Step 1 - Cervical stairstep (see figure below).

Step 2 - Cervicocranial Fascia Release. These two steps involve creating cervical myofascial or dural relaxation and balancing in addition to releasing general sutural stress utilizing the mastoid as a lever.

Step 3 - TMJ fascia release consisting of vault bone sutural release and facial bone sutura release. This step helps release tensions in the maxilla and zygoma and related sutures utilizing the mastoid as a lever.

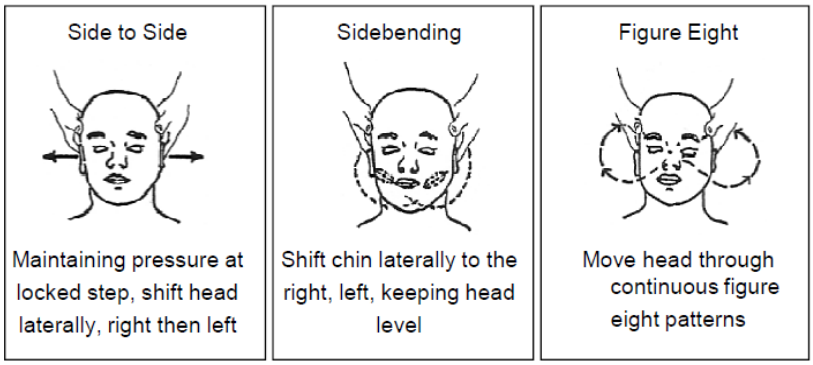
Step 4 – Sternocleidomastoid and Platysma Muscle Release. This step stretches and relaxes the musculature and fascia of the neck.

Step 5 - Maxilla adjustment consisting of maxilla-palatine spread, maxilla rotation, and maxillary straddle ("fruit jar"), and the zygoma release. This step helps balance the temporal bone and sphenoid.

Steps 6 and 7 of the protocol were not included in this patient's treatment.

Step 6 - is used to help balance the falx and sagittal sinus along with affecting somatosensory regions of the brain.

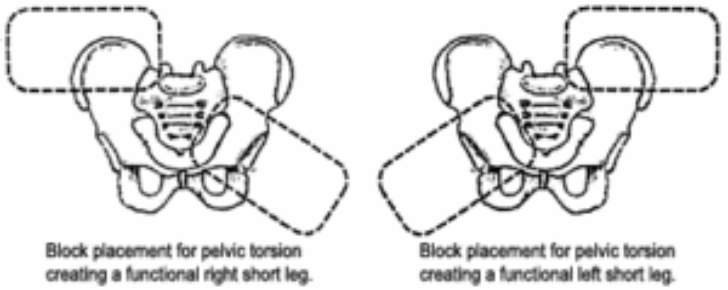
Step 7 - is used to balance CSF pulsations in the occiput and whole cranium.



Cervical Stairstep Procedure[12]

Cervical stairstep is a procedure developed by DeJarnette[13] to facilitate cervical articular facet position and motion. He theorized that this method of care could be applied for hypermobile cervical motor units as well as in instances of joint fixation.

SOT category two block placement involves supine pelvic wedge placement under the pelvis to reduce pelvic torsion and facilitate sacroiliac joint stability.



SOT Category II Block Placement[12]

The modified Van Rumpt hiatal hernia release was performed as follows. First instruct the patient on how to breathe diaphragmatically pushing the abdomen out on the in breath and allowing it to come back in on the out breath. Have the patient turn their head to one side and rapid mouth breathing (diaphragmatically) is to be done on command. The doctor obtains purchase on the stomach with a flat thumb contact and a supporting hand behind it. When ready, instruct the patient to begin rapid breathing. The doctor then applies footward tension on the stomach feeling for release as the patient moves their diaphragm up and down with their breathing. This procedure is performed three times with varying lines of drive. When this has been completed, the doctor then performs gentle footward traction on the hyoid bone.

Results:

Four treatments were given over a period of two weeks. Symptoms were improved after the first treatment and significantly by the second treatment. Between the second and third treatment session the patient underwent a laryngoscopy and was told that the ZD was not of sufficient size as to require surgery. The patient lives a distance away from this office, and has not returned for further treatment as his symptoms did not recur. Although four months have elapsed, none of his original symptoms have been reported even though no other treatment has been received, as related by telephone follow up.

Discussion

It would certainly be preferable for a periodic follow-up visit to be made by the patient. The patient has been informed that complications and recurrences are still possible. There are cases reported in the literature of spontaneous ulceration and bleeding of ZD[14] and the development of cervical osteomyelitis secondary to a ZD perforation[15], both life

threatening conditions. Treating chiropractors should also be aware that one patient presented with a mild intermittent left arm pain with little in the way of orthopedic or neurological findings and had an otherwise "silent" ZD[16]. Surgical iatrogenic complications during anterior cervical fusion have also been reported to accidently create a ZD[17,18].

This patient presented himself for treatment seeking an alternative to surgery which had been originally recommended to him. It was suggested that alternative chiropractic and manual therapies might be helpful. The rationale for chiropractic care was as that ZD has been described as a condition of dyscoordinated swallowing associated with increased intraluminal esophageal pressure[2-4]. From a chiropractic and physiological perspective it was hypothesized that this might be due to a combination of causes including the following: a fore-shortening of the esophagus caused by abnormal/aberrant muscular contraction in conjunction with inappropriate neurological firing of cervical nerves and Cranial Nerves V, VI, IX, X, and XII. All of these nerves are involved in the act of swallowing with the Vagus N in particular.

To address the foreshortening of the esophagus the hiatal hernia release procedure was performed. In conjunction with this, cervical stairstep procedure and steps 1, 3 and 4 of the sutural release protocol was considered to be helpful in relaxing the cervical musculature and fascia.

The other steps of DeJarnette's cranial sutural protocol were employed to help correct inappropriate firing of the cranial nerves and assist in returning normal swallowing function.

Cranial N V exits the skull through the foramen rotundum and foramen ovale. Cranial N VI exits the brain through the petrous temporal bone via the internal auditory meatus to the sylomastoid foramen. It's passage is all through the temporal bone. Cranial N IX and X exit via the jugular foramen formed by junction of temporal and occiputal bones. Cranial N XII exits via the hypoglossal canal within the occiput bone .

The Vagus N (X) was considered the most affected by the cranial sutural protocol as its goal is to mobilize the sutures. It, and Cranial N IX, are the only mentioned nerves which actually exit at a sutural confluence. However many of the maneuvers utilize the temporal bone as a lever via the mastoid contact. It was theorized that this might also affect the other cranial nerves if the temporal bone's position was adversely affecting their function. Step 5 of the sutural release would also affect the sphenoid bone through its direct connection with the maxilla, and therefore could affect the nerves exiting via foramens ovale and rotundum.

Additionally the soft tissue procedures used to relax the cervical musculature and fascia and mobilize the esophagus and trachea can affect the recurrent laryngeal nerve (a branch of the vagus nerve) as it ascends into the neck between the trachea and esophagus.

Had the patient returned for further treatment it is likely that treatment would have iinvolved specific adjustments for his occiput. These could affect the cranial nerves and the superior pharyngeal constrictor muscle as it attaches to the basilar part of the occipital bone at the pharyngeal tubercle.

Conclusion:

While there have been no studies reported utilizing conservative chiropractic methods and the treatment of ZD, it appears that such treatment in some instances may provide therapeutic benefit to those suffering from this disorder. With all case reports it is difficult to make generalizations without any controls, comparative sham procedures, or randomization utilized to address issues of placebo, ideomotor, regression to the mean, or other types of effects. Yet the chronicity of the patient's symptoms and the temporal relationship between treatment and response to care is of interest. There is hope that this study may generate greater interdisciplinary care relationships that will help patients gain an option of therapy that offers a lower risk than surgery. Research should be taken to evaluate whether a subset of patients may be better suited for this alternative method of care or whether this case was an anomaly.

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Treatment of low back pain in pregnancy with Sacro Occipital Technique (SOT): A case report.

Aimee Carroll, Charles L. Blum, DC

Introduction:

According to a 2004 study by Wang, et al [1], 68.5% of women reported low back pain during their current pregnancy. Kovacs, et al[2], found that 71.3% of pregnant Spanish women had low back pain, whereas. Lisi[3], it is noted that 57% of women with low back pain during pregnancy report the pain negatively disrupts their activities of daily living. With 6 million pregnancies in the United States every year, according to the American Pregnancy Association[4], that leaves approximately 4.1 million women per year with pregnancy associated low back pain.

Since pregnancy related low back pain is so prevalent and can interfere with activities of daily living, it is important to find ways to help these women cope with the pain, specifically by means that are minimally invasive and will not cause any harm to the mother or child. Using a chiropractic technique, such as Sacro-Occipital Technique (SOT), offers a low force way to treat the pain in these patients and appears to cause minimal risk to the mother and child. The purpose of this paper is to provide information of a potential way of caring for pregnant women with low back pain, using SOT.

Methods/Intervention:

The Assessment:

The patient, a 33-year-old Caucasian female, who was previously receiving treatment at the Palmer College of Chiropractic West (PCCW) Student Clinic since 2009, started treatment with a new intern at 15 weeks into her pregnancy (November 2011). She had chronic low back pain before becoming pregnant, which then continued and escalated during the start of the pregnancy.
Other than being pregnant, the history and physical exam revealed no significant health issues with this patient. She has had chronic low back pain since 2009, for which she was receiving high velocity low amplitude (HVLA) chiropractic manipulative therapy in the PCCW Clinic. Her chronic low back pain had initially responded well to the HVLA manipulation but not since a few months prior to her pregnancy.

No significant findings were found during the examination of this patient. All lower extremity motor and sensory findings were negative. Straight leg raise, Kemp's, and prone press up were all negative as well. The patient's active range of motion was all within normal limits. With the pain being localized to the lower lumbar and sacroiliac (SI) joints with no radiating symptoms. Pain was reproducible upon seated palpation of the areas. The patient's diagnosis was determined to be lumbar and SI segmental dysfunction with associated myofascial pain, due to the findings on the physical examination. Her pain levels were recorded and monitored throughout the treatment and

pregnancy using the Roland-Morris low back pain and disability questionnaire[5], Oswestry disability index 2.0[6,7], and the quadruple visual analog scale[8].

Category II SOT technique involves a specific diagnostic process to determine placement of the padded blocks used during treatment, this method is described in detail in the treatment section. Minimal research was found[9,10] supporting the use of this procedure for pregnant women other than a retrospective study by Shelley and Blum, which studied this treatment on 103 pregnant patients[11]. A study by Hochman[12], evaluated the clinical effects of category II blocking by assessing lumbar ranges of motion before and after blocking. He found slight but significant increases in lumbar ranges of motion after pelvic blocking specifically in lateral flexion. Other studies have found a relationship between category two block procedures and increased muscle strength in the cervical[13] spine and upper extremity[14].

Treatment/Intervention:

The patient was treated with SOT Category II procedures[15]. This specific category was designed for patients with an "unstable pelvis", meaning either sprain or laxity to the ligaments supporting the sacroiliac joint. The pregnant pelvis is considered unstable due to loosening of the pelvic ligaments during pregnancy. The hormone relaxin is considered responsible for pregnancy related laxity of the pelvic ligaments, though according to Aldabe, et al[16], relaxin levels do not directly correlate with the amount of pregnancy related pelvic pain.

Treatment was not administered at a regular interval due to holiday schedules, as well as the patient's school schedule. Treatment started with seated palpation of the patient's spine to find fixations in the thoracic spine. The patient was then asked to lay supine on the table. The first step was checking piriformis muscle restriction by taking hold of both of her feet and ankles and internally rotating them, which ever foot did not internally rotate as far, that was the side of tightness. The process of releasing the restricted side was to stand on the side of the table opposite of the leg/thigh with reduced internal, and contact posterior to the greater trochanter on the tight side and have the patient start with her leg in an internally rotated position and slowly externally rotate her entire leg while applying force to the posterior aspect of the greater trochanter, this was done 4-5 times or until upon repeating the internal rotation both legs moved symmetrically.

The iliopsoas muscle check was performed next by standing at the head of the table, with both forearms/wrists of the patient are grasped and using the doctor's body weight to apply a cephalic force or pull on the arms evaluating superiorward movement of the rib cage. Simultaneously the patient extends their fingers out, and the doctor notes whatever side the fingers are shorter which relates to the side of the restricted iliopsoas muscle. To release that tight muscle, stand on the opposite side of the table of the tight side, facing the head of the patient and have her bend her knee on the tight side. Stabilize the ilium against the sacrum under the bent knee with the caudal hand, and with the cephalic hand contacts the iliopsoas muscle and massage the area to release the tight muscle

(approximately 30-40 seconds). Re-check the arms after releasing the muscle, and they should be even.

With myofascial influences affecting the greater and lesser trochanters then the next step was to check her leg length to assess pelvic torsion[17,18] and make note of the short leg side, in this patient, her right leg was primarily the short one. Leg length determines the placement of the blocks under the pelvis during treatment.

Following leg length determination check medial knee or lateral knee, and superior/inferior inguinal ligament for sensitivity making note of what areas had tenderness. The patient did not always have inguinal ligament tenderness, but medial knee tenderness (pes anserinus) was present throughout the treatment sometimes only one knee, other times bilaterally.

The next step is to block the patient. On the short leg side, the block was put in perpendicular to the patient splitting the iliac crest in half. On the side of the long leg, the block was put in at a 45-degree angle cephalically starting at the greater trochanter. After the patient was on the blocks the patient is reassessed for medial knee and/or inguinal ligament tenderness. When the tenderness goes away that is the time to take the patient off the blocks, which takes approximately 3-4 minutes. After removing the blocks an ice pack is placed under the sacroiliac joints for 5-10 minutes, followed by adjustments to any thoracic fixations using a supine thoracic adjustment, and any cervical spine fixations found using diversified chiropractic manipulation.

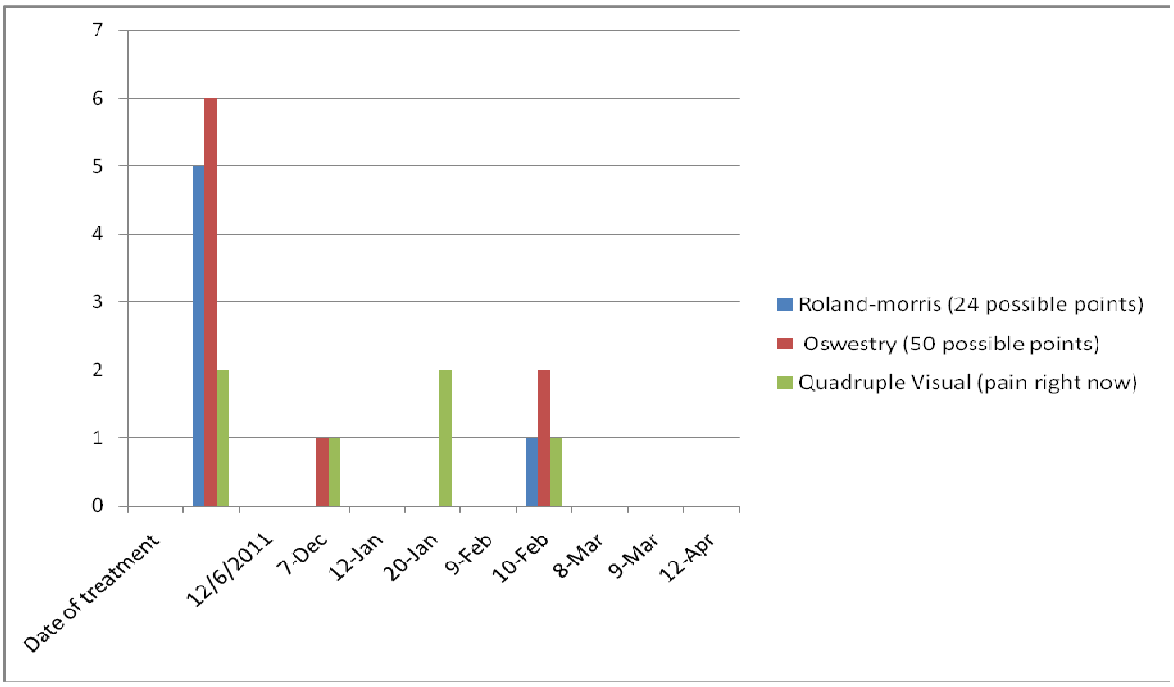


Table 1. Graphic representation of patient's response to care utilizing outcome assessment measures (*note- areas where there is no graph are where the patient scored a 0 on the test).

Results:

A Roland-Morris, Oswestry, and Quadruple visual analog scale assessment forms were filled out before the start of the SOT treatment to get a baseline. Scores were taken again pre-treatment and 24-48 hours post treatment; this was done periodically at random intervals before and after treatment. With another scoring post partum, at the completion of all SOT treatment [See tables 1 and 2].

Date of Treatment	**12/6/2011**	**7-Dec**	**12-Jan**	**20-Jan**	**9-Feb**
Roland-Morris (24 possible points)	5			0	
Oswestry (50 possible points)	6	0	1	0	0
Quadruple visual (pain "right now")	2	0	1	0	2
Date of Treatment	**10-Feb**	**8-Mar**	**9-Mar**	**12-Apr**	**26-Apr**
Roland-Morris (24 possible points)		1	0	0	0
Oswestry (50 possible points)	0	2	0	0	0
Quadruple visual (pain "right now")	0	1	0	0	0

Table 2. Numerical representation of patient's response to care utilizing outcome assessment measures.

Pre-SOT treatment baseline (December 6, 2011): Roland-Morris disability index -5/24, Oswestry disability index- 6/50, Quadruple visual analogue scale- Pain right now-2/10, Pain on average-2/10, Pain at best- 0/10, 80% of waking hours pain is at best, Pain at worst- 6/10, 1% of waking hours pain is at worst. Towards the end of the treatment on 4/12/12 one week prior to delivery of the baby, 24 hours after treatment her Roland-Morris was 0/24, Oswestry was 0/50, and Visual analogue scale were all rated 0/10 for pain levels. Two weeks later was the final treatment for the patient, after the delivery of the baby, the patient's scores were still all rated 0, with the patient reporting feeling as if she "recovered faster" than after her first pregnancy and was able to be more active.

Discussion:

A retrospective study evaluating chiropractic spinal manipulation for low back pain of pregnancy found that chiropractic treatment was predominately safe[3] and Miller concluded that "(1) Musculoskeletal pain, especially back pain, is a significant cause of morbidity in pregnant patients, (2) Manipulation is effective, in some types of back pain related to pregnancy, (3) There is not a single documented case of negative side-effects from chiropractic manipulative therapy during pregnancy, and (4) Chiropractic manipulative therapy is a safe and often effective approach to reduce the discomfort of back pain in pregnancy.[19]" Therefore it is reasonable on face validity that chiropractic care, specifically SOT using padded blocks to treat the patient would provide minimal risk to the mother or child, since there is no thrusting or HVLA manipulation performed to the pelvis, and the patient is lying in a supine position at all times.

The patient's disability index scores always decreased post treatment. Towards the end of the pregnancy and treatment she was scoring all 0's on all outcome measures. Her overall disability index scores decreased after every treatment, and gradually decreased over the course of the treatment.

Category II pelvic blocking is theorized to approximate the sacrum to the illia[5] thus helping to stabilize an unstable pelvis, and correcting any misalignment in the pelvis, which can also help to reduce pain. SOT category II treatment appeared to relieve the low back pain of this patient based on her outcome assessment findings. In the study by Shelley and Blum[11] outcomes of pregnant patient treated by category II blocking were associated "with reduction or elimination of pelvic or inguinal pain, improvement of muscle strength and ability to rise from seated position as well as lift or carry objects, and improved sleeping and restfulness.[11]"

Since this patient had chronic low back pain before pregnancy, better baseline, and documentation of her pain levels prior to her pregnancy and how she responded to treatment would have been helpful. Also, re-measuring the disability index scores not only 24 hours, but 48, 72 hours post treatment might offer greater information regarding how long the effects of the treatment actually lasted. The patient's pain levels were only measured until one-week post partum, so it is hard to discern long term results from the treatment.

This study was performed on a woman, who had chronic low back pain prior to her pregnancy, which continued while she was pregnant. For some women, low back pain only comes on with the onset of pregnancy and worsens into the last trimester[1]. In our case, the patient had decreased pain during her pregnancy and while chronic her low back pain was uncomplicated with minimal physical examination findings.

Conclusion:

The purpose of this paper was to provide information of a potential way of treating pregnant women with low back pain, using SOT. With case studies generalizing to patients at large is difficult because of the lack of a control or sham comparative procedure, which allows for confounders such as the placebo or ideomotor effect as well as regression to the mean. Still the patient's positive response over the length of care during her pregnancy, having had a history of chronic low back pain prior and during pregnancy, suggest that further study is warranted.

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Parkinson's Disease and Soft Tissue Orthopedics (STO): A Case Report.
Kenneth Y. Davis, DC

Introduction:

This case report focuses on a patient with Parkinson's disease (PD) with a relationship to genetic mutation involving the methylenetetrahydrofolate reductase (MTHFR) gene mutation along with acute traumatic stress resulting from unforeseen surgical procedures. The patient's symptom picture and objective findings became significant after a surgical resection of the ascending colon caused by a resection due to perforation from a routine colonoscopy.

Parkinson's disease (PD) is the second most common neurodegenerative disorder after Alzheimer's disease representing approximately 0.3% of the whole population in industrialized countries. PD is more common in the elderly. The prevalence rises from 1% in those over 60 years of age to 4% of the population over 80[1]. The mean age of onset is around 60 years, although 5–10% of cases, classified as young onset, begin between the ages of 20 and 50[2]. The incidence of PD is between 8 and 18 per 100,000 person–years[1]. The disease is attributed to selective loss of neurons in the substantia nigra. Its cause is enigmatic in most individuals. Symptoms of PD respond in varying degrees to drugs. Surgery may offer hope for patients no longer adequately controlled in this manner[2]. Currently studies using stem cells to treat PD are under way, but the prognosis depends on the patient's age and symptoms[3].

Symptoms of PD include muscle rigidity, tremors, and changes in speech and gait. While the etiology of PD remains mostly unknown[3] , both genetic susceptibility and environmental factors are sometimes considered to be putative contributors to its origin. Recent epidemiologic studies have focused on the possible role of environmental risk factors present during adult life or aging, since pure genetic forms of PD are rare. Several possible risk factors may be implicated related to life style, past history, family history, occupational history and exposures to potential neurotoxic agents[4]. A 2012 Swedish study stated that a "33% overall excess risk of PD was noted among patients with an autoimmune disorder; the risk was increased during the first 10 years of follow-up after hospitalization of autoimmune disorders[5]."

"Depression is a common finding with approximately 35% of patients with Parkinson disease (PD) and is often persistent. The underlying mechanisms of depression in PD are not known in detail, but changes in brain structure, signaling by neurotransmitters, and changing levels of inflammatory and neurotrophic factors are all suggested to contribute to its development[6]." Along with depression, dementia has also been found associated with PD. A German study on the epidemiology of PD with dementia (GEPAD) [n=1449] found 28.6% met DSM-IV criteria for dementia. 33.6% met criteria for depression and 61% additionally had other clinically significant psychopathological syndromes[7]."

The methylenetetrahydrofolate reductase (MTHFR) gene encodes an enzyme that plays an important role in processing amino acids, specifically the conversion of homocysteine

to methionine. Mutations in the MTHFR gene lead to impaired function, or inactivation, of methylenetetrahydrofolate reductase[8]. Approximately 40% of Americans are carriers of MTHFR deficiency, while 10% have the active condition. Since mutations in the MTHFR gene can lead to increased homocysteine levels, this condition has been found associated with various cardiovascular related conditions[9,10].

Aside from cardiovascular related conditions, elevated homocysteine levels have also been found related to inflammatory bowel disease[11] and elderly related dementia[12]. Is there any possible relationship between MTHFR and PD? Fong et al found that the "influence of folate/homocysteine conversion is considered to be important in the pathogenesis of PD." The findings from their study "provide support for the synergistic effects of polymorphisms in the folate metabolic pathway genes in PD susceptibility; the increased PD risk would be more significant in carriers with the polymorphisms of MTHFR, MTR (methionine synthase), and MTRR (methionine synthase reductase) genes[13]." In another study they also discussed how increased homocysteine levels might accelerate dopaminergic cell death in Parkinson's disease (PD) through neurotoxic effects[14].

Bowel perforation injuries during a colonoscopy result in a hole in the bowel. "Perforation has been estimated to occur in approximately 0.2% of diagnostic colonoscopies and 0.6% of colonoscopies where biopsy is also performed[15], but may in fact occur less frequently[16]. In 50–60% of cases, perforation occurs at the rectosigmoid region of the large bowel, with an additional 10–20% perforation rate at the cecum[17,18]." Advanced age, female sex, the presence of multiple co-morbidities, diverticulosis, and bowel obstruction have been shown to increase the risk of perforation[19].

A retrospective study [n=30,366] by Lüning found that of the colonoscopies performed, "35 colonic perforations occurred (0.12%). All the patients underwent a laparotomy: for primary repair in 18 cases (56%), for resection with anastomosis in 8 cases (25%), and for resection without anastomosis in 6 cases (19%). The postoperative course was uncomplicated in 21 cases (60%) and complicated in 14 cases (40%), including mortality for 3 patients (8.6% resulting from perforations and 0.01% resulting from total endoscopic colon procedures)[20]."

As the human genome is being explored and evaluated in relation to human health and disease, the MTHFR gene has been shown to be an indicator for inflammatory conditions relating to cardiovascular health as well as neurological conditions as related to PD. The inability of folic acid to be converted to methyl folate results in decreased levels of dopamine, serotonin, glutathione, and tetrahydrobioterine, which are critical to nerve production, protection and adequate balance of brain neurotransmitters.

Alternative therapies involving nutritional therapy and chiropractic related soft tissue procedures have not been investigated adequately for treatment of the PD patient. Most studies tend to focus on surgical intervention and drug therapy. The methodologies offered in this paper may offer hope for PD patients suffering from this debilitating and degenerative disease.

The premise for this hope is that utilizing a holistic model may offer an alternative low risk intervention. Soft Tissue Orthopedics (STO) provides a holistic model utilized with this patient called the Triune of Health: a balance of body, mind, and spirit. This model does not attempt to generalize PD patients but presupposes that no two patients, although exhibiting the same condition, illness or symptoms, would have the same underlying cause. This was particularly evident with this patient.

Case Report: The Assessment:

The patient is a 75 year old, petite, vivacious woman, widow, grandmother who is extremely sensitive, compassionate, fun loving, young in her being, open to explore health on all levels, compliant, well put together, and self-sufficient. She is a recovering alcoholic with a history of breast cancer (surgery-right breast), cataract surgery, colon resection, angina, and had a recent diagnosis of PD in 2012.

The patient was an ongoing patient and returned for care in May of 2012 after surgical resection for a perforation of the colon. Examination findings revealed a patient who had deteriorated significantly from her last office visit in March of 2012. Her neurological and orthopedic assessments revealed significant disturbances in her balance, co-ordination, and gait. Involuntary tremor was noticed in her left leg and ankle. She was extremely weak, with muscle weakness of the lower extremities, inflexibility and rigidity of limbs and joints, and exhibiting short-term memory loss.

The patient was referred for an allopathic neurological assessment in case co-treatment became indicated. The neurologist confirmed the diagnosis of PD (May, 2012). Blood chemistry profiles were performed focusing on the gene's mutation as relating to the MTHFR. This was performed because as the human genome is explored, it is becoming more important to have knowledge of a patient's genetics, mutations and their determinant role in health and disease.

Treatment/Intervention:

Utilizing sacro occipital technique (SOT) analysis, as developed by M. B. DeJarnette[21], she was determined to have a category one presentation[22]. A category one is multifactorial with a focus on fixation of the anterior sacroiliac joint secondary to pelvic torsion associated with altered sacral nutation affecting CSF circulation from the lumbosacral cistern cranialward. Soft Tissue Orthopedics as developed by M. L. Rees utilizes various diagnostic and reflex testing that includes temporal sphenoidal (TS) diagnosis[23] (see Figures 1 & 2), extremity and cranial-dural-sacral assessment, nutritional therapy, proprioceptor disruption reflex points, as well as orthopedic and neurological tests. Spinal level dural port subluxation and reactive trapezius analysis were also performed as part of the assessment and examination.

TS diagnosis discovered by DeJarnette and then further developed by Rees utilizes points found sensitive to palpation around the perimeter of the temporal and sphenoid bones to assess and treat specific regions of the spinal column, soft tissue, and related viscera. While the patient's predominate category presentation related to a cranial-dural-sacral category one, features of categories two and three were identified as well as extremity kinematic chain influences.

Adjunctive nutritional therapy was guided by the TS findings as well as laboratory analysis related to the MTHFR gene mutation. Proprioceptor analysis (e.g., Anterior Iliac Wing Proprioceptors - see Figure 3) is an aspect of STO that utilizes specific reflex patterns and symptom presentations to localize predominant regions of proprioceptive imbalance in the body for treatment. Orthopedic and neurological testing involves commonly used orthopedic and neurological tests to help corroborate the STO analysis and the patient's response to treatment.

Dural port subluxations related to SOT's occipital line two fibers and used in chiropractic manipulative reflex technique (CMRT)[25-27], were analyzed utilizing the TS line assessment and STO treatment protocols. The trapezius fiber analysis was an assessment tool developed by DeJarnette in the 1960s[28] and later expanded in the 1970s to involve what he termed the reactive trapezius[29]. The trapezius fibers are located on the prone patient at the superior aspect of the trapezius muscle which is divided into seven nodules between the acromioclavicular notch and lateral aspect of T1[30] (see Figure 3). When a trapezius fiber reacts to pressure by mounding, this indicates a possible pathological relationship between a vertebra and organ in its reflex arc (see figure 4). DeJarnette highly recommended a localized radiograph of the vertebral region to rule out any pathology if this reactive trapezius reflex arc was found.

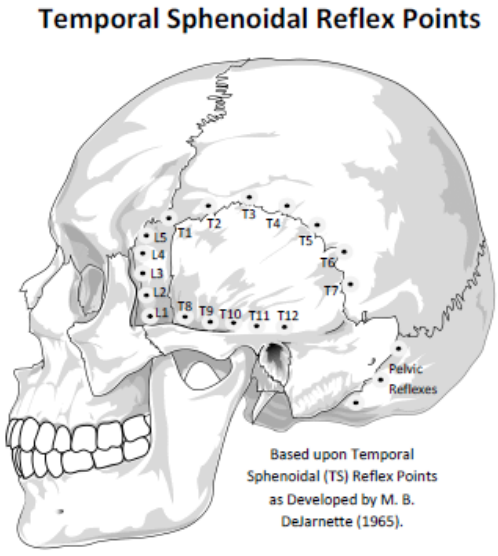


Figure 1

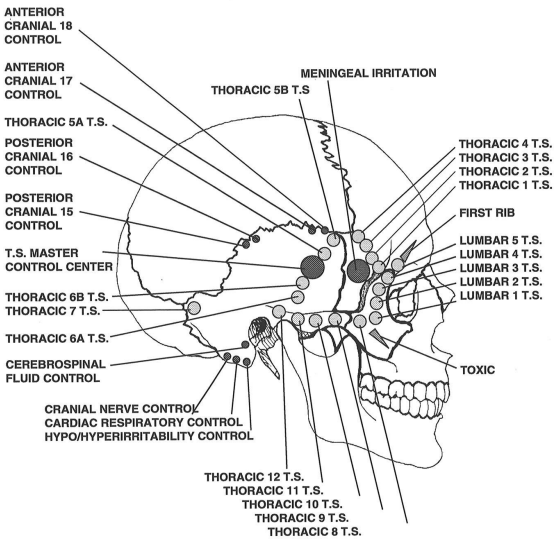


Figure 2

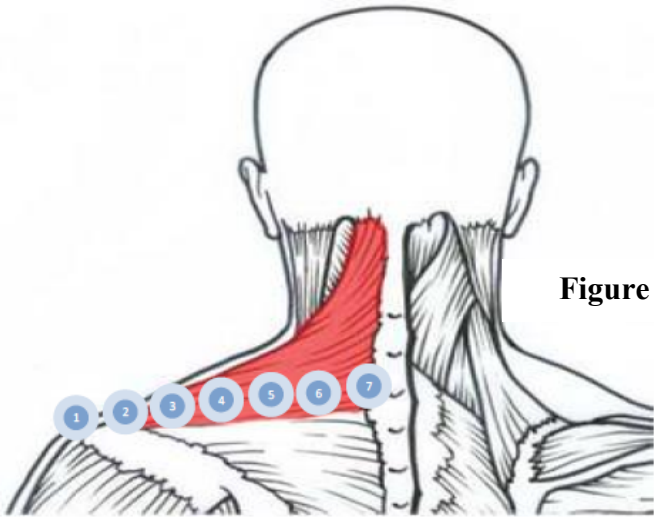


Figure 3

Reactive Trapezius Fibers and Pressure Utilized – Figure 4							
Trapezius	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Thoracic	T1, T2, T10	T3, T11, T12	T4, T5	T6	T7	T8	T9
Lumbar			L1	L2	L3	L4	L5
Pounds of Pressure	4.0 lbs	3.5 lbs	3.0 lbs	2.5 lbs	2.0 lbs	1.5 lbs	1.0 lbs

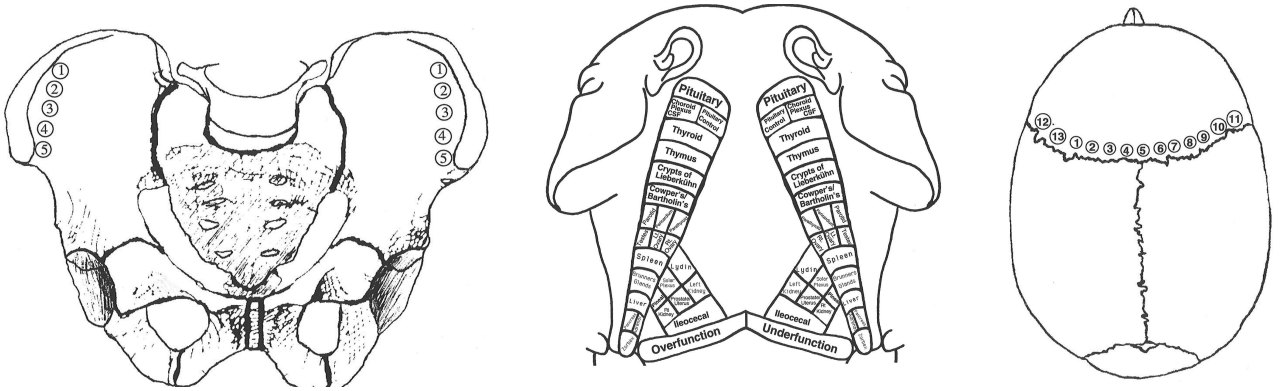
The results of the patient's examination found a category one, left occipital compression syndrome, reactive trapezius fiber 6 relating to lumbar 4 (colon syndrome) and specific STO proprioceptor reflex points[31] (coronal neuronal pool number 5, left anterior iliac wing number 4, and right sternocleidomastoid proprioceptor 2 – see figures 5,6,7). Gait testing showed extreme weakness upon left to right. Spider lace adhesions relate to findings during palpation of the bi-lateral mesenteric apron and colon (see next page for treatment protocol). These adhesions were considered positive because they were sensitive to touch, there was restriction of the fascia surrounding the viscera, and STO related reflexes (vascular tree) were also sensitive to palpation.

Treatment incorporated TS diagnosis, visceral manipulation, and nutritional therapy. A method of assessing acute and chronic neurological conditions developed by Davis[32] was used clinically and is entitled the "Glands of Self Destruct (GSD)." These GSD are reflex points areas on the body that purportedly become sensitive when there is acute or chronic neurological stressors in the region of the GSD reflex. To date 20 GSD areas have been found by Davis on the body and this patient had marked sensitivity at the lateral border of the right costal margins between rib 3-9 (GSD reflex #1 – Dorland Gland)[32].

Results:

In January 2013, the patient was re-evaluated by her third neurologist who found a ninety-five per cent improvement in her condition. He stated, "You baffle me, I do not see the signs and symptoms that you presented with…." Her response to care is profound because the two previous neurologists told her, "You may want to consider it important to get your life in order since you don't have much time left." As of her last treatment on January 22, 2013 she was found to be strong, stable, with significant balance and stability. Only a slight tremor in her left ankle was noticeable.

STO Proprioceptive Reflex Points



Anterior Iliac Wing Pools | Sternocleidomastoid Pools | Coronal Neuronal Pools

Figure 5

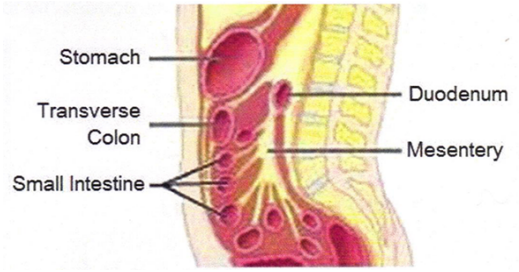
It was recommended that she consider lifetime nutritional support for the MTHFR gene mutation, since it is theorized this would help prevent a reoccurrence of her symptomatology. Continued assessment and focus on treatment protocols appears to be important along with adjunctive procedures in treating the patient and emphasizing their particular presentation and not the disease or condition.

The Triune of Health as discussed by Rees and utilized in STO incorporates a holistic mindset which incorporate various physical neuromusculoskeletal distortions and their effect on the interrelationship of the physical, biochemical, structural, mental/emotional and spiritual aspects of a patient[33,34]. The physician/doctor role provides an opportunity to guide and help patients take responsibility for their health and well being. Patient directed care involves physicians being teachers by instructing the patient how they can help make quality choices in their life style habits, rest, relaxation, and other stressors that can greatly alter their ability to maintain health and wellbeing.

Messenteric Apron Technique

1





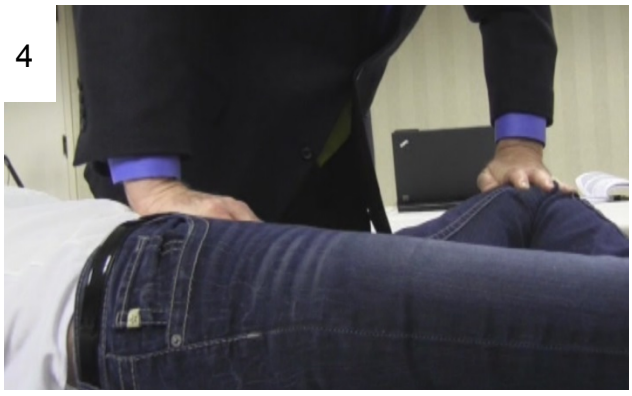
2



3



4



1. Palpate for tender areas on the medial lower legs (circulatory tree) between the knee and the ankle. Tender areas indicate a lack of blood supply (ischemia) in the mesenteric apron.

2. Press into the soft tissue as shown below. While holding the tissue with one hand, bring the patients knee up with the other.

3, Continue to hold the tissue while stretching the leg out to the side as shown. (Ask the patient to give you a little bit of resistance while still allowing you to move the leg out.)

4. Stretch the leg all the way out.

From: Davis K. Using Temporal Sphenoidal Diagnosis/Bloodless Surgery for Rapid Assessment and Correction of Vital Organ Dysfunction and Related Spinal-Level Subluxations. Three Days with a Master Consolidated Reference Guide. 2012:277-278.

Discussion:

An informative brief overview of essential and PD tremors and their possible responsiveness to chiropractic was discussed by Daniels[35]. Even though there have been a series of case studies or retrospective studies discussing a role of chiropractic in the treatment of PD[36-42] the level of evidence is relatively low. Controlled studies should be performed to gain a greater understanding of chiropractic's role in the treatment of patients with PD. While it is unlikely that chiropractic may reverse substantia nigra neuronal damage, the treatment can help improve flexibility, balance, and strength.

Ultimately, the role of long term chiropractic care may be to provide early diagnosis, appropriate referral, and provide palliative care to improve the PD patient's quality of life and increase their activities of daily living[35,43]. One aspect of this care could be utilizing nutritional consultation and to facilitate any concomitant affects to a PD patient's presentation secondary to MTHFR gene mutation with vitamin supplementation such as an assimilable form of folic acid (methylfolate - sublingual) or adequate vitamin B to improve PD symptomatology[44].

While various health practitioners determined the patient's diagnosis of PD, it was notable that after six months of care the patient was able to walk into the office without aid, whereas on her initial visit she had an unsteady gait, significant balance disturbances and a lack of co-ordination. As a noteworthy sidebar, the patient stated that she had recently "danced the night away at a wedding."

It is possible that the patient presented with a "pseudo" PD presentation, which was able to confuse various neurologists who specialize in these conditions. It may be that she had a form of PD whose threshold for presentation was lowered by the MTHFR gene mutation and exacerbated by increased stress due to the perforated colon. Once these stressors were reduced or eliminated, her PD presentation likewise was allowed to go into remission.

Conclusion:

This case discusses a patient who appeared to present with PD, had concomitant MTHFR gene mutation, and a history of a perforated colon. The care was multifactorial involving holistic analysis and treatment (Triune of Health). Various STO assessments and treatments as developed by Rees were used. As this is only a case report without the ability to offer a control group or comparative procedures, it is difficult to generalize the findings to the population at large. However this may offer a window into the treatment of PD patients who have MTHFR gene mutation and similar presentations. Further research is indicated into the role of SOT, STO, and nutritional modification in the treatment of PD.

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The effects of diversified chiropractic manipulation versus sacro occipital technique (SOT) in chiropractic management of sacroiliac syndrome.

Charmaine Lynn Dell, M.Tech Chiropractic (SA), Barrett Losco, M.Tech Chiropractic (SA), Christine Dominique Losco M.Tech Chiropractic (SA)

Introduction/Background:

The purpose of this pilot comparative study was to assess the effects of diversified manipulation (DM) versus sacro occipital technique (SOT) in the management and treatment of sacroiliac syndrome (SS). Since there are not many comparative studies in chiropractic regarding its techniques, SOT included[1,2], a randomized non-controlled study was performed with IRB approval granted through the University of Johannesburg.

Methods:

Patients were recruited by means of numerous advertisements in local newspapers and posters placed throughout the University of Johannesburg, Doornfontein Campus. Both male and female patients between 18-55 years of age with mechanical low-back pain or localized pain/tenderness over the PSIS with possible lower extremity referred pain. Orthopedic tests evaluated sacroiliac joint movement restriction, positive Straight-leg raise, Patrick Fabere test, Gaenslen's test, Ericsen's tests, and sacral compression test.

Potential candidates were examined and accepted based on the inclusion and exclusion criteria. This study consisted of two groups; a DM group and a SOT group each consisting of 15 subjects (18-55 years) with SS. Each successful candidate was treated six-times over a two-week period.

The objective measurement consisted of inclinometer range of motion readings[3] of the thoraco-lumbar and lumbo-sacral regions of the spine in all directions. DM group received Thigh-Ilio Deltoid manipulation[4] whereas the SOT group received category two blocking (supine pelvic blocking reducing pelvic torsion) [5]. The objective data collected over the six-treatment sessions was statistically analyzed to ascertain any differences in improvement between the two groups. Before the commencement of the treatment one, three and six, the candidate completed the Oswestry Back Pain and Disability Index questionnaire (OBPDIQ) [6] and the Numerical Pain Rating Scale (NPRS) [7].

Results:

Digital inclinometer findings noted statistically significant improved lumbosacral ranges of motion in both groups, with particular increases in flexion/lateral-flexion in the SOT group and increases in extension/rotation in the DM group. Subjective outcome assessments showed statistically significant improvements with regards to OBPDIQ and NPRS for both groups.

Discussion:

Of importance is that apparently both the DM and SOT group both showed improved objective and subjective assessment changes following the 6-treatments in the 2-week period of time. In another study [n=5] that assessed lumbar range of motion utilizing SOT category two block placement, they noted increased lumbar ranges of motion but not in extension[8]. This suggests the findings of increased lumbar range of motion may not be isolated to this pilot study alone.

Conclusion:

The results of the study indicate that both SOT and DM had a positive effect on patients suffering from SS, with SOT care appearing to have a greater overall benefit. It should be emphasized that the present study was a pilot study to determine the effects of DM versus SOT in the management of SS. Since both techniques appeared to have a positive effect, the SOT care could be appropriate for a patient and/or doctor if a preference is indicated for a low-force intervention. Further research into comparative studies of chiropractic technique is indicated ideally with a larger sample and a control group.

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The validity and specificity of the arm fossa test.

Andrew C. Evans, MTECH-Chiro (RSA), Chris Yelverton, MTECH-Chiro (RSA)

Introduction:

Sacroiliac joint dysfunction (SJD) is a common problem in the general population and diagnosis is primarily made with the use of manual orthopedic tests[1,2]. Whether clusters of these tests can be used to accurately diagnose SJD is being studied[3]. This study is designed to assess the validity and specificity of the Arm Fossa Test (AFT), which is part of the Sacro Occipital Technique (SOT) evaluation protocols[4]. This may contribute to the research related to diagnostic tests that assess the specific joint dysfunction related to SJD. An ethics committee at Technikon Witwatersrand (TWR) (now Johannesburg University) approved the study in January 2005.

Methods:

To perform the AFT, the examiner tests the responsiveness of the latissimus dorsi muscle on the supine patient, as the examiner successively makes light contact with the upper and lower portions of the left and right inguinal ligaments. The finding of a delayed or slow responding latissimus dorsi muscle is thought to be consistent with sacroiliac hypermobility; whereas a strong muscle points toward either a normal sacroiliac joint or one with sacroiliac hypomobility.

Eighty subjects were selected for the study, 35 females and 45 males. They were sourced from the TWR health clinic. Prior to testing subjects a case history was taken, and they underwent a full sacroiliac regional examination using generally accepted diagnostic techniques. The subjects were then taken to a different room where an assessor tested for SJD using the AFT. This was done by two different assessors, each without knowledge of the other's results and was therefore double blinded.

Results:

Of the 160 sacroiliac joints (right and left side for each of the 80 subjects) evaluated, the AFT correctly evaluated 166 (28 true positives and 88 true negatives). This gives a percentage correlation of 72.5%. The AFT incorrectly evaluated 44 (40 false positive and 4 false negatives) as shown by the misclassification rate of 27.5%. The Kappa Coefficient, indicated as 0.40, is bordering on a moderate strength of agreement.

Discussion:

Since the AFT's main purpose is to assess the presence of a specific type of SJD hypermobility, it is possible that it is not as sensitive for assessing SJD associated with

hypomobility. Yet in several separate studies of various SOT examination procedures including the AFT test, Leboeuf-Yde reported the following for the AFT:

- intraexaminer reliability: high in one study[5] and low in another[6]

- interexaminer reliability: low[6]

- validity: some value in correctly distinguishing a correctly treated from an incorrectly treated group of participants[7]

- validity: in relationship to lumbopelvic pain: sensitivity=54%, specificity=69%[8]

- validity: no relation between side of involved fossa and side of sacroiliac fixation[7].

Conclusion:

The AFT clearly has some validity but should not be used on its own as a tool for the diagnosis of SJD but rather as part of a comprehensive diagnostic evaluation of the joint. Further research is needed to determine whether the AFT is better suited for evaluating the subset of patients with SJD that is related to hypermobility or SJD associated with hypomobility.

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SOT blocking for back pain: Integrating chiropractic and acupuncture: A case report.

Alanna Flanagan, Charles L. Blum, DC

Introduction:

If there is one truth about the history of medicine, beyond the universal truth of death, it is that there has been and will be pain; and with that pain comes a desire to be free of that pain. In whatever form it takes, a great deal of medicine schemes to find ways of preventing or avoiding pain. Back pain can be particularly confounding and for all of the advances that have been made in allopathic medicine, back pain relief remains elusive. To that end, back pain relief challenges many complimentary medicine modalities as well. And although it is stated that up to 90% of back pain will subside on its own within two months regardless of the type of treatment or even the absence of treatment, a quest to help patients suffering from back pain continues[1].

Low back pain is an extremely common problem that most people experience at some point in their life. One study found "1-year incidence of a first-ever episode of low back pain range between 6.3% and 15.4%, while estimates of the 1-year incidence of any episode of low back pain range between 1.5% and 36% [2]. " It is estimated that 15% to 20% of adults have back pain during a single year and 50% to 80% experience at least one episode of back pain during a lifetime [3].

Generally "the incidence of low back pain is highest in the third decade, and overall prevalence increases with age until the 60-65 year age group and then gradually declines [4]." Another study noted that low back pain had "the highest prevalence among female individuals and those aged 40-80 years [2]." After the resolution of an episode of acute low back pain, about 25% of subjects will have a recurrence in the next year [5].

"Individuals with low back pain often experience a more physically heavy workload at work and lower physical activity during leisure time, and they are also more likely to be smokers, have had higher body mass index, live in smaller communities, and are less educated than people without low back pain [6]."

Spinal pain is associated with significant economic, societal, and health impact. Estimates and patterns of productivity losses and direct health care expenditures among individuals with back and neck pain in the United States continue to escalate. Comorbidities including psychological and physical conditions and numerous other risk factors are common in spinal pain [7]. Other commonly reported risk factors associated with low back pain include low educational status, stress, anxiety, depression, job dissatisfaction, low levels of social support in the workplace and whole-body vibration. "Low back pain has an enormous impact on individuals, families, communities, governments and businesses throughout the world [4]."

As allied alternative medical healthcare works towards helping patients with low back pain to offer safe conservative care, acupuncture can be utilized to help improve patient care and outcomes. This case report discusses a 41-year-old male presenting with recurrent acute low back pain that was treated with analgesics, acupuncture, and a novel form of chiropractic, sacro occipital technique (SOT) pelvic blocking. SOT pelvic block placement for acute low back pain [8-11] has a method of care that incorporates wedges or blocks. Integrating SOT blocking and acupuncture may be a helpful low risk alternative for patients presenting with acute low back pain.

Case Report:

41-year-old male had been athletic playing various sports until the prior three years. While good muscle tone was noted in his legs, his core strength appeared to be weakened. He has reported low back pain since age 19 from varsity volleyball and his low back "goes out" approximately once a year since age 29 when he has a significant anterior antalgic lean, difficulty walking and cannot work until the pain resolves and mobility returns.

Several injuries in high school where he played baseball, soccer and volleyball. Exploratory right knee surgery at age 12 found that the anterior cruciate ligament was shredded on the lateral aspect. He had a dislocation of his right shoulder at age 15 as well as a right bicep tendonitis at age 16. His chronic recurrent acute low back pain developed at age 19 while in college playing varsity volleyball. At age 30, he found that incorporating qi gong and acupuncture into his treatment regimen helped him to recover from low back pain. In his mid-30s he found that SOT blocking and muscle relaxants improved the speed of his recovery to full activities of daily living.

Treatment/Intervention:

During his acute flare-ups, the patient incorporates Robaxin 500mg, acupuncture, and SOT blocking to help reduce pain and improve function. The Robaxin is taken orally every 4 hours during first 30 hours, when awake. Cryotherapy applied every hour for 20 minutes up to 5 times in 24 hours. Acupuncture is utilized within 12 hours of incident to facilitate with pain relief. SOT blocking followed by ice for 20 minutes 48 hours after incident also has been found to help him restore mobility. Following the initial 12 hours acupuncture is performed once a day for two more days to further relieve any lingering pain as well as facilitating a relaxed mindset and muscular response to the initial trauma.

Acupucture Care: The differential diagnosis for the Traditional Chinese Medicine (TCM) points is blood and qi stagnation in the du channel. The point selection is from those below. The combination can be based on the level of acute pain with fewer local points (more distal) until the pain subsides and then more local. Needling protocol is as directed by Deadman et al, A Manual of Acupuncture, at each point [12].

With this patient the treatment is approximately 28 minutes long once the final needle is inserted. The order of insertion is bottom to top with the local points inserted last. The electric stimulation lasts 15 minutes only. Removal is in the reverse order. The following treatment points have been grouped by function.

Day 1:
Points: UB 40-command point of the lower back to direct the treatment towards the back (both)
GB 34: command point for the tendons to release the muscle (left)
SI 3: confluent of the DU to open the spine (both)
GB 41: Confluent Dai Mai to direct the treatment towards the back (left)
UB 11: command point for the bones (both)
UB 52: Local and KD spirit 15 HZ to release any spasm (right)
UB 28: Local and UB shu 15 HZ from UB 52 to release any spasm (right)
UB 62: Yang Qiao Crossing (right)
UB 59: Yang Qiao Xi for acute pain (right)
UB 63: Xi Cleft for acute pain (left)
ST 36: harmonize the treatment
SP 10: move blood (right)
UB 17: move blood (both)
LV 3: move qi (left)
LI 4: move qi (right)

Day 2 and 3, these points were added.
Du 2: local
Du 3: local
GB 30: local (both)
UB 32: local (both)
UB 56: Sinew support

Chiropractic Care: Initially the psoas muscles are assessed and if in a state of guarding or restriction they are released using soft tissue manipulative methods. Category three SOT pelvic blocking involves placing pelvic blocks or wedges under the pelvis based on reducing pelvic torsion and decreasing stress at the lumbosacral disc and vertebral joints [8-11]. The blocks positions are modified following reducing pelvic torsion and then later angulated based on finding positional preferences that reduce or eliminate the low back pain or related radiculitis. This treatment can last 15-30 minutes and following acupuncture with electric stimulation post blocking is used to reduce pain, and expedite muscle recovery.

Results:

From the patient's response among muscle relaxants, acupuncture and SOT, it appeared that SOT blocking was most effective in diminishing the length of time he experienced

pain and also shortened his recovery. Outcome measures to the treatment rendered focused on the patient's report of pain reduction along with his improved function, and ability to return to his usual activities of daily living.

While both acupuncture and SOT blocking are seen to have very low risk the use of muscle relaxants and pharmaceutical interventions can be fraught with side effects and possible risks. Aside from specific risks and adverse reactions to muscle relaxants one common anticipated side effect is sedation. Sedation has an effect on society economics because it limits a patient's ability to function, in the home, with self care, at work, and particularly precludes activities such as driving a car.

The patient in this study indicated that his acute low back pain flare-ups are unpredictable and occur without any particular frequency therefore the medication, acupuncture and SOT blocking do help in the short-term. In the long-term it is possible that ongoing acupuncture, chiropractic SOT care, and rehabilitative exercises might facilitate greater stability with reduced flare-ups and improved biomechanical function.

Discussion:

Interdisciplinary care of acute low back pain can be an important option for patients seeking alternatives to traditional allopathic care, which involves medications, injections, and surgery. This case describes the use of muscle relaxants, acupuncture, and chiropractic SOT block placement for the treatment of acute low back pain.

While this patient used muscle relaxants, muscle relaxants are arguably no more than a misnomer of the pharmaceutical world in that they interfere with the central nervous system. They indirectly affect the skeletal muscles, while interrupting the brain's signal of pain [13]. They do little to relax an actual spasm once initiated and they come with significant side effects such as dizziness, fatigue, nausea, and sedation [13]. They are a management tool to reduce overall discomfort during an acute episode with the hope that the body will sort itself out.

In a study by van Tulder et al, they found that along with staying active, non-steroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants were effective in acute low back pain. Of interest they also found strong evidence that bed rest and specific exercises were not effective tools for the treatment of acute low back pain [14]. Muscle relaxants have been found to have adverse effects so it is important that they are used with caution and closely monitored.

With acupuncture, there is potential to interrupt a muscle spasm using electric stimulation which will cause the muscle to release, even if only during the treatment. In a study conducted in 2008, electric stimulation at 2 Hz proved to be the most effective long term choice for chronic nociceptive low back pain [15]. "For patients with acute back pain (defined as lasting less than three months),…the data [is] sparse and inconclusive. The

evidence comparing acupuncture to other therapies is also inconclusive [16]. Yet, there is data that suggests acupuncture creates an analgesic effect during treatment [17,18].

This analgesic effect of acupuncture is important since "physical and mental health co-morbidities and measures of analgesic use were associated with chronicity, healthcare utilization and costs. Given the association of comorbidities and cost for patients with low back pain, "management approaches that are effective non-pharmaceutical alternative for pain relief would be beneficial to reduce long term costs of patients identified with lower back pain [19].

While the studies on the use of acupuncture for acute low back pain are not conclusive they are nonetheless encouraging. For instance in one study "wrist-ankle acupuncture" was successfully used to treat acute low back pain [20]. Wang et al, also found a clinical efficacy for acupuncture that offers short-lasting benefits [21]. However with acute low back pain sometimes short acting relief can be significant to control pain related to fear response behavior.

The safety of acupuncture has been supported in the literature since serious adverse event are very rare [22]. Thomas et al also found traditional acupuncture care delivered in a primary care setting was safe and acceptable to patients with non-specific low back pain. "Acupuncture care and usual care were both associated with clinically significant improvement at 12- and 24-month follow-up. Acupuncture care was significantly more effective in reducing bodily pain than usual care at 24-month follow-up [23]." Manheimer et al also noted that acupuncture can be used to effectively treat chronic low back pain [24]. Chronic low back pain can have acute flare-ups and Brinkhaus et al extensively analyzed the effects of acupuncture on this type of condition [25], Nevertheless Vas et al noted "clinical experience has shown that uncomplicated lumbalgia responds rapidly to acupuncture, which achieves a reduction in pain intensity and duration, and also contributes to the prompt return of patients to their normal working activity [26]."

Theoretically as long as there is no anatomical misalignment causing the spasm or guarding of the muscle, repeated electric acupuncture stimulation will provide central nervous system benefit as well as direct muscle benefit, allowing for a patient reduce or eliminate their need muscle relaxants for low back pain. Collaborative chiropractic and electronic acupuncture care may be effective tools for patients seeking acute low back pain relief [27]. Since both acupuncture and chiropractic may help limit the need for muscle relaxants in the treatment of low back pain [28], conjoint efforts would be expected to facilitate patient recovery.

SOT was developed in the early 1920s by Major Bertrand DeJarnette, DO, DC, an engineer, osteopath, and chiropractor. SOT offers a method of diagnosis and treatment, which utilizes pelvic wedges or blocks to help with acute low back pain and other patient presentations [29]. In the 1960s DeJarnette began implementing pelvic blocks into his treatment protocols and by the 1980s he finished formalizing the development of three categories for chiropractic diagnosis and treatment.

This three-category system recognizes that human structures have specific patterns of imbalance. By generalizing patients into three categories DeJarnette developed methods of determining three identifiable, yet interrelated, systems of body reaction. Through the use of specific indicators, the location and correction of these three generalized body patterns could begin to be reliably assessed. Utilizing an outcome assessment system of pre and post treatment tests could then be applied to evaluate need for care, whether the care rendered is appropriate, and if the intervention was successful [29].

The three-category system stemmed from DeJarnette's engineering and anatomical background. His study of anatomy helped him investigate the two aspects of the sacroiliac joint, which has an anterior synovial portion and a posterior hyaline cartilage portion. While the sacroiliac joint is one joint the anterior aspect should have motion and this is where sacral nutation and counternutation takes place. On the other hand the posterior sacroiliac joint is focused on weightbearing stability and support. DeJarnette's engineering principles evaluated the weightbearing characteristics of the sacroiliac joint and determined that when the joint could not adequately support body weight then load bearing stress will be moved superiorward to the L5/S1 and L4/5 discs via the iliolumbar ligaments, most commonly [29].

In case the patient's acute low back pain was treated by category three protocols. A category three represents the body's inability to maintain sufficient weightbearing at the posterior sacroiliac joint and can commonly lead to lower lumbosacral discopathy. DeJarnette described this category relating to nerve root compression or stretch syndrome due to direct involvement of the cartilaginous (discs) joints of the spine. He also determined that related muscles such as the piriformis and psoas need to be considered in both assessment and treatment and that sciatic nerve irritation was a common feature of this category [8-11, 29].

The main method of correcting these positional and functional patterns of imbalance utilizes pelvic blocks and hands-on adjusting techniques. With severe acute low back pain the most common category is category three and has specific block placement and usage [8-11, 29].

Blocking requires the use of two wedge-shaped blocks placed under a patient pelvis with the patient lying prone on a treatment table. The blocks are positioned so as to reduce pelvic torsion and lumbosacral stress to the discs and soft tissues. The category three block placement allows for pelvic blocks position modification using the patient's report to develop a positional preference. Ideally the blocks are positioned to triangulate forces with the focus to reduce stress to the vertebra, discs, and related nerves. As the blocks are placed and positions are modified, pain is monitored by the patient's report of pain or upon palpation of various indicator points on the patient's body and the patient's response to palpation [8-11, 29].

Ideally with the use of pelvic blocks a patient having acute low back pain can have their traumatized tissues relax and related nociception reduced. DeJarnette noted that "This occurs because of an interaction between the specific position the body is in and the

motion of the body caused by normal breathing" allowing the structures to settle back into alignment [29].

SOT chiropractic and acupuncture care are beginning the process of publishing collaborative studies illustrating how these professions can develop interdisciplinary relationships. Three recent case reports noted how SOT and acupuncture can work together in the treatment of varied conditions such as dysmenorrhea [30], asthma [31], and a shoulder related SLAP tear [32].

Within our society it appears that back pain is on the rise so looking for low risk conservative interventions such as acupuncture and SOT block placement may offer a possible alternative option to higher risk interventions such as pharmaceutical medications and/or surgery. Theoretically whereas SOT block position can help with mechanical aspects of acute low back pain syndromes it is likely that acupuncture can facilitate with acute pain reduction, improved response to inflammation, and helping the patient respond to conservative care.

Conclusion:

Since acute low back pain is not something that patients will choose to "watch and wait," developing methods of conservative are that are both safe and effective should be our first priority. This case study illustrated how a patient with chronic recurrent acute low back pain has found an ability to cope utilizing muscle relaxants, acupuncture, and chiropractic (SOT blocking). As with all case studies their lack of control, sham, and sample size suggest caution in extrapolating the results for patients at large. Ultimately further study is needed to determine if these allied conservative methods can be generalized to the acute low back pain population and mitigate the need for surgery or other procedures offering greater risk.

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Health promotion and prevention practice in a chiropractic teaching outpatient clinic: A continuing study to determine if patient file auditing reflects active health and wellness advice?

Rod Floyd, DC, MSPH, Dr PH

Introduction

The purpose of this paper is to determine through retrospective patient file audits if patients received advice on health promotion, wellness or prevention based on risk indicators at Palmer College of Chiropractic Florida campus. The clinic administration and several of the faculty clinicians are in the process of developing a wellness program at Florida's campus. Before the program is developed it is important to find out what areas of wellness, health promotion, and prevention are being recommended by interns and signed off by faculty clinicians. It is also important that chiropractors in private practice recommend wellness, health promotion, and prevention to their patients.

Blum and colleagues assessed 1316 patients from 27 different chiropractic clinics. Sacro-Occipital Technique was the main technique used in these clinics. The patients were surveyed regarding their reason for seeking care. Over 40% of the patients stated the main reason for seeking care was to improve their health as well as disease prevention.[1]

Ndetan and colleagues assessed health promotion and wellness advice given at two chiropractic teaching clinics in the United States through retrospective file audits.[2] The researchers assessed the number of documented events where outpatients were given health promotion advice by interns and had this service signed off by faculty clinicians. This was based on indicators within the patient file that would represent health risks or family risk factors inherent to the patient.

The United States Government, including Healthy People 2020, continues to recommend that health care providers assist patients in setting and reaching goals regarding the prevention of behavioral risk factors that predispose to premature onset of morbidity and mortality.[3] In addition, the American Chiropractic Association and the Association of Chiropractic Colleges both have recommended and endorsed the use of evidence-based health promotion and wellness measures in their position and mission statements.[4,5] In 2007, the Council on Chiropractic Education (CCE) began requiring that chiropractic interns in CCE accredited chiropractic colleges and universities recommend wellness and health promotion to patients.[6] Those standards called for didactic information to change knowledge, attitudes, and beliefs of interns regarding health promotion practices and further, that interns also demonstrate skills in the assessment, delivery of information, and provision of resources to patients.

From a chiropractic perspective, those who suffer chronic spinal conditions are also at risk for the same unhealthy co-morbid conditions that plague most Americans and some studies indicate they may be more likely to suffer those co-morbid health conditions.[7-9] Chronic spinal conditions in general have become the second leading cause of disability in the United States [10] representing a serious public health issue.

Chiropractic and use of health promotion in practice.

The National Board of Chiropractic Examiners since 2005 has reported that doctors of chiropractic (DC) perform a variety of health promotion-oriented tasks as part of routine practice.[11] Those tasks vary in scope depending on the specific area of health promotion. For example, a vast majority of DCs recommend general exercise, but far fewer discuss smoking cessation.

In a study conducted by Hawk and Evans, smoking cessation advice was provided to patients in nine teaching clinics.[12] These researchers found that about 40% of patients had been told to quit smoking but fewer had been given specific information on how to be successful with a quit attempt.

Ndetan and colleagues were the first to conduct research in a chiropractic institution assessing the number of health promotion interventions documented in patients' charts, including assessing the documented attempts to deliver health promotion messages when a chart indicated a need for health promotion or a red-flag condition indicating needed behavioral changes.[2]

Borody and Till reported that historically there has been little attention given to health promotion or public health in the chiropractic educational settings.[13] Also, authors contended there were relatively few chiropractic educators who are adequately qualified to teach public health in chiropractic colleges. In addition, an Australian study found that chiropractors expressed a willingness to counsel patients on health promotion but were more likely to give patients brochures than develop a tailored health promotion program.[14]

Rose and Ayad reported that students' knowledge of health promotion and public health concepts improved significantly by the end of a course in community health at a chiropractic college.[15] However, Hawk and colleagues have argued that the curricula being used in chiropractic courses do not thoroughly address the chiropractor's role in public health, clinical prevention, or health promotion.[16] Furthermore, little data is available investigating the attitudes of U.S. doctors of chiropractic in terms of clinical preventive services, particularly with regard to characterizing their understanding of the profession's position relative to the public health care arena, or to identify possible professional educational needs.[17] For example, in the study by Rose and Ayad even after taking a community health course about 50% of the students still had unfavorable responses to vaccinations although vaccines are considered a major public health accomplishment in managing preventable disease.[15] The aim of this study was to attempt a similar study to that of Ndetan et al[2] and evaluate the number of opportunities and subsequent documented incidents where health promotion or wellness advice was given in one teaching clinic by reviewing random patient charts.

Methods:

File Selection: After approval of the Palmer College institutional review board one hundred patient files were randomly selected by chiropractic teaching assistants (CTAs) beginning with the first new patients seen on or after January 1, 2007. New CCE standards on wellness and health promotion went into effect on that date so charts prior to this date were excluded. Every tenth patient chart was analyzed for inclusion until a suitable dataset was developed. For example, if the visit was for a simple condition and the patient identified or was found to have no risk factors for preventive intervention, the next file was selected so that only files indicating a true need for advising were included in the sample. File selection continued until 100 charts were selected meeting that criteria.

Exclusionary criteria and data extraction

Patients ≤18 and >64 were excluded from the study because intake forms used would have added additional variables. Those charts indicating a healthy patient with no need for health promoting or wellness-related advice based on risk assessment such as personal or family history, review of systems, and current medical situation were excluded. Personal history, family history, and red flag data were extracted by the principal investigator and placed in an SPSS™ version 16 (IBM, New York) database for analysis.

Conditions reviewed

The patient files were assessed for pertinent family history of diseases that would indicate a condition that may warrant intervention with health promotion, including cardiovascular disease (CVD), diabetes, cancer, hypertension, arthritis, cervical pain, thoracic pain, low back pain (LBP), hip pain and headaches. Personal medical history of the patient, and conditions that would indicate a red-flag, such as history of stroke, CVD, diabetes, current hypertension, and high body mass index (BMI) were considered risk indicators. BMI was calculated using (weight in pounds / height in inches x height in inches) x 703. Hypertension was categorized based on accepted guidelines for those with normal, higher than normal blood pressure, and hypertension.[18] Health promotion activities included diet and nutrition, physical activity, smoking cessation, weight management, stress management, cancer prevention, posture awareness, and CVD prevention. These data were analyzed for basic descriptive frequencies.

Results:

One hundred files were selected and reviewed. Among those there were 44 males and 56 females. The mean age was 38. The mean systolic blood pressure (SBP) recorded was 120.9 mm Hg and mean diastolic blood pressure (DBP) was 79.2 mm Hg. The mean weight recorded was 175 pounds and the mean BMI calculated was 27.2. **Table 1** depicts these findings along with other descriptive statistics listed within **Table 2** in the Appendix.

Table 1. GENDER, AGE, BLOOD PRESSURE, WEIGHT, AND BMI

Gender: Male: 44, Female: 79

Age: Mean Age 38

Mean systolic blood pressure: 120.9 mm Hg

Mean diastolic blood pressure: 79.2 mm Hg

Mean Weight: 175 lbs

Mean BMI: 27.2

BMI distribution:

Normal: 36%
Overweight: 36%
Obese: 24%
Morbidly Obese: 2%
Underweight: 2%

Overall health promotion and BMI

Health promotion advice given on at least one occasion was noted in the patient charts of 91of the sample. BMI was assessable in all 100 patients from available height and weight data in the charts. Of those, 36% were normal, 36% were overweight (OW), 24% were obese (OB), 2% were morbidly obese, and 2% were underweight. Of those either OW or OB, 73% received

advice on diet and nutrition, including an anti-Inflammatory diet and supplements; 80% received advice related to physical activity, such as walking, stretching, and conditioning.

History of low back pain, hip pain, cervical pain, thoracic pain, headaches, arthritis and advice

Within the sample, 66/100 (66%) reported LBP. Of which 43/66 (65%) were OW or OB. Eighty six percent 37/43 of the LBP patients who were OW or OB received advice on physical activity. However, only 5/43 (12%) were advised on weight management. Twenty-two out of one-hundred (22%) reported hip pain of which only 1/22 (5%) were OW or OB. One-hundred percent (1/1) were advised on physical activity and none were advised on weight management. Forty-four percent out of one-hundred reported cervical pain of which 26/44 (59%) were OW or OB. Eighty-five percent (22/26) were advised on physical activity and only 2/26 (8%) were advised on weight management. From the

sample, 38/100 reported thoracic pain of which 24/38 (63%) were OW or OB. Seventy-one percent (17/24) were advised on physical activity and 0/24 (0%) were advised on weight management. Fourteen out of one-hundred (14%) reported headaches of which 8/14 (57%) were OW or OB. One-hundred percent (8/8) were advised on physical activity and 1/8 (1%) were advised on weight management. No one within the sample reported arthritis.

Family history and advice

Thirty-nine patients had a family history of heart disease. Twenty-six out of thirty-nine (66%) were OW or OB. Twenty-three out of twenty-six (88%) received advice on physical activity. Only 3/26 (12%) received advice on weight management. Twenty-six patients had a family history of diabetes. Fourteen out of twenty-six (54%) were OW or OB. Eleven out of fourteen (79%) received advice on physical activity. Only 1/14 (7%) received advice on weight management. Twenty-five patients had a family history of hypertension. Seventeen out of twenty-five (68%) were OW or OB. Thirteen out of seventeen (76%) received advice on physical activity. However, only 2/17 (12%) received advice on weight management. Three-percent reported a family history of arthritis. Among these patients 2/3 66% were OW or OB. 2/2 100% were advised on physical activity. 1/2 50% were advised on weight management. No one in the study reported a family history of low back pain, hip pain, cervical pain, thoracic pain, cervical pain or headaches.

Combined risk for cardiovascular disease and advice

We combined risk of heart disease, hypertension, or those at risk for hypertension, diabetes, and current OW or OB patients into one CVD risk category. In our study 62% were determined to be at risk for CVD. Out of those 55 (89%) were given some form of health promotion advice.

Other results

Only 32% of the sample was advised on general posture. Patients having a family history of cancer equaled 47% of the sample. However, none of these patients received cancer prevention advice. Only 5/14 (36%) patients currently smoking cigarettes were advised about smoking cessation.

Discussion:

In this current retrospective study, health promotion advice on at least one occasion was noted in the patient chart of 91% of the total sample. In a previous study conducted by Ndetan and colleagues[2] 201 charts were selected for review. From the 2 campuses they investigated, health promotion advice on at least one occasion was noted in the patient chart of 53.7% of the total sample.

In the current study one area of concern was the underuse of weight management advice for those patients with a history of low back pain, hip pain, cervical pain, thoracic pain, and headaches, along with a family history of heart disease, diabetes, and hypertension with comorbid OW/OB. Within the sample, 66% reported LBP. Among those with LBP, 65% were OW or OB. However, only 5/43 (12%) were advised on weight management. It should be emphasized that obesity must be approached in a caring way so patients feel comfortable discussing the topic. Interestingly, Ndetan et al.[2] found that among those who were OW or OB and had LBP in their sample <1% was advised on weight management.

In this chiropractic teaching setting our results indicated that only 32% of patients were advised on general posture. We found this curious since the primary focus of chiropractic is on the spine. Ndetan and colleagues[2] also found a low percentage advised on posture on two campuses (13%). Finally, in the current study while 47% had a family history of cancer none received general cancer prevention advice based on the chart audits.

The CCE and various governmental agencies expect all clinical providers, including chiropractic student interns, to perform health promotion as part of routine practice.[3,6] Future clinical practice will be dictated in part by what is taught in our teaching clinics. This study indicates that there are many opportunities for interns and their mentors, as well as DCs in the field to engage patients on preventable causes of morbidity and early mortality. Patients are in need of specific advice on how they can reduce disease risk factors and improve long-term health outcomes. Interns and clinicians need to address certain risks factors such as unhealthy weight with the use of weight management advice and resources, CVD risk reduction and cancer prevention through smoking cessation advice, dietary change and physical activity levels. Other areas where DCs could likely play a role would be athletic and musculoskeletal injury prevention. Finally, Hawk and colleagues in their "consensus process to develop a best-practice document on the role of chiropractic care in health promotion, disease prevention, and wellness" attempt to direct the profession specifically to incorporate more advising toward better health behaviors, lifestyle, and screening for preventive services.[19] We certainly hope this will be the case as continued retrospective studies such as this one do indicate a need for change.

Limitations

This study was conducted at one chiropractic teaching institution where only 100 files were assessed for the number of health promotions interns recommended to patients and were signed off by faculty clinicians. Although this study has been compared to a study that had 201 charts assessed this study cannot necessarily be generalized into other chiropractic colleges or field-based practice. It is also a possibility that some encounters where lifestyle or behavior change was mentioned went uncharted.

Conclusion:

It is clear that there is work to be done in the area of health promotion advising of patients in chiropractic teaching clinics. This is especially true in the areas of weight management with OB and OW patients with and without LBP, postural advice, and general CVD and cancer prevention. It is imperative that teaching clinics continue to assess the areas of health promotion and prevention to help patients reach optimal wellness. The chiropractic profession needs to become a leader in health promotion as chiropractic patients deserve a higher level of preventive care emphasized in the clinical encounter. Further, the time spent with, and rapport with patients should provide a fertile platform for delivery of this education in a chiropractic setting.

Acknowledgments:

The author of this current study would like to acknowledge the following interns for their assistance: Angel De Los Reyes, James Worthington, Aaron Dixon, and Audrey Gil De Rubio. A special thank-you goes out to Harrison Ndetan, MPH, Dr.PH for his help as a consultant on this study.

Funding Sources and Conflicts of Interest:

The Palmer College of Chiropractic – Florida campus internally funded this project and the author declares he has no conflicts of interest.

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Appendix: Table 2

GENERAL HEALTH PROMOTION ADVICE

General health promotion and advice

91/100 (91%) of the sample received some type of health promotion advice

HISTORY AND HEALTH PROMOTION ADVICE

History and health promotion advice: Low back pain

66/100 (66%)
43/66 (65%) were OW or OB
37/43 (86%) with LBP and OW or OB received advice on physical activity
5/43 (12%) with LBP and OW or OB received advice on weight management

History and health promotion advice: Hip pain

22/100 (22%)
1/22 (5%) were OW or OB
1/1 (100%) with hip pain and OW or OB received advice on physical activity
0/1 (0%) with hip pain and OW or OB received advice on weight management

History and health promotion advice: Cervical pain

44/100 (44%)
26/44 (59%) were OW or OB
22/26 (85%) with cervical pain and OW or OB received advice on physical activity
2/26 (8%) with cervical pain and OW or OB received advice on weight management

History and health promotion advice: Thoracic pain

38/100 (38%)
24/38 (63%) were OW or OB
17/24 (71%) with thoracic pain and OW or OB received advice on physical activity
0/24 (0%) with thoracic pain and OW or OB received advice on weight management

History and health promotion advice: Headaches

14/100 (14%)
8/14 (57%) were OW or OB
8/8 (100%) with headaches and OW or OB received advice on physical activity
1/8 (1%) with headaches and OW or OB received advice on weight management

History and health promotion advice: Diabetes

3/100 (3%)
1/3 (33%) were OW or OB
0/1 (0%) with diabetes and OW or OB received advice on physical activity
0/1 (0%) with diabetes and OW or OB received advice on weight management

History and health promotion advice: Arthritis

0/100 (0%)

FAMILY HISTORY AND HEALTH PROMOTION ADVICE

Family history and health promotion advice: Heart disease

39/100 (39%)
26/39 (66%) were OW or OB
23/26 (88%) with a FH of heart disease and OW or OB received advice on physical activity
3/26 (12%) with a FH of heart disease and OW or OB received advice on weight management

Family history and health promotion advice: Diabetes

26/100 (26%)
14/26 (54%) were OW or OB
11/14 (79%) with a FH of diabetes and OW or OB received advice on physical activity
1/14 (7%) with a FH of diabetes and OW or OB received advice on weight management

Family history and health promotion advice: Hypertension

25/100 (25%)
17/25 (68%) were OW or OB
13/17 (76%) with a FH of hypertension and OW or OB received advice on physical activity
2/17 (12%) with a FH of hypertension and OW or OB received advice on weight management

Family history and health promotion advice: Arthritis

3/100 (3%)
2/3 (66%) were OW or OB
2/2 (100%) with a FH of arthritis and OW or OB received advice on physical activity
1/2 (50%) with a FH of arthritis and OW or OB received advice on weight management

OTHER RESULTS

General posture advice

32/100 (32%)

Cancer advice

0/100 (0%)

Smoking cessation for patients currently smoking

14/100 (14%) currently smoking
5/14 (36%) received advice on smoking cessation

The role of the atlas vertebrae in the Sacro Occipital Technique (SOT) category system.

Harvey Getzoff, DC

Introduction:

The intent of this paper is to study the SOT category system by examining the adaptive qualities of the atlas vertebrae. The role of the atlas vertebrae in human function has been debated since the early days of Chiropractic. D.D. Palmer in his foundational book *The Philosophy Science and Art of Chiropractic*, comments on the relationship of "facial and head pain and atlas subluxations and that the atlas bone is very often subluxated[1]." B.J. Palmer in his "Green Books" went much further stating "that the only subluxations which really exist are those of the upper cervicals, namely atlas and axis [2]." He then proceeded to develop the HIO (Hole-in-One) adjusting technique, which is well-known within chiropractic circles. Many chiropractic techniques promote the concept that by properly adjusting the atlas vertebrae all other spinal vertebrae will follow. The Atlas Orthogonal Technique states that it "intends to restore a person's balance and stimulate the natural healing normally present in the body by adjusting the atlas vertebrae[3]."

Major Bertrand DeJarnette, the founder and the developer of SOT[4,5], was certainly a valuable contributor to the atlas vertebrae discussion. In his 1980 SOT book, Dr. DeJarnette stated that "the second most significant indicator that the human is shifting from well- being to health problems is a tilting of the skull. This skull tilting indicates that the atlas vertebrae is uncomfortable[6]." Therefore SOT also considers the atlas to be an important part of the process of human function, and this presentation will attempt to illustrate how the atlas is intimately involved in the very nature of each of the three SOT categories. DeJarnette developed assessment and treatment tools to generalize patients' presentations and divided them into three categories.

Discussion:

In Category one, the atlas adjusts itself to a functional position that allows dural membrane tension to be maximized. Dural tension is a key component of the Primary Cranial Sacral Respiratory Mechanism (PCSRM)[7] (Category One). It plays an important role in cranial and sacral respiratory function and the movement of cerebral spinal fluid (CSF) throughout the Central Nervous system. Dr. DeJarnette in his 1979 Cranial Technique text wrote that "The constant pumping (of CSF) essential to health is done by the dura with its basic anchor at sacral three and its superior spinal anchor at the superior rim of the atlas the axis and cervical three."[8] In the presence of a sacral, spinal or cranial respiratory dysfunction, atlas adaption becomes imperative to the maintenance of the PCSRM as it strives for maximum function. Heel tension, a key indicator for category one, results from a tendon guard reflex response to a disturbance of the atlas vertebrae. In his 1980 Sacro Occipital Technique text DeJarnette discussed that the objective of category one blocking was "to return the atlas vertebrae to a normal range of compensating motion[6]." As the category one blocks and other category one adjustments

restore the PCSRM and heel tension resolves, the atlas will respond accordingly. DeJarnette expresses it this way: "The atlas serves to protect the upper end of the Dura mater by being flexible enough to vary its position to accommodate for the position of the owner[6]."

Category two is based on the ability of the body's weight-bearing system to fully communicate through the nervous system while responding to the demands of a gravitational environment. Roger Sperry, PhD, Nobel Prize winner in Physiology and Medicine 1981, stated that "90% of the brain's activity is used to balance your body within the gravitational field of earth. If your body is mechanically distorted, it will affect the other 10% which controls all the other body functions[9]." [10]

Even though a breakdown in the category two syndrome often reflects itself in the weight bearing portion of the sacroiliac joint, all weight bearing structures could be and are usually involved[11]. DeJarnette contended that cranial sutural dysfunction altering head posture can be reflected throughout the entire postural system[8]. The atlas can be the key in its attempt to right the head and minimize its functional effect on weight- bearing balance. In Darryl Curl's book, *Chiropractic Approach to Head Pain*, Chek and Curl write "The upper cervical spine maintains an intimate relationship with the cranium as well as a tremendous influence over the structures below."[12] They also make the following relevant comment: "The influence of the atlas is believed to come primarily from influence of the mechanoreceptors and nocicepters of the upper cervical spine, traction of the cord by the dentate ligaments and compensatory shifts in the center of gravity of the head and pelvis to maintain stability"[12] Dr. DeJarnette says it this way: " The atlas is the only vertebra that responds to the cerebral righting mechanism as a biped." [13]

DeJarnette described the relationship of lumbar vertebral disorders and category three. He stated that "The lumbar subluxation is primary in a category three[6]." In a category three the atlas acts in direct relationship with the fifth lumbar vertebrae. Tenderness and /or swelling of the lateral transverse process of the atlas is indicative of the fifth lumbar spinous rotation to that side. This SOT process is called R plus C (Resistance and Contraction - discovered and developed by DeJarnette), also known as cervical indicators[14] and discussed by Getzoff in the article *Sacro Occipital Technique Categories: A Systems Method of Chiropractic.* DeJarnette determined that "specific cervical responses to specific lumbar subluxations enable practitioners to make specific lumbar listings[15]." The R factor, the atlas, can be stimulated to release the C factor, the muscles surrounding the subluxated fifth lumbar. Therefore R plus C is both a diagnostic and therapeutic procedure. According to DeJarnette without the function of atlas' resistance, the ability of the body to cope with the presence of a lumbar subluxation would be greatly impeded. DeJarnette noted that "The atlas is greatly affected by the functional position of lumbar five and responds to changes in the position of lumbar five[13]."

There are extensive studies that investigate the asymmetry of the adult atlas. In these studies variation in morphological development of the atlas is common. In the Doherty

and Heggeness study "a significant variability was noted in objective measurements of the lateral mass height and sagittal plane widths of the entire bone[16]," of eighty-eight dried human atlas vertebrae. Pei Feng et al further stated that "the (atlas) asymmetry was of different shapes on both sides[17]," in sixty adult atlas computer models. In his textbook, Facial Growth, Donald Enlow concludes the following. "Development is a process working to an ongoing state of aggregate, composite structural and functional equilibrium. Any change in any given part must be proportionately matched by appropriate growth changes and adjustments in many other parts, nearby as well as distant, to sustain and progressively achieve functional and structural balance of the whole[17]."

Conclusion:

DeJarnette's understanding of the abilities of the atlas vertebrae to respond to different functional needs and the ability of all tissue to respond to the demands placed on it, is congruent with current evidence that each atlas vertebrae has its own unique form. When examining the multi-adaptive qualities of the atlas vertebrae and its position allowing for visual and vestibular accommodations, it is clear that it can enable functional systems to maintain themselves in the presence of structural breakdowns. Further research into the role of the atlas as both an indicator of body function as well as a focus for treatment in chiropractic is warranted.

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The Relationship of Cranial Facial Growth and Development to the Sacro Occipital Technique (SOT) Category System: Three Case Studies.

Harvey Getzoff, DC

Introduction:

The intent of this paper is to examine whether deficiencies in cranial facial growth and development can impede normal homeostasis of functional systems as described by the SOT Categories[1]. Cranial facial growth and development is determined by the growth of its various structural parts in relationship to the development of its organs, functional spaces and soft tissues of the head necessary for human function[2]. The organs are the brain, eyes, ears, teeth and tongue. In addition to the four pairs of sinuses, the functional spaces include the nasal and oral pharynx used for ingestion and respiration[3]. The soft tissues are the muscles and the periosteal tissues lining the sutures, sinuses, mandibular condyle, teeth and the surfaces of the cranial bones.

Ian Walters in his chapter on Craniofacial Orthopedics in Darryl Curl's book *Chiropractic Approach to Head Pain* states that, "Alteration in shape, size and position of bone as well as its origin and maintenance are secondary, compensatory and obligatory to prior changes in soft tissue, organs and functional spaces[4]." The growth and development of the cranium is a process of outward displacement essential to life. Walters refers to it as, "microcosm of an expanding universe[4]." An often found limitation of cranial facial growth and development in the mid face (primarily the maxillae), inhibits not only respiration but the positioning and development of the mandible. This results in malocclusions and TMJ disorders. Albert Chinappi DDS wrote in his paper "The Unity of Form and Function-A Dental Paradigm," that, "the mandible hasn't been allowed to develop to its full potential because of maxillary constriction[5]."

The three functional systems in question are the Primary Cranial Sacral Respiratory Mechanism[6] (PCSRM) (SOT category one), the weight-bearing system of the body (SOT category two) and the lumbar spine and its relationship to the cervical spine and the pelvis (SOT category three) [7].
Major Bertrand DeJarnette, D.C. founder and developer of the Sacro Occipital Technique (SOT) [8,9] addressed the understanding of human function by classifying three clinically definable but interrelated categories. These categories not only have methods of identifying the level of dysfunction (called indicators) and specific treatment protocols, but they give us a model of function for which to strive[7].

Category One addresses The Primary Cranial Sacral Respiratory Mechanism (PCSRM). The PCSRM is a system of harmonious functional units that allows the central nervous system to be nourished and protected as it regulates and coordinates function throughout the body. The components of the PCSRM are the inherent motion of the sacrum and the cranial bones/sutures, the dura and it attachments, the movement of cerebral spinal fluid and the expansion and contraction of the ventricles and the brain[6]. Upledger states that, "The physiological nature of the suture determines the type of motion in which it

participates and which it will allow[10].” This is not an isolated concept and has been also discussed by Retzlaff[11] and Moss[12].

Category Two addresses the weight bearing qualities of the body as it functions in a gravitational environment. Further stated, Category Two is the ability of the weight bearing structural system of the body to fully communicate through the nervous system so that maximum weight bearing function can occur within the demands of a gravitational environment. Roger Sperry PhD, determined that, “90% of the brain’s activity is used to balance your body within the gravitational field of earth[13,14] .” In SOT the key components of the weight bearing system are the weight bearing portion of the sacroiliac joint, the entire spine, the cranial suture system along with the position of the head[15].

Category Three addresses subluxations of the lumbar spine and its compensatory methods. As stated by DeJarnette in his 1980 SOT Manual, “The lumbar subluxation is primary in the Category Three[16].” Understanding the importance of the compensatory qualities of the cervical spine, the styloid processes of the temporal bone and the pelvis to the lumbar spine can be crucial in identifying and adjusting the Category Three[17]. The Step Out Toe Out (SOTO) procedure is a key component of Category Three, helps define the severity of the lumbar subluxation while initiating a pelvic response[18].

The following case studies will examine not only the functional systems in question but the cranial and dental findings as they relate to these three patient presentations.

Case Study #1

Female, Date of birth, 11/08/1947.

Basic History: Initial visit on 3/20/1985. The patient’s symptoms included left jaw joint pain, difficulty opening mouth and chewing, teeth feel out of alignment, pain sudden, and onset three weeks previous after yawning. Also reported was left neck pain and generalized headaches. Prior to onset of jaw joint pain the natural spaces between the two upper central incisors and lateral incisors had been closed by a dentist.

Key Findings: On standing plumb line analysis the head was positioned with a noticeable head tilt (left ear lower than the right) associated with the left shoulder higher than the right. Standing with eyes closed there was motion in all directions, limited, while always returning to the center. In the seated position the cervical ranges of motion were limited on the left in both lateral flexion and rotation. There was a left leg length deficiency with heel tension (reduced manual induced ankle dorsiflexion). Palpation of the occipital fibers[19] revealed a line two area five on the left along with a thoracic seven line two finding. Occipital fibers are swelling at the region of the suboccipital region that DeJarnette utilized to assess visual and vestibular righting and specific vertebral imbalance. A right crest sign (increased paravertebral muscle tension at L4/5 region) was related, via a Lovett Brother Relationship[20], to the ipsilateral temporal bone function and indicated a right temporal bone imbalance. Utilizing the SOT cough test, the sacrum was found to be in nutation and termed an SB+[21]. There was no arm/fossae[22] or step out toe out[18] findings. There was no leg length discrepancy

in the supine position. Cranial ranges of motion revealed restriction of the right maxillary/malar and temporal/frontal sutures[23]. The left temporal mandibular joint (TMJ) was painful and restricted on opening.

SOT Diagnosis: Category one with right temporal and frontal external restriction as the key findings were found and did not clear with pelvic blocking. All SOT findings (indicators) were addressed as part of the category one adjusting protocol[1]. A referral to the Orthodontist was made at the initial visit, because of the recent dental history, the difficulty opening the mouth, and the appearance of a maloclussion.

Dental Diagnosis: Class 2 division 2 occlusion with a deep bite, a retruded jaw and a narrowed maxillae.

Summation: After three weeks and six adjustments the pain and dysfunction were reduced. All findings were still present but with greater mobility of the cervical spine. Orthodontics was begun five months after her initial chiropractic adjustment. She successfully completed orthodontics (maxillary expansion and mandibular repositioning). The dental spaces were reopened, enhanced laterally, and later all spaces were restored with bonding. At her adjustment in mid-January 2013 she stated she has not had a headache or jaw pain, which had persisted for twenty five years. There was no head position or cranial findings and the patient attempts to receive chiropractic adjustments approximately every 3 weeks.

Case Study #2

Male, Date of birth, 08/12/1947.

Basic History: The patient noted pain in his right hip area and down the right leg posterior and lateral and into the right ankle. There was numbness in the right foot. There was mild pain in the lumbosacral area. Sitting, bending, getting up and standing worsened all symptoms. The onset was two months prior to the initial visit on 01/17/1983. There was no history of trauma but there was a previous episode 5 years earlier. He reported having difficulty sleeping due to the pain and was taking three different medications for the pain. The patient was referred by the orthodontist to the chiropractic office because of the extensive back, hip, and leg pain.

Key Findings: On the plumb line the head was positioned with the left ear lower than the right, while the spine was leaning to the right with very limited motion when the eyes were closed. The right styloid process was tender to palpation[17]. There was a right leg length deficiency, a left iliofemoral joint restriction and a right SOTO restriction[18]. Tenderness was elicited at the interspinous space of lumbar 4/5 when palpated. The Straight Leg Raise (SLR) [24] was possible bilaterally at 40 degrees and the right psoas muscle was constricted. Cranial ranges of motion[23] revealed restriction of the left maxillary/malar suture. The left TMJ was restricted on opening.

SOT Diagnosis: Category three, with a subluxation of lumbar 4/5 and resultant disc pathology as the key finding was found on evaluation. All SOT findings (indicators) were addressed as part of the category three adjusting protocol[1].

Dental Diagnosis: Class 2 Division 2 deep bite, with missing lateral incisors and narrow maxillae. The left TMJ was in a closed lock.

Summation: After 5 and ½ weeks and 15 adjustments the pain was greatly reduced. Pelvic blocks were no longer necessary to reduce any pelvic torsion or discopathy. There were no spinal lean or unilateral styloid tenderness. There were no longer any psoas, iliofemoral or SOTO findings. The SLR progressed to 60 degrees bilaterally. Orthodontics began 04/12/1983 and was successfully completed 1 year later (maxillary expansion, mandibular repositioning). The orthodontics was so successful that the lateral incisors were able to be restored and the TMJ functioned normally. The patient was last seen in the chiropractic office December 2012 doing well, and presently receives one adjustment per month as a preventive measure. As of April 2003 it was noted that since December 2012 normal head position has been found at each chiropractic visit.

Case Study #3

Female, Date of birth 06/15/1966.

Basic History: The patient's initial office visit 06/09/2003 and she presented with bilateral TMJ pain primarily on the right with generalized headaches which began 4 months prior. The initial onset of the pain was 8 years prior to the initial office visit. Bilateral neck and trapezius tightness was presented along with a chronic history of ringing in the ears, allergies and sinus problems. The patient was referred to the office by the Orthodontist.

Key Findings: On the plumb line the head was position on the right while the spine was curved to the left. There were unilateral differences at the thoracic 1/first rib junction and postural instability when the eyes were closed. There was left leg length deficiency with a left upper arm/fossae finding (findings of weight bearing sacroiliac joint instability)[22]. Also found was a right rotational restriction of the cervical spine and an occipital line[19] 2 area 4 - thoracic 6 subluxation. The cranial ranges of motion[23] revealed restrictions primarily at the right maxillary/malar suture. The right TMJ was unable to translate and opening was limited

SOT Diagnosis: Category two (weight bearing sacroiliac joint instability) with right maxillary/malar suture restriction as the key finding was found. All SOT findings (indicators) were addressed as part of the category two adjusting protocol.

Dental Diagnosis: Class 2 Division 2, narrow maxillae, with a right cross bite. There was a history of a four bicuspid extraction and a closed lock of the right TMJ.

Summation: Improvement was significantly noted regarding head position, negative arm/fossae finding, no leg length differential, stability during plumb line analysis, full cervical ranges of motion, along with normal cranial and the TMJ findings. Orthodontics

began one week after her initial office visit. There were 15 adjustments over a 9 month period. Orthodontic care was successful relative to maxillary expansion with the result that the cross bite was eliminated and her mandible was restored to a more functional position leading to normal translation and opening.

Discussion:

Cranial facial growth and development is an ongoing homeostatic process affected by the development of organs, functional spaces and soft tissue responses influencing osteoblastic and osteoclastic activity to maintain structural integrity. Guyton in his text book *Human Physiology* says, "the shape of bone can be rearranged for proper support of mechanical forces by deposition and absorption of bone in accordance with stress patterns[25]." Arey in his textbook *Developmental Anatomy* stated, "although the shape of a cranial bone and its architectural design are hereditary the final appearance is modified in conformity with the stresses actually encountered in post natal life[26]." Wolff's law states; "The shape of a bone depends upon the physical stresses applied to it". [27,28] Ian Walther sums up the process by stating that, "The periosteal matrix (soft tissue) may therefore be said to orchestrate growth through a concert of apposition and resorption[4]."

While the cranium is responding to the developing soft tissue, organs, and spaces, the rate of growth is ongoing and defined. Chinappi describes it this way:

> "The vault and cranial base develop first because of their relationship to the expanding brain. This growth is complete by about six years of age. In close proximity to the cranial base, the second growth area is the mid face or maxilla. The growth in the width of the maxilla is ninety five percent complete for males and ninety eight complete for females by twelve years of age. The growing mandible depends on the process of intra-membranous bone formation and remodeling for the bulk of its substance. The overall mandibular remodeling and condylar growth are geared to accommodate housing for the developing teeth to adapt to the mandibular displacement movements and to adapt to the complex growth changes occurring throughout the whole head[5]."

Cranial bone development is both controlled and responsive to the functional needs of the tissues involved. It is important to understand that mandibular positioning as well as head position is dependent on the growth of the mid-face (the maxillae) and the need for the mandible to sustain function. Chinappi states that "Ultimately, the malocclusion is a result of the system failing to provide a correct environment. Once the maxillary dentition has made its accommodation to the process, the later developing mandible is at mercy[5]."

Chinappi comments on the effects of maxillary expansion and mandibular repositioning by saying that "unexpected but frequent observed functional changes include improvement of the cervical curve and relief of temporal mandibular disorder type symptoms including but not limited to headaches and muscle spasms[29]." DeJarnette noted that "the cranial lesion can produce any effect humanly possible to produce in the human body and it can affect all

tissues of that body[30]." The stressors associated with poor head position are both neurological (vestibular and proprioceptive)[31] and mechanical (postural and the destructive effect on all types of soft tissue). Physicians should consider cranial growth and development as part of patient evaluation and care. Chinappi suggested that orthodontic care be based on "a philosophy of treatment that seeks to alter the shape of the bony alveolus in the maxilla and, in turn, the location of the mandible and its alveolar processes[29]."

As summarized by Donald Enlow in his textbook *Facial Growth* "Development is a process working toward an ongoing state of aggregate, composite, structural and functional equilibrium. Any change in any given part must be proportionately matched by appropriate growth changes and adjustments in many other parts, nearby as well as distant, to sustain and progressively achieve functional and structural balance of the whole[32]."

Conclusion:

It appears that head position and cranial function can be altered by deficiencies in cranial growth and development. Structural functional systems also respond to head position and cranial function. Cranial and dental diagnosis can play a critical role in functional systems' assessments (SOT categories). Application of the theory that maxillary deficiencies and resultant mandibular positioning associated with postural accommodations can be co-treated with dental and chiropractic procedures was examined in this paper. The success of these three cases, each representative of one of the three SOT categories, demonstrates that a chiropractor and a dentist working together can create synergistic beneficial outcomes. Further research is indicated to examine dental and chiropractic interdisciplinary care for a subset of patients with compromised dental growth and development consistent with functional system breakdown.

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A Shared Legacy: early cranial manipulation in osteopathy and chiropractic.
Michael Greer

Introduction:

Nephi Cottam is widely regarded as the originator of cranial manipulation in chiropractic, and William Garner Sutherland is often cited as the first developer in osteopathy. However, they were not the only practitioners to develop cranial concepts at the beginning of the 20th century. By mid-century chiropractors Willard Carver, Leo L. Spears, and Major Bertrand DeJarnette as well as osteopaths Dain L. Tasker, Charlotte Weaver, and Beryl Arbuckle, to name just a few, had developed cranial concepts. This research identifies and discusses the available comparative literature on the history of cranial manipulation in chiropractic and osteopathy in the first half of the twentieth century. To conduct this literature review, the researcher used multiple search strategies which yielded 11 relevant sources, including 7 articles, 2 senior research projects and 2 books, from the years 1981 to 2012.

Across three articles[1,2,3], chiropractor Calvin Cottam names dozens of practitioners who used cranial manipulation, all in an effort to establish that his father, Nephi Cottam, was the first to use cranial manipulation for health benefits. This information mostly takes the form of names and dates. There is very little detailed comparison of theory or technique, mentioning only the technique of Leo L. Spears, Richard Van Rumpt and Dain L. Tasker. Another article by Cottam and Erin MacGillivray Smith[4] also spends about half of its text trying to establish that Nephi Cottam, and not William Garner Sutherland, was the first developer of cranial manipulation. Cottam and Smith cite eleven other pioneers, but again acknowledgement of their contributions is in the form of names, and in some cases published works, only. Only the techniques of chiropractors Richard Van Rumpt and Willard Carver are described. Relatively little space is devoted to osteopaths, one exception being Dain L. Tasker.

In her senior research project, future chiropractor Mary Harrington[5] describes Sutherland's elements of the PRM (primary respiratory mechanism) and then focuses her attention on chiropractors Nephi Cottam, George Goodheart, and especially Major Bertrand DeJarnette. Harrington spends little time comparing the techniques or theory of any two cranial manipulators. An article by chiropractor Charles Blum[6] proposes that Sutherland and chiropractor Nephi Cottam were the two main originators of cranial manipulation. Chiropractor Doug Hays[7] mentions a number of early cranial manipulators, both osteopaths and chiropractors, but again we see that Cottam and Sutherland emerge as the leading figures. Hays acknowledges chiropractors George A. Cole and Willard Carver and also introduces us to chiropractors Joseph Janse and Frank L. Finnell, who developed the Nasal Specific Technique. This latter technique is briefly described. Hays also recognizes osteopaths involved in the early development of osteopathy in the cranial field: Harold I. Magoun Sr., Paul Kimberly, Howard and Rebecca Lippincott, and especially Beryl Arbuckle.

The most comprehensive book on cranial manipulation across several professions - Leon Chaitow's[8] *Cranial Manipulation: Theory and Practice* (1999) - focuses most of its attention on the developments in the second half of the 20th century. His coverage of the early history, both theoretical (except Sutherland's) and practical, is virtually non-existent. Nephi Cottam, Charlotte Weaver, Beryl Arbuckle are treated briefly.

Torstem Liem[9], on the other hand, acknowledges Charlotte Weaver as a co-developer of osteopathy in the cranial field. He also touches on osteopath Dain L. Tasker. Liem does discuss the contribution of chiropractic to cranial manipulation, but in a mere three short paragraphs. He mentions chiropractors Nephi Cottam, and Major Bertrand DeJarnette, and mentions in passing the contribution of Willard Carver, Leo L. Spears, and Richard Van Rumpt. What Liem also does is provide a chronological table of the major contributors to the development of cranial manipulation, outlining their major contributions in a sentence or two. In short, Liem's history of cranial manipulation provides a good, but rudimentary, introduction to the history of cranial manipulation.

Conclusion:

This research confirms that there is a scarcity of in-depth, comparative literature examining the early cranial concepts emerging from chiropractic and osteopathy. There is a gap in the literature. Further comparative research would serve to foster a broader understanding of the roots of the phenomenon of cranial manipulation and the extent to which it evolved along a parallel time frame across the two professions. A greater knowledge of *all* developments in cranial manipulation will inform our knowledge and practices of chiropractic craniopathy and osteopathy in the cranial field and serve to acknowledge the early pioneers in chiropractic and osteopathy who shared a legacy in the exploration of the cranium, its mobility, and its manipulation for health benefits.

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Michael Greer is a registered massage therapist (RMT) who lives and works in Nova Scotia, Canada. He is a 5th year student of osteopathy at the College d'Etude Osteopathique in Montreal (Halifax campus) and is currently writing his dissertation on the early history of cranial manipulation in chiropractic and osteopathy. He welcomes any e-mails on that subject at michael_greer@hotmail.com (underscore between michael and greer).

Improvement in the Quality of Life of a Patient with Aicardi Syndrome Undergoing Multiple Forms of Chiropractic Care: A Retrospective Case Study.
-Joseph D. Heinecke

Introduction:

Aicardi syndrome is a congenital neurodevelopmental disorder that is associated with severe cognitive as well as motor impairment. It is diagnosed based upon the dysgenesis or agenesis of the corpus collosum, chorioretinal lacunae and infantile spasms.[1-5] It has been demonstrated that multiple forms of epileptic spasms occur and that the brainstem does not always play an initiating role in the generation of seizures/spasms as is the case in many forms of epilespy.[4] Polymicrogyria, periventricular and subcortical heterotopias, and choroid plexi papillomas are other common neurological findings.[6] Liteature suggests presenting with two classic features plus two other major or supporting features highly favors the diagnosis.[1,2] This syndrome has only been described in females and 47 XXY males, with a high mortality rate reported in male cases.[2]

Multiple neurological abnormalities often accompany Aicardi syndrome, and include microcephaly, mental retardation, developmental delay, intractable epilepsy, axial hypotonia and limb hypertonia with spasticity.[2] In addition, craniofacial abnormalities or deformities that have been noted with Aicardi syndrome include small philtrum (a vertical groove in the middle area of the upper lip) with upturned nasal tip, decreased angle of nasal bridge, and a prominent premaxilla.[2] It is also to be noted that fused vertebrae, hemi-vertebrae, blocked vertebrae and absent ribs often lead to scoliosis and are skeletal anomalies often associated with Aicardi syndrome.[2]

Behavioral Component of Developmental Disabilities:

Individuals with disorders exhibiting developmental and cognitive delays including Aicardi syndrome often demonstrate behavioral difficulties such as self-injurious behavior (SIB).[7] Self injury is an unusual and often chronic form of aberrant behavior which can pose serious risk to those demonstrating this particular form of behavior.[8] This includes facial tapping or hitting, head-banging, biting, eye gouging, face slapping, hair pulling, jaw popping or other behavior that invokes harm on the individual.[8] Each individual presents differently and may demonstrate various levels of severity. It has been demonstrated that those demonstrating SIB have a lower quality of life.[9]

There have been several studies that have shown people undergoing chiropractic care have improved quality of life.[10-13] A search of the literature could not find any discussion of chiropractic care and a patient with Aicardi syndrome. There is little to no literature demonstrating a correlative or causative relationship regarding increased quality of life with chiropractic care and Aicardi syndrome; further studies should be conducted in attempts to underline the relationship between these variables

Case Report:

Patient History:

The patient is a four-year-old female who was adopted at birth. Due to her adoption, little is known about her biological mother other than she was a 38-year-old non-registered immigrant at time of birth, and had gestational diabetes. The patient was born via cesarean section without complications.

The patient was born with anopthalmia of the left eye and microopthalmia of the right eye. The patient has a right hand deformity in which the thumb divides into two digits. The patient also presented with renal cyst, eczema, cleft palate, and spina bifida vera. Following birth, the patient was placed in intensive care for the first six weeks of life during which time a sacral spina bifida vera was surgically repaired. The cleft palate was surgically repaired at nine months of age.

At approximately three years of age the patient began having seizures. Prior to the first epileptic episode, the patient demonstrated mild spastic behavior on two separate occasions, but not with any predictable timing or frequency. The patient then experienced a more severe epileptic episode, after which time the patient began having multiple spastic episodes throughout the day. They would typically occur just after waking. The patient was taken to the emergency room at which time a neurological consult was recommended.

An electroencephalogram (EEG) was performed and a diagnosis of infantile spasms as well as Aicardi syndrome was given by the attending medical doctor. The patient was placed on Topomate® (25mg/day), which is an FDA approved medication for general epilepsy. The patient's symptoms improved and she was later placed on Acthgar® gel injections (a steroid medication) for six weeks. The seizure activity drastically dropped off with only one other epileptic episode occurring since being placed on anti-seizure medications.

The patient developed acid reflux after discontinuation of Acthgar® gel at which time the patient's medical doctor prescribed Zantac®, a proton pump inhibitor designed to prevent esophageal acid reflux. According to the caregiver, the drug was ineffective, therefore the medication was discontinued and acid reflux persisted. Additional medical concerns included history of hypertension, which was associated with a hypoplastic, abnormal functioning right kidney diagnosed by her nephrologist.

Activities of Daily Living:

The patient is unable to feed herself without assistance and so the caregiver places a tray in front of the patient to indicate the presence of food, then places the food on a spoon at which time the patient is able to grasp the spoon and place the food into her mouth. The patient has never grabbed food by hand and then placed it into her mouth without assistance. All food is ground into a puree consistency as the patient is unable to

masticate, but is able to swallow with occasional difficulty. In order to assist in drinking, a modified cup with two handles and a nipple is placed in front of her and the word "cup" is said loudly. The patient then responds by grasping the cup and drinking.
The patient has never crawled, cannot walk, but can move across a room by lying on her back and wiggling her torso in a "crabwalk" fashion. She is capable of grasping objects, grabs, pulls and pushes, especially when expressing dislike. She is able to sit up and hold her head up and remain in an upright position if placed by the caregiver, but cannot pull herself up to sit. She expresses left-handedness and tends to favor her left side. The patient is able to stand with support against an object in front of her, and uses a "walker-type" apparatus to help support her body weight.

Communication and Behavior:

The patient uses mostly non-verbal communication to express likes and dislikes. She can reportedly understand language and responds by using her own body language. The patient can also recognize sound, touch, and smell. She can say the words "up", "cup", "eat", "mama" and "shah" (the word for her sister). She can use sign language for "all finished" and "drink".

Her caregiver described her behavior as somewhat challenging as she often appeared agitated or irritable with prolonged periods of crying and engaging in SIB; hitting herself in the face and head, as well as aggressive facial rubbing thus affecting her quality of life.[9] Caregivers undergo additonal stress, coping with maladaptive behaviors of special needs children compared to caregivers of non-special needs children, which often leads to a decreased quality of life for the caregiver.[14]

Examination:

The patient presented to the clinic for chiropractic care with the chief complaints of prolonged crying, irritability, general dislike of touch and SIB, consisting of hitting herself in the face and in the head, as well as aggressive facial rubbing.

At the time of the physical examination, the patient appeared irritable and presented with multiple rashes on the face and extremities, which was later diagnosed as eczema. Vital signs were taken, with the exception of blood pressure. Her pulse was 92 beats per minute. Her temperature (axillary) was 97.6 degrees fahrenheit. The patient weighed approximately 20 pounds and measured 38 inches in length. Head and chest measurements were also taken. Head circumference was measured at 41 centimeters and chest circumference was measured at 49 centimeters.

The patient was unable to cooperate so a cranial nerve examation was not performed**.** Pallesthesia was performed with no reaction to a 128 hertz tuning fork when placed on extremities (lower extremity, patella, fibular head, lateral/medial malleoli, and the styloid process of the fifth metatarsal base; upper extremity, acromioclavicular joint, olecranon process, and the radial and ulnar styloid processes). Patellar and achilles deep tendon reflexes were performed. A biceps reflex test was not performed. Patellar deep tendon

reflexes were 2+ bilaterally. Achilles deep tendon reflexes were 1+ on the right and absent on the left, using the Wexler scale.

Spasticity and hypertonicity of the left paraspinal musculature including the erector spinae group: iliocostalis, longissimus and spinalis, were noted on the left with rib humping also present. A right convex scoliosis from T2-T9 and a left convex scoliosis from T10-L4 were present, with the apices T5 and L1 respectively. Hypertonicity of the cervical paraspinal musculature were noted bilaterally, including splenius capitis, levator scapulae, longissimus cervicis and sub occipital musculature including rectus capitis posterior major, rectus capitis posterior minor, obliquus capitis superior and inferior. Left lateral head tilt and right rotation were noted with global restrictions in cervical ranges of motion, mainly right lateral flexion, pure flexion, and left rotation. An anatomical leg length discrepancy was present with the right leg measuring 39.5 centimeters and the left leg measuring 40.5 centimeters.

Several cranial asymmetries and motion abnormalities were observed. Cranial asymmetries included flattened frontal bone, right sunken sphenoid, otherwise described as concavity of the right sphenoid. The patient also demonstrated concavity of the right zygomatic arch as well as bulging of the right parietal bone. Cranial fixations and malpositions included fixation of the left sphenoid into flexion, right temporal external rotation and right occipital inferior torsion. This was determined both by cranial palpation as well as visual inspection. Subluxations of the atlas and occiput were also present upon static and motion palpation of these structures.

Methods/Interventions:

The patient initially began receiving chiropractic adjustments in the form of Diversified Technique by the first intern to oversee care. In general diversified technique is characterized by a high velocity low amplitude thrust. Diversified is considered the most generic chiropractic manipulative technique and is differentiated from other techniques in that its predominant objective is to restore proper movement and alignment of spine and joint dysfunction. [15]

In addition to chiropractic intervention, the patient was also undergoing occupational therapy which after assessment mainly focused on attempting to build her sign language vocabulary, using a walker with wheels and self-feeding with her fingers as well as using a cup without handles.

The first chiropractic adjustment consisted of an occipital lift in which the patient was lying supine on the adjusting table. The fleshy portion of the intern's finger pads were placed just under the occipital rim and approximately one inch inferior to the superior nuchal line, then slight inferior to superior traction was applied to restore proper motion and kinematics between the occiput and atlas. One week following the first adjustment, the caregiver reported the patient was much less irritable throughout the week and was more receptive to therapeutic touch. The following visit consisted of an occipital lift

(detailed above) as well as an adjustment of the sacrum. When adjusting the sacrum, a fingertip contact was made with the patient lying prone on the chiropractic table, then the intern used the fleshy portion of both fingertips overlapping each other, contacting the right posterior superior aspect of the sacrum, making a gentle high velocity, low amplitude thrust in a posterior to anterior, and superior to inferior line of drive.

After the third adjustment consisting of the previously mentioned protocol, the patient exhibited a decrease in primitive posturing as well as an increase in response to caregiver touch. On the seventh visit the patient presented with an exacerbation of symptoms, especially irritability and resistance to touch. Subseqeuntly, on the eighth visit, the patient was calmer and more receptive to the adjustment. The patient continued to be adjusted via Diversified Technique for a total of 22 visits over a one year span. There were occasional gaps in care consisting of missed appointments which were then rescheduled to a later date. There was a two month gap in care in which the patient was out of town. During this gap the caregiver reported an increase in irritability and increased episodes of SIB, as described earlier.

A new chiropractic student intern began implementing care. The patient was then adjusted via Activator Technique at the preference of the new intern. The patient was scheduled to be seen once a week. Activator Technique involves the use of a handheld spring-loaded instrument that when used, delivers a predictable, calculated thrust to make the adjustment.[16]

There are four different settings on the Activator IV that allow for a increasing amount of output force to be used with each setting, ranging from 16 lbs to 38 lbs.[16] A total of six adjustments were given via Activator Technique, focusing on the occiput and sacral subluxations. The occipital adjustment was made by placing the rubber tip of the activator against the posterior inferior margin of the occiput of the prone patient. The number one setting was used, delivering a predictable amount of force into the bony and soft tissues, in a inferior to superior, and posterior to anterior line of drive. The sacral adjustment was made by placing the rubber tip of the activator against the posterior superior aspect of the sacrum. The number one setting was used, and the adjustment was made using a posterior to anterior and superior to inferior line of drive. The patient showed continual improvement while under care in the form of decreased irritability, but was still exhibiting SIB. She did however display an increase in receptiveness to touch.

After six adjustments under Activator Technique, a new intern took over care and implemented Sacro Occipital Technique (SOT), specifically SOT Cranial Technique. SOT Cranial Technique is a method of care whose premise is that it is possible to affect the physiology of the body by applying specific force/s to the bones of the skull and related structures. Due to substantial cranial asymmetries and perceived cranial dysfunctions that presented with this particular patient, it was felt by the intern that this particular approach would be well suited to the patient.

To correct flexion malposition of the left sphenoid, both thumb pads of the intern were placed on the greater wing of the sphenoid bone bilaterally and the palmar pads of digits

2-5 were placed along the inferior ridge of the occiput. The right hand maintained its stabilizing position over the right portion of the cranium as a superior and posterior force, or stress, with the left thumb was placed on the greater wing of the sphenoid on the left. This movement was performed while the patient was in the exhalation phase of breathing.

To correct right temporal external rotation, the intern placed his left palm transversely across the width of the entire cranium to stabilize it. The patient's right temporal bone was contacted by the intern's right thenar pad, with the fleshy portion of the right fingertips contacting the postero-lateral portion of the right mastoid body and process, while stressing the temporal bone anterior and inferior. This movement was performed while the patient was in the exhalation phase of breathing.

To correct right occipital inferior torsion, the seated intern placed the palmar surface of his right hand over the supine-lying patient's frontal bone with 2nd and 3rd, and 4th and 5th digits straddling the maxilla. The intern's left hand was positioned with the palm over the occiput and the fingers directed caudally. While the patiend inhaled, the intern directed an inferior to superior and counter-clockwise stress with his inferior hand directed towards the right inferior portion of the patient's occiput.

To achieve cerebrospinal fluid (CSF) balancing at the "occipital bowl", the seated intern placed both hands along the inferior nuchal line of the supine patient using an extremly light contact, waiting to feel bilateral synchronization and symmetry of pulsations to indicate proper CSF flow. The contact was held during both the inhalation and exhalation phase of respiration.

After the first SOT Cranial adjustment less SIB was reported by the caregiver. Over the course of SOT care, the patient ceased to exhibit all forms of SIB. She appeared to be less agitated and more receptive to caregiver touch.

Quality of Life Survey:

A quality of life survey was created to be filled out by the primary caregiver in order to better assess quality of life for this patient. Other quality of life surveys exist in literature but because of this patient's severe motor and cognitive impairments, it was felt that these surveys did not provide proper content to assess quality of life for this particular patient.

Ideally, the form would be completed both prior to the onset of care and again at the conclusion of care, then the scores would be compared. Because this case study was not foreseen at the onset of care, the caregiver filled out both surveys at the conclusion of care. She was asked to fill out both forms honestly and to the best of her ability to represent the patients status as well as her own status both prior to and after chiropractic care.

Results:

The patient received a total of 46 adjustments in just under a two-year period. During this time the patient showed improvements in several areas of functioning including a complete extinction of SIB.

After the first visit the caregiver reported that the patient was far less irritable and was more receptive to touch. By the third visit the patient began to show decreased primitive posturing and continued to be more receptive to touch. The caregiver had previously reported that the patient's weight had been relatively stagnant for an entire year. Within a four month period while under chiropractic care, the patient increased two clothing sizes and gained nearly two pounds. After the 29th visit the caregiver reported that the patient had less difficulty swallowing when eating.

It was previously discussed in the case report that self-injurious behavior leads to decreased quality of life.[9] While under chiropractic care the patient ceased to exhibit SIB therefore adding to her quality of life. According to the survey the caregiver also reported an increased quality of life as a result of chiropractic care for her child.

While more studies are needed to fully understand the role of chiropractic on those with developmental disabilities, this study supports an outcome of increased quality of life associated with chiropractic intervention and Aicardi syndrome.

Discussion:

Quality of Life:

There is no unified consensus in the literature as to the definition of quality of life**,** however, Bowling gives the definition: "Quality of life is a concept representing individual responses to the physical, mental and social effects of illness on daily living which influences the extent to which personal satisfaction with life circumstances can be achieved. It encompasses more than adequate physical well-being, it includes perceptions of well-being, a basic level of satisfaction and a general sense of self-worth." [11]

The eleven question survey that was created and implemented for this case study assesses four key domains which consist of family interaction, emotional well-being of the caregiver, emotional well-being of the patient, and physical well-being of the patient. It should be mentioned that the quality of life survey implemented in this study has not been evaluated for reliability or validity to assess whether or not it can accurately measure changes in quality of life.

As this survey represents a perception of the patient's health provided by the caregiver, answers may have been adapted according to expected patient benefit, current mood or other factor. The caregiver was instructed to answer all questions honestly and to the best

of her ability. Nonetheless, the survey implemented can provide some insight as to the changes in quality of life that took place over the course of care.

Diversified Technique is a commonly taught adjusting technique and implements several different sources. It consists of adjustments of the spinal column and the extremities.[17] No specific analytic system is used. Instead, Diversified Technique calls upon the assessment of normal biomechanics, as well as static and motion palpation of a joint and related soft tissue structures to discern the need for manual adjusting, in an attempt to create or restore motion in a particular joint.[17] This technique involves the use of a high-velocity, low-amplitude thrust with a line of drive or directional force specific to each finding, to correct perceived joint dysfunction.[18] More research is needed to fully understand the role of Diversified Technique and its effect on human physiology.

Korr's Facilitation Hypothesis:

Korr suggested that when muscles are subjected to abnormal stress or strain, mechanoreceptors located in the muscle begin to become activated.[19] Abnormal positioning of a vertebrae could possibly affect the tone of the muscles related to it and cause increased firing of proprioceptors in said muscles. In the case of this patient, the suboccipital muscles which along with the cervical vertebrae and play an important role in postural processes, visual and vestibular righting.[20] As a result, increased nociception and decreased proprioception into the central nervous system can occur.[21]

This increased nociceptive input might explain behaviors of prolonged crying, irritability and SIB that were being demonstrated by the patient. Proprioceptive information is facilitated by second-order neurons in the spinal cord which can have affects on the proprioceptive information that is being received and can decrease the firing threshold of these neurons, which in turn increases their sensitivity.[19]

When second-order neurons are facilitated they become hyper-sensitive to impulses that could be arriving from any source in the body, visceral or somatic.[19] In the spinal cord, second-order neurons synapse with lateral horn cells as well as anterior horns cells, which are part of the sympathetic nervous system.[19] Continuous irritation of the lateral horn cells, as a result of overstimulation via abnormally functioning musculature from malpositioned vertebrae, could cause lateral horn cells in the spinal cord to be facilitated or hypersensitive. This facilitated or hyper-irritable sympathetic nervous system is considered by Korr to be a major contributing factor in the etiology of musculoskeletal dysfunction and visceral organ disease. Cardiovascular, gastrointestinal and certain musculoskeletal disorders have been associated with overstimulation of the sympathetic nervous system.[19]

Chiropractic adjustments purportively restore proper proprioception by restoring proper vertebral motion and position, leading to decreased stretching or tension seen in related cervical musculature.[19] This could may potentially lead to a decrease in overstimulation of the lateral horn cells having a calming influence on the sympathetic nervous system.

Activator Technique:

According to Menke and Fuhr, Activator Methods Chiropractic Technique is based on a dynamic approach to spinal and somatic dysfunction in which areas of spinal and extremity dysfunction are identified by specific movements that are performed by the patient, as well as identification and observation of functional leg length change that occurs with areas of dysfunction.[22] Areas of dysfunction are corrected with a mechanical instrument designed to deliver a pre-set force to bony and soft tissues.[22]

A study by Nguwen concluded that the prone extended leg length inequality or functional leg length inequality that is used by Activator Methods to detect areas of dysfunction in the spine and extremites had good inter-examiner reliability.[23] This study supports that it is possible to detect areas of neurological dysfunction by isolating spinal segments and observing functional leg lenth change. Leg length inequality is measured by looking at the heels of the patient's feet in the prone position. When the person first lies prone on the table, the side of the short leg is termed the "pelvic deficient" or PD side. The patient is instructed to perform a specific movement or isolation test and the examiner looks for a functional leg length change. A specific isolation test correlates with a specific area of spinal dysfunction.[22] For example, instructing the patient to place the hand that correlates with the PD side above their head while lying in the prone position isolates the T12 spinal segment. If there is an overstimulation of mechanoreceptors from a malpositioned vertebrae present, in this example T12, a functional leg length change producing an apparent short leg occurs and the area of dysfunction (subluxation) is corrected with the Activator instrument. It was found by Keller et al. that the Activator instrument is effective for the correction of dysfunction in the spine and extremities.[24]

Activator Technique is taught in the majority of U.S. Chiropractic colleges and it is estimated that approximately 45,000 Doctors of Chiropractic use this technique worldwide.[22] In fact, recent surveys from the National Board of Chiropractic Examiners states that Activator Technique is one of the two most widely used chiropractic techniques in the United States.[22] Further research is needed to fully understand the role of Activator Technique and its effects on human physiology.

SOT Cranial Technique:

In SOT Cranial Technique, pressure in specific vectors are applied to various bones of the skull to affect physiology. Studies have demonstrated that there is cranial bone movement in humans and that it continues into adulthood.[25,26] It was demonstrated by Pick in an MRI study that pressure to maxilla and bregma, changes the shape of brain tissues including the fornix, by four millimeters and the corpus callosum, by five millimeters.[27] This study shows that it is possible to affect brain structure and possibly brain physiology by applying forces to the bones of the skull.

According to Retzlaff, "Cranial dural membranes form the walls of the cranial venous sinuses, and help maintain the position of the cerebellum, cerebrum and spinal cord as well as help provide some support to the cranial capsular matrix by passing through the

sutures to become external periosteum of the cranium." [28] The connection of muscles such as the rectus capitus posterior minor , spinal ligaments to the dura, as well as the dentate ligament connecting the spinal cord to the dura, all indicate a relationship between spinal dynamics and its perpetuation into the meningeal fascial tissue.[29,30]

The cranial nerves also carry dural sleeves with them for an extended distance; therefore abnormal meningeal tension could be transmitted to a nerve and therefore affect its function. Tension encountered anywhere along the meninges could possibly be transmitted to the cranial nerves.[31] This is because the peripheral and the central nervous systems are a continuous tissue tract.[31] The neuropathies that could ensue from cranial bone dysfunction are hypothesized to be both motor and/or sensory, and their severity depends on the amount of compression as well irritation to nervous tissue.[31]

As some aspects of cranial related technique are still considered controversial or unproven, further study is needed to fully understand the relationship/s of cranial bones and their related structures as well as the role of cranial therapy in the form of SOT Cranial Tecnique on human physiology.

Overall there is an extremely limited amount of research when it comes to those with developmental disabilities, including Aicardi syndrome, and chiropractic care. Limitations to this study include the fact that it focuses primarily on one individual as well as the fact that the survey lacks an evaluation of its validity and reliability and was not filled out prior to beginning care. As with all case reports is the issue of placebo or ideomotor effects, regression to the mean, or that the patient would have outgrown the condition.

Conclusion:

This retropspective case study followed a four-year old girl with Aicardi sydrome and other congenital anomalies and changes that occurred in the quality of life of both her and her caregiver as a result of chiropractic care. While under chiropractic care the patient ceased to exhibit SIB in the form of hitting herself in the face and head, and aggressive facial rubbing. The patient also became more receptive to touch, experienced decreased irritability and made significant weight gains within four months of care after a year of stagnant weight. Overall the patient demonstrated an increased quality of life. The quality of life survey also suggests that the patient as well as the caregiver demonstrated an increased quality of life while the patient was undergoing chiropractic care. Due to the patients temporal response to care and the worsening when care was not received suggests that the chiropractic encounter was valuable for the patient, family, and caregiver.

Acknowledgements:

I would like to thank Dov Pine for his clinical excellence and numerous contributions to this study. Without him, it would not have been possible. I would also like to thank Dr. Charles Blum for his contribution of research materials and guidance.

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The accuracy of kinesiology-style manual muscle testing to distinguish true spoken statements from false: The results of 2 studies of diagnostic test accuracy.

Anne M. Jensen, DC, MSc, MSc, MACC, Richard Stevens, MSc, PhD, Amanda Burls, MBBS, MSc (Neuroscience), MSc (Public Health)

Introduction:

Manual muscle testing (MMT) is an integral part of any physical exam, and is routinely performed by various types of health care practitioners. Confusion arises because three different applications claim the term MMT, all seemingly similar in performance, yet divergent in the grading and interpretation of test outcomes. The three types identified are : (1) MMT as used in orthopaedic and neurology settings to assess neuromusculoskeletal integrity, (2) MMT as used in Applied Kinesiology (AK), and (3) kinesiology-style MMT (kMMT) which uses MMT in a binary fashion to guide the course of treatment. kMMT differs from the other 2 types in that only one muscle, usually called the indicator muscle, is tested repeatedly as the target conditions vary. It is the third type of MMT, kMMT, which was under investigation in these studies.

kMMT is estimated to be used by over 1 million practitioners worldwide, yet despite this prevalence, its usefulness has not yet been fully demonstrated. In kMMT, the outcome of the test is binary ("strong" or "weak") and is interpreted by the practitioner to mean the presence or absence of a target condition. The target condition, or what the practitioner is testing for, is determined by the practitioner prior to initiating the kMMT. The target condition can vary from muscle test to muscle test, and since in practice there are literally hundreds of possibilities for target conditions, this poses a significant challenge when designing diagnostic test accuracy studies for kMMT.

Previous studies using kMMT found that following the speaking of true statements, a muscle was able to resist significantly more force compared to after speaking false statements; that is, true statements resulted in a "strong" muscle response, while false statements resulted in a "weak" muscle response.

The purpose of these studies was to estimate the accuracy of kMMT for detecting truth in verbal statements spoken by a test patient using actual verity of the statements as a reference standard.

Methods:

Test Methods

These studies were prospective studies of diagnostic test accuracy. No participant was assessed prior to enrolment. This protocol received ethics committee approval by the Oxford Tropical Research Ethics Committee (OxTREC; Approval #34-09) and the Parker University Institutional Review Board for Human Subjects (Approval #R09-09). Written informed consent was obtained from all participants, and all other tenets of the Declaration of Helsinki were upheld.

The Target Condition

In our studies, the condition we targeted was *truthfulness*: We wished to ascertain if kMMT was useful in distinguishing truth from falsehoods. Here "truth" refers to the colloquial usage of term: *that which is generally accepted as fact or reality*.[1]

To control the presence or absence of our target condition (truthfulness), TPs were show neutral pictures on a computer screen, and via an earpiece were instructed to say a specific statement while viewing the picture. Sometimes the statement was true (i.e. target condition present) and sometimes it was false (i.e. target condition absent). For example, if a TP was presented with a picture of an apple and was instructed to say, "I see an apple," this statement was considered to be true, using our definition of truth (above). On the other hand, if a TP was presented with a picture of an apple and was instructed to say, "I see a horse," this statement was considered to be false.

The Index Test: kMMT

Only the anterior or lateral deltoid was tested while the TP was either a seated or standing. Beyond that, Practitioners were allowed to individualise their testing methods, as long as the integrity of the study methods was maintained (e.g. blinding). Also, once a testing position was initiated, this position was retained for the duration of participation.

The paradigm used for these studies is one in common use among muscle-testing practitioners: If a person speaks a statement they belief to be true, the muscle stays strong, and if a person speaks a statement that they believe to be false, the muscle goes weak.

As in clinical practice, the interpretation of the outcome of each kMMT was left to the discretion of each Practitioner. After performing each kMMT, the Practitioner alone decided if the muscle stayed strong or went weak, and recorded the results himself by entering "S" for "strong" or "W" for "weak" on a keyboard.

The Reference Standard: Actual Truth of the Spoken Statement

The reference standard used in these studies is the actual verity of the spoken statement, so therefore, for all intents and purposes, is a perfect gold standard: The truthfulness of the spoken statement is definitively known.

The Testing Scenario

Each Practitioner performed 40 kMMT muscle tests on the TP, broken up into 4 blocks of 10 tests each. Each single test consisted of this sequence of events: (1) the TP was presented with a picture on a computer screen, (2) the TP was instructed via an earpiece to speak a specific statement while viewing the picture, (3) the Pair assumed the testing position, (4) the Practitioner performed the kMMT, and (5) the Practitioner entered the result of the kMMT into the computer. Then the sequence was repeated.

The Control Condition: Guessing the Truth of a Spoken Statement

There are specific physiological events that spontaneously occur when someone is lying, such as changes in facial expressions, body language, speech cadence and skin dampness.[2, 3] There is a chance that it is not the kMMT itself that allows practitioners to differentiate truth from lies; they may simply be good at detecting these physiological changes. Therefore, to control for this possibility a control condition was enacted whereby the Practitioner was asked to guess if spoken statements were true or false, without any testing. Taking into consideration the possibility of visual, auditory and kinesthetic clues, Practitioners were asked to watch, listen to, and touch the skin of TPs' arms as they spoke the given statements. Otherwise, the testing scenario remained exactly the same as during the kMMT, except kMMT was removed and guessing was implemented. Each Practitioner performed 40 guesses broken up into 4 blocks of 10 guesses each. A guessing block followed each kMMT block, which also allowed participants to rest from the kMMT.

Methodology Differences between Study I and Study II

The methodologies of Study I and Study II were identical with 2 exceptions. In Study I, 48 unique Pairs were recruited and in Study II, 20 unique Pairs were recruited. In Study I, the Practitioner also viewed a computer screen and was presented with visual stimuli which were either (1) the same as the TP's picture or (2) a blank screen. In the second instance, the Practitioner was then blind to the verity of the TP's statement, and it was these blind tests that were used as the primary outcome. In Study II, the Practitioner's computer monitor was removed, so they were, therefore, completely blind to the verity of the TP's statements. Consequently, Study II was a replica of the Practitioner blind condition of Study I. We undertook Study II to see if the results of Study I could be replicated.

Participants

Two groups of participants were recruited: (1) Health care practitioners who routinely use kMMT in practice ("Practitioners"), and (2) Test Patients ("TPs") who were naïve to kMMT. Each Practitioner was paired with a single TP – and together they formed a unique testing pair ("Pair"). Recruitment was done by direct contact (via email or telephone), social media and word of mouth. Any volunteer was eligible if he or she was aged 18-65 years, had fully functioning and painfree upper extremities, and was fluent in English. All Practitioners who wished to participate were included.

To simulate a real therapeutic environment, data was collected in private clinical settings whenever possible. All recruitment took place in the United Kingdom, and in the states of Texas, Arizona, New Mexico and California in the US.

Statistical Methods

Since the evaluation of validity of kMMT is in its early stages, and since we are mainly interested in estimating how well kMMT is at detecting truth, we will be reporting error-based measures of accuracy: sensitivity, specificity and overall fraction correct[4] – and their 95% confidence intervals (95% CI). Sensitivity can be described as the nonerror rate of those with the target condition.[4, 5] In our case, since the target condition is *truthfulness*,

sensitivity will be the proportion of true statements correctly identified as true. Specificity can be considered the nonerror rate of those without the target condition,[4,5] so in these studies, it is the proportion of false statements correctly identified as false. These error-based measures will also be reported for the guessing condition.

Results:

Study I

Participants

For Study I, 48 unique Practitioner-TP Pairs were enrolled between June 2010 and October 2011. There were 32 female and 16 male Practitioners, and 31 female and 17 male TPs. Of the Practitioners, 20 were chiropractors, 4 mental health professionals, 2 acupuncturists, 2 naturopaths, 2 massage therapists, 12 other health professionals, 4 non-health-professionals, and 2 who did not respond. Twenty-six Practitioners were in full-time practice, 13 were in part-time practice, and 7 were not currently practicing. The Practitioners' mean number of years in practice was 14.8 (±10.4 SD) years. The mean age for Practitioners was 49.3 (± 12.0 SD) years, and for TPs, 40.8 (± 12.8 SD) years.

Test Results

The mean overall fraction correct was 69.3% with 95% confidence interval (CI) of 66.0-72.5%, and with a range of 45.8% to 92.3%. The mean overall fraction correct for the guessing/control condition was 49.8% (95% CI 46.6-53.18%), and with a range of 27.8% to 76.2%. The sensitivity of kMMT was found to be 0.59 and its specificity, 0.57. The years of a Practitioner's kMMT experience or type of Practitioner did not significantly correlate with a Practitioner's kMMT accuracy. Aside from arm fatigue, there were no adverse events reported from any testing. (See Table 1 below.)

Study II

Participants

For Study II, 20 unique Practitioner-TP Pairs were enrolled between July and November 2011. There were 13 female and 7 male Practitioners, and 8 female and 12 male TPs. Of the Practitioners, 14 were chiropractors, 2 mental health professionals, 1 acupuncturists, and 3 other health professionals. Fourteen Practitioners were in full-time practice, 4 were in part-time practice, and 2 were not currently practicing. The Practitioners' mean number of years in practice was 16.4 (±9.0 SD) years. The mean age for Practitioners was 48.5 (± 10.9 SD) years, and for TPs, 39.0 (± 11.4 SD) years.

Test Results

The mean overall fraction correct was 63.1% with 95% CI of 56.8-69.4%, and with a range of 35.0% to 95.0%. The mean overall fraction correct for the guessing/control condition was 57.6% (95% CI 52.1-63.2%), and with a range of 35.0% to 90.0%. The sensitivity of kMMT was found to be 0.71 (95% CI 0.64-0.73) and its specificity, 0.55 (95% CI 0.47-0.64). The years of a Practitioner's kMMT experience or type of

Table 1 - Summary of Results: Study I & II

	Accuracies†								
	MMT				Control				
Study #	Mean	SD	CI	Range	Mean	SD	CI	Range	*p*-value
1	**69.3**	11.5	66.0 - 72.5	45.8 - 92.3	**49.8**	11.4	46.6-53.1	27.8 - 76.2	<0.001*
2	**63.1**	14.4	56.8 - 64.9	35.0 - 95.0	**57.6**	12.7	52.1-63.2	35.0 - 90.0	0.122

† Accuracy as defined as % correct; MMT, Manual muscle testing; SD, Standard Deviation; CI, Confidence Interval; *Significance

Practitioner did not significantly correlate with a Practitioner's kMMT accuracy. Aside from arm fatigue, there were no adverse events reported from any testing. (See Table 1 below.)

Discussion:

The results of Study I seem to suggest that kMMT may be useful in distinguishing true from false statements, and have been supported by the results of Study II. Since it is known that accuracies of diagnostic tests can vary greatly across clinical contexts, target conditions and patient and practitioner subgroups,[5] the consistency of these results are encouraging.

However, caution is advised: We have estimated the clinical utility of kMMT for one target condition only: truthfulness. The generalizability of these results to other target conditions has yet to be evaluated. Readers are reminded that the evaluation of the true usefulness of kMMT is yet in the early stages.

Conclusion:
Manual muscle testing used to identify true spoken statements is significantly and consistently more accurate than chance, and therefore, its use may have merit in the management of specific cases. The variation between practitioners, from highest accuracy to lowest, suggests there is much yet to be learned about the skills involved and possible influencing factors.

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Fatigue, depression, and sleep disorders: A case report.

Daniel Kalish, DC, Christopher T. Arick, DC

Introduction:

Fatigue, depression and sleep disorders impact tens of millions of Americans. Disability Adjusted Life Years (DALYs), the sum of years of potential life lost due to loss of work productivity due to disability, one DALY represents the loss of the equivalent of one year of full health and allows us to compare diseases that do not cause death but do cause disability to those that can cause death such as cancer or heart disease.

"While the two leading causes of death heart disease and cerebrovascular disease remain among the top six causes of burden of disease, four primary non-fatal conditions are also among the 20 leading causes of burden of disease; these are unipolar depressive disorders … The leading causes of burden of disease in high-income countries included three diseases (unipolar major depression, adult onset hearing loss and alcohol use disorders) for which direct mortality is low. Unipolar depression makes a large contribution to the burden of disease, being at third place world-wide and eighth place in low-income countries, but at first place in middle and high-income countries."[1]

Depression, as it is presently treated in the U.S., is commonly treated by anti-depressant medications. The benefit of anti-depressant medication in mild to moderate depression, compared to placebo, is minimal or non-existent.[2] In adults over the age of 65, selective serotonin reuptake inhibitors (SSRIs) were found to have an increased risk of adverse side effects leading to mortality.[3] All types of antidepressants have shown limited efficacy in juvenile depression.[4] Clinical studies show that 30% to 60% of SSRI-treated individuals suffer from some form of medication induced sexual dysfunction.[5]

Depression, fatigue and sleep problems tend to cluster together. To attempt to understand the association of these complaints, chiropractors look at the individual holistically and see the interconnections between common conditions. In this manner, doctors can treat patients more effectively with much less adverse events and burden to the patient. In functional medicine, a clear interrelationship is seen between depression, fatigue, and sleep as all interconnected phenomena that can and must be treated together for successful outcomes. Conventionally, a diagnosis of chronic fatigue syndrome may be given, but no pharmacological therapy has been proven effective.[6]

This study will present a case of one patient presented with fatigue, depression, and sleep problems to a functional medicine center. By utilizing advanced testing to analyze the core physiological reasons rather than changing the symptomatic complaints, the patient's health improved greatly under natural therapies.

Case Report Assessment - Patient History:

A 22 year-old man presented to an office of a chiropractor specializing in functional medicine. His complaints included increasing depression, fatigue, and sleep problems. He was also complaining of a stomach ache that would wake him up at night. The patient was a collegiate basketball player at the time of consultation. His complaints were so severe that he was forced to cease most normal daily activities that would usually bring him joy. The patient was previously being treated by a group specialty practice of university physicians and his past medical diagnoses included chronic fatigue syndrome secondary to viral infection and overtraining syndrome secondary to strenuous athletic activities.

A further review and inquiry of the patient's previous medical history revealed that at the age of 18 months he acquired an entamoeba histolytica infection.[7, 8] The patient reported that his childhood was plagued with consistent fatigue, mental fog, learning disabilities and immune related health challenges.

At the time he presented in the chiropractic office, he was continuing with evaluation and management by the physicians at the specialty medical center located at the university that he was attending. His diagnoses given by the medical physicians at the time of initial consultation with the functional medicine chiropractor were viral induced chronic fatigue and over training syndrome.

Lab Results:

The following functional medicine tests were ordered by the chiropractor: gastrointestinal pathogen screen, functional adrenal stress panel, neurotransmitter channel function test, heavy metal toxicity panel. [See appendix]

Helicobacter pylori, Giardia, Entamoeba histolytica, and Cryptosporidium parvum were found present on different occasions on the gastrointestinal pathogen screen during the initial evaluation and further treatment. The patient was determined to be in second stage adrenal exhaustion from the functional adrenal stress panel. Imbalances in the levels of serotonin and dopamine after an amino acid challenge were found with the patient. The heavy metal toxicity panel showed high levels of lead, mercury, barium, tellurium, and boron through urine testing.

Treatment/Intervention:

Dietary
The patient was placed on a paleolithic/ancestral diet that was free from inflammatory foods and potential food sensitivities. These recommendations included eliminating gluten, dairy, soy, and limiting sugar and processed foods in the diet. The patient was told to focus on nutrient dense foods and natural grass-fed meats. Examples of these foods were given to the patient.[9]

Wellness

The patient was given a regiment of multivitamin, antioxidants, and an essential fatty acid supplement to strengthen his physiology during chronic stress and benefit him regarding fatigue and mood.[10,11]

Adrenal Stress
To reduce the adrenal stress of the patient, supplemental liquid dehydroepiandrosterone (DHEA), pregnenolone, and licorice root were given to the patient. These recommendations were designed to increase energy, decrease depressive symptoms, and improve sleep.[12]

Gastrointestinal Pathogen Intervention
The patient followed the dietary, wellness, adrenal recommendation for 60 days to reduce inflammation, increase energy, and improve depressive symptoms. The patient then was treated to eliminate the pathological gastrointestinal infections by botanical preparations of mastica, probiotics, and specific anti-microbial botanicals.[13-15]

Neurotransmitter Transporter Function
The patient was instructed in supplementation to balance serotonin and dopamine levels using 5-HTP and tyrosine laboratory guided protocols. These highly sophisticated labs measure pre-synaptic neuron Organic Cation Transporters (OCT2) to present the amount of serotonin and dopamine going into the pre-synaptic cells.[16,17]

Heavy Metal Detoxification
Several months after the digestive treatments were completed we began the detoxification process for mercury and lead which lasted one year using anti-oxidants, sulfur containing compounds and liver supportive herbal and nutrient products.[18,19]

Results:

Pre and post lab work demonstrated his improvement in adrenal function, elimination of gastrointestinal tract infections, and reduction in heavy metal toxicity and improvement in brain function regarding OCT2 transporters. Over the course of several years of treatment the patient experienced restoration of normal sleep patterns, elimination of his depression and a gradual improvement in fatigue and stamina to the point where he is now able to work, exercise and maintain a normal lifestyle rather than spending the majority of his time in bed at home as he was when treatments were initiated.

This treatment was tracked over the course of many years and represents a complex functional medicine case, short term outcomes were achieved in the first months of treatment, better sleep, and elimination of depression. However complete elimination of the chronic fatigue took many years.

Discussion:

This patient presented with problems with each of the three body systems treated in functional medicine. The three body systems are the adrenal, gastrointestinal, and detoxification.[20] As each body system was corrected, the patient's symptomatic picture steadily improved and he represented a classic example of what can be done with chronic fatigue cases using specific, organized techniques.

This approach gives hope that clinicians can also apply these techniques to patients that are not as sick as in this case. Clinicians should expect better result with a person with their first year of fatigue, rather than after a decade of fatigue, or in someone going through just a year of depression, rather than ten years. The earlier the intervention occurs, the faster and easier the treatments are and the more we can reduce potential suffering.

Restoration of normal hypothalamic-adrenal-pituitary (HPA) axis dysfunction brings improvement to energy, mood and immune function.[21,22] Elimination of gastrointestinal tract infections creates a positive environment such that the gut tissue can repair and one can begin to absorb nutrients fully.[23] Elimination of allergic or intolerant foods provides the system with more nutrients and greatly reduces inflammation.[24] Detoxification from heavy metals reduces the body burden of these damaging compounds that impact our central nervous system and correction of serotonin and dopamine levels in pre-synaptic neurons gets brain function back to its normal state.[25] All of these treatments combined lead to overall improvements in health that are marked.

Functional medicine relies upon pre and post lab testing correlated with symptomatic relief to determine the effectiveness of various treatments, there is room for "interpretation" in this in that some may assume the recovery was spontaneous or would have occurred even if all treatments would be withheld. Cost is main limitation to applying this work to other patients along with patient compliance issues.

Conclusion:

This case report demonstrates the wide range of functional medicine tests available and how they can be used to treat conditions that are widespread and may not be as safely or effectively addressed by conventional medical options. In this case, functional medicine was applied to the common complaint of fatigue, depression and sleep problems. This case was chosen in particular because it features the use of all the body systems: adrenal, gastrointestinal, and detoxification. Future research into the effectiveness of the specific, organized functional medicine approach would best be performed by looking at component parts of this work in less complex patients. Currently research in this area is underway at a leading medical research facility in the U.S. and should be prepared for publication in 2014.

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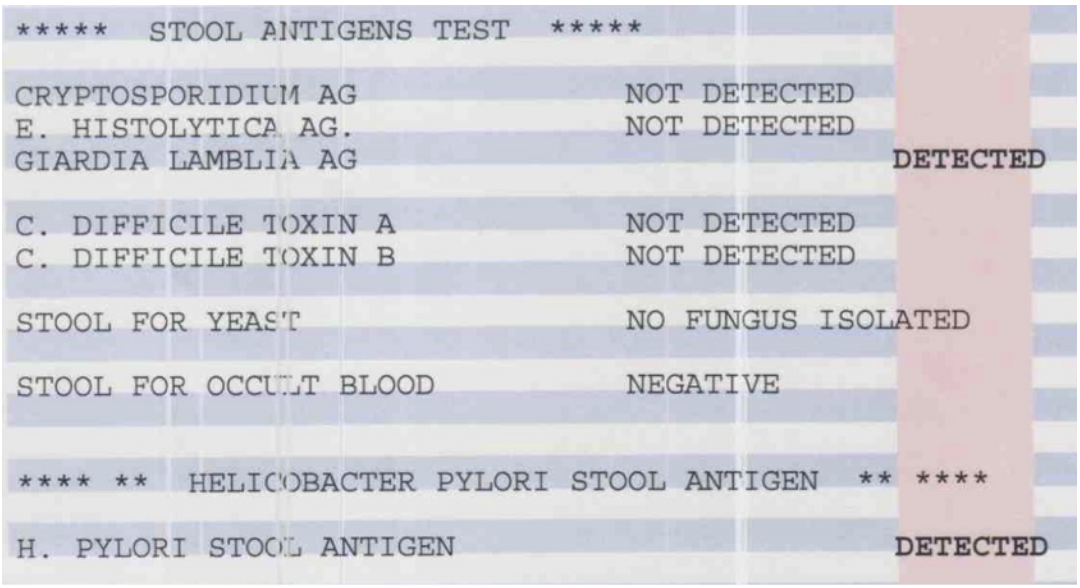
* ** FUNCTIONAL ADRENAL STRESS PROFILE ** *

			UNITS	REFERENCE RANGE
CORTISOL				
MORNING	(6:00-8:00 AM)	**10.5**	nM	13.0 - 24.0
NOON	(12:00-1:00 PM)	5.9	nM	5.0 - 8.0
AFTERNOON	(4:00-5:00 PM)	5.2	nM	4.0 - 7.0
NIGHTTIME	(10:00 PM-12:00 AM)	**4.9**	nM	1.0 - 3.0
CORTISOL SUM		26.5	nM	23.0 - 42.0
DHEA-S AVERAGE		7.14	ng/ml	2.00 - 10.00
TOTAL CORTISOL / DHEA-S RATIO		**3.7**	RATIO	5.0 - 6.0

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***** ** FUNCTIONAL ADRENAL STRESS PROFILE ** *****

				UNITS	REFERENCE RANGE
CORTISOLS					
MORNING	(6:00-8:00 AM)	14.4		nM	13.0 - 24.0
NOON	(12:00-1:00 PM)	7.8		nM	5.0 - 8.0
AFTERNOON	(4:00-5:00 PM)		**2.0**	nM	4.0 - 7.0
NIGHTTIME	(10:00 PM-12:00 AM)		**0.6**	nM	1.0 - 3.0
CORTISOL SUM		24.8		nM	23.0 - 42.0
DHEA-S AVERAGE		8.95		ng/ml	2.00 - 10.00
TOTAL CORTISOL / DHEA-S RATIO			**2.8**	RATIO	5.0 - 6.0



***** STOOL ANTIGENS TEST *****		
CRYPTOSPORIDIUM AG	NOT DETECTED	
E. HISTOLYTICA AG.	NOT DETECTED	
GIARDIA LAMBLIA AG		DETECTED
C. DIFFICILE TOXIN A	NOT DETECTED	
C. DIFFICILE TOXIN B	NOT DETECTED	
STOOL FOR YEAST	NO FUNGUS ISOLATED	
STOOL FOR OCCULT BLOOD	NEGATIVE	
**** ** HELICOBACTER PYLORI STOOL ANTIGEN ** ****		
H. PYLORI STOOL ANTIGEN		DETECTED

*****Stool Culture for Pathogens*****

Source	Stool
Preliminary Report	Normal flora after 24 hours
Final Report	* Escherichia coli isolated *
Amount of Growth	Light

*****Stool for Ova & Parasites*****

Ova & parasites #1	* Entamoeba coli cysts detected *
Ova & parasites #2	No Ova/Parasites detected
Ova & parasites #3	* Entamoeba coli cysts detected *
Ova & parasites #4	No Ova/Parasites detected
Trichrome Stain	Few oocysts of Cryptosporidium parvum seen using Acid Fast Stain

*****Stool Antigens Test*****

Cryptosporidium Antigen	* Detected *
E. histolytica Antigen	Not detected
Giardia lamblia Antigen	Not detected

Highly Toxic Heavy Metals

1	Aluminum	9		<= 61
2	Arsenic	10		<= 57
3	Cadmium	<DL*		<= 0.90
4	Lead	3.34	H	<= 4.40
5	Mercury	8.9	H	<= 7.4
6	Thallium	0.32		<= 0.41

Potentially Toxic Elements

7	Antimony	<DL*		<= 1.72
8	Barium	11.6	H	<= 10.5
9	Bismuth	1.7		<= 10.3
10	Cerium	<DL*		<= 1.76
11	Indium	<DL*		<= 0.17
12	Tellurium	0.22	H	<= 0.17
13	Tin	0.1		<= 17.2
14	Titanium	640		<= 2,923
15	Tungsten	0.29		<= 0.60
16	Uranium	0.03		<= 0.48

Elements of Unknown Human Requirement

17	Boron **	2.8	H	0.3 - 4.3
18	Lithium	26		9 - 115
19	Nickel	5.7		1.6 - 9.6
20	Strontium	132		31 - 304
21	Zirconium	<DL*		<= 4.6

Creatinine = 69 mg/dL

** Boron is reported in ug/mg creatinine

Highly Toxic Heavy Metals

1	Aluminum	12		<= 61
2	Arsenic	15		<= 57
3	Cadmium	0.36		<= 0.90
4	Lead	2.82	H	<= 4.40
5	Mercury	<DL*		<= 7.4
6	Thallium	0.62	H	<= 0.41

Potentially Toxic Elements

7	Antimony	<DL*		<= 1.72
8	Barium	22.5	H	<= 10.5
9	Bismuth	<DL*		<= 10.3
10	Cerium	<DL*		<= 1.76
11	Indium	<DL*		<= 0.17
12	Tellurium	<DL*		<= 0.17
13	Tin	<DL*		<= 17.2
14	Titanium	1,427		<= 2,923
15	Tungsten	<DL*		<= 0.60
16	Uranium	0.30		<= 0.48

Elements of Unknown Human Requirement

17	Boron **	4.2	H	0.3 - 4.3
18	Lithium	67	H	9 - 115
19	Nickel	10.0	H	1.6 - 9.6
20	Strontium	624	H	31 - 304
21	Zirconium	<DL*		<= 4.6

Creatinine = 45 mg/dL

** Boron is reported in ug/mg creatinine

The Case Study Report: *The Individual's Experience*
Matthew McCoy DC, MPH

> *"In fact, it is only in the detailed context of a lengthy case description that we fully appreciate the personal and social meanings of illness."*[1]

I have personally been under chiropractic care since I was a child though unfortunately not at an early enough age. My story is similar to the stories of probably millions of people who have benefited from subluxation-based chiropractic care. I suffered from chronic ear infections, food and environmental "allergies" and a variety of undefined gastrointestinal problems. I say suffered in the true sense of the word since in my mind I was suffering. Not only did these ailments affect me physically but they also had emotional, social and spiritual ramifications. Being sick all the time takes its toll on you and you go through various periods of frustration, anger and depression. School, friendships and a variety of societal interactions become a nightmare as people wonder what is wrong with you or you try to hide that you have these problems. Being dragged to various specialists who you never really interact with you adds to the demoralization attached to being "sick."You wonder "why me?" and begin to question your religion, God and the meaning behind your suffering.

Because of chance occurrences I ended up in a chiropractor's office and the road to a new life began. That road was nevertheless long as I went through a transformation in some of the deepest values and beliefs that my family and I had held on to for generations. I'm still going through that transformation to this day. I can only guess what would have happened to me had those chance occurrences not materialized, but I can tell you I went through some desperate times.

My experience in practice over the past decade, my discussions with chiropractic colleagues and my reading of the literature tells me that my story is shared and really nothing new to the vast majority of practicing chiropractors. Chiropractic care has a profound positive impact on a person's quality of life and I trust that the average chiropractic patient shares similar experiences. What remains most important to me however is the impact that chiropractic had on my life and no doubt this is a feeling shared by each and every individual whose life has been changed as a result of chance occurrences that brought them to the doorstep of a chiropractor's office. I am reminded of the story about the man walking along the beach who observes a woman frantically picking up and throwing starfish back into the ocean that had washed up on shore following a storm. The shoreline is literally covered with starfish and the woman could never save every one. The man walks up to her and asks what she's doing and is told that she is throwing them back because if she doesn't they'll die. The observer pauses and says "it doesn't matter since you'll never be able to throw them all back." The woman replies as she tosses another starfish into the surf "It matters to that one" and goes back to her work.

I am amazed that in the research world the case study report is relegated to the bottom of the evidence pile a notch above the anecdote which is just above the Old Wive's Tale

(Table 1.) As if what happens to you, me and our patients as individuals really doesn't matter all that much. Even more amazing is that this label is perpetuated by researchers within the chiropractic profession itself. It amazes me because chiropractors have been helping people recover their health one person at a time for over a hundred years.

Table 1

Levels of Research Evidence

- Randomized Controlled Clinical trials
- Cohort Studies
- Retrospective (Case Control) Studies
- Cross Sectional Studies
- Single Subject Time Series Studies
- Case Series Studies
- Case Studies
- Anecdotal Reports

Yet the randomized controlled clinical trial is held as the "end all be all" of research. The idea of taking three groups of people and applying an intervention, a placebo and no intervention and then extrapolating those results to millions is what we hang our hat on.

> *"The decision to seek medical consultation is a request for interpretation...Patient and doctor together reconstruct the meaning of events in a shared mythopoesis...Once things fall in place; once experience and interpretation appear to coincide; once the patient has a coherent 'explanation' which leaves him no longer feeling the victim of the inexplicable and the uncontrollable, the symptoms are, usually, exorcised."*[2]

I maintain that the systematic description of an individual's experience under chiropractic care may be the single most important piece of evidence we have about how chiropractic effects people's lives. The rest of the world doesn't get to see the "miracles" that occur in our offices on as regular a basis as we do. Usually the only way they see or hear about it is through anecdotal reports from you, their friends and family. Hopefully these anecdotal reports are at least positive but many times what's in the media about chiropractic is negative.

Thankfully the research community in chiropractic has begun to grow now that we as a profession have shifted our focus towards it. But don't think that the only research that counts are the big, double blind, randomized, placebo controlled studies that need lots of

money and people to get published. They are by no means the only way to get chiropractic into the scientific literature and public eye and document what we do for our patients.

Right now every practicing chiropractor taking care of patients in their offices has the opportunity to document the effects of chiropractic on the patients they are caring for. Once that experience is written down and published, the entire world can see it and it is there forever.

The focus of this Perspective is the writing of a Case Study since it is the most applicable to the average practitioner and the real world is where the practitioners exist. I recently asked a group of over 200 chiropractors for a show of hands as to how many had successfully managed a patient who had asthma through subluxation directed care and over 90% of them raised their hand. Unfortunately we don't have 200 case reports describing this in the peer-reviewed literature. Imagine if 1000 chiropractors reported successful results following Subluxation reduction in a patient who had AIDS, or ear infections or whatever. Those 1000 case reports collectively represent data that can be used to educate patients, government, third parties etc., on the merits of subluxation-based chiropractic care. Imagine if you could take those 1000 cases to some funding body and request money to do more in-depth, large-scale research on the topic. I encourage you to take an interesting patient that you have and develop a case study and I'm offering an outline and help on how to do it.

How to Prepare a Case Study Report

Many instructional articles and books are available on the topic of how to write a case study.[3-10] I have indicated the major sections appropriate for a chiropractic case study and have indicated the information, which should be contained in each, and how it should be organized. A case report could include the following headings and or categories (Table 2):

Table 2

Possible headings or categories for a case report

1. Abstract
2. Introduction
3. Case report
4. Discussion
5. Conclusion
6. References

The Abstract

The abstract or synopsis summarizes the main points of the case study including (1) the purpose of the case report. (2) The basic procedures followed. (3) The main findings and (4) the principal conclusions (Table 3). Consult the Abstracts from several case studies

in the *Annals of Vertebral Subluxation Research* (AVSR) for ideas on how to structure your Abstract.[11-18]

Table 3

The abstract should answer the following questions:

- Objective — Why is the case study being presented?
- Clinical features — This should be a brief overview of the patient's presentation & diagnosis.
- Intervention and Outcomes — This is a brief overview of what was done and what happened as a result.
- Conclusions — This is a brief statement of what you feel the significance of the case is.

The Introduction

This discussion should give the reader a general overview of the topic you are about to discuss relative to your case presentation. It could consist of one to two paragraphs as to why this case is important. If you were writing about the effects of subluxation reduction on a child with cerebral palsy you might want to discuss the condition in general. The same would be true with more mundane topics such as neck pain, headaches and other neuromusculoskeletal conditions. It is extremely important to realize that your case does not have to involve some dramatic life threatening illness that the patient recovered from.

Case studies are needed on every aspect of chiropractic care. Also, it's very important for you to remember that your case study can be solely about the analysis, reduction or correction of subluxation in your patient and does not have to be about the amelioration of some disease or condition. It is important for chiropractic research to focus on subluxation analysis, reduction and correction as an outcome in and of itself. After all you might have a wellness patient without symptoms or other disease manifestations who experiences an improvement in quality of life as a result of the correction of their subluxations.

The Case Report

This section should detail the pertinent history, chief complaint/reason for care and exam findings regarding the case under discussion. You should discuss what type of care was instituted and the results of that care. This is one of the most important parts of a case report. Document the care in such a way that the procedures performed are readily identifiable. Describe progress from one visit to the next. Give biographical information about the patient if appropriate. You want to describe the type of methodology you used

to find and characterize the subluxation(s), the techniques you used, the type of subluxation(s) addressed and the levels. The more information and detail about these aspects, the stronger the case report.

The Discussion

This section could include a more detailed discussion of the condition under investigation. A review of the literature would be appropriate here as well as a review of the literature relative to common treatment protocols either within or outside of chiropractic. If your case study dealt with cerebral palsy then review how the condition is managed medically or through alternative means. Review any chiropractic literature related to the condition. Perhaps others have written on the topic and have seen similar results as you. Don't get overwhelmed by the review of literature portion as you might not have one or you might have only one reference. You might not know how to review the literature and in that case contact me at AVSR and I'll guide you through it. You can also contact your chiropractic college library for assistance. You could conclude this section by making hypotheses regarding the literature and your experience with this case.

The Conclusion

This should be a concise discussion of what you concluded as a result of your review of the literature and your experience in this case as well as the significant features of the case. Discussion of the clinical importance of the case can also be presented here. A statement regarding limitations of your study and the prospect for future research could be included here.

References

List all relevant references that support your case study report and the statements made therein. Although initially appearing tedious, guidelines exist on how to list the references and once you get going it's pretty simple and straightforward. Consult past issues of AVSR for guidance on how to lay out your reference section and review the Information for Authors section of AVSR for instructions on how to do this. You can also review other guides on the topic such as The AMA's Manual of Style[19] or The Uniform Requirements for Manuscripts Submitted to Biomedical Journals.[20] You can also look at examples of case studies from other health related journals in libraries or the Internet to get ideas and guidance on how to organize and write your case study.

Conclusion

I want to strongly encourage you to take the time and pick one of your patients who has experienced a positive benefit from chiropractic care and go through this process. Imagine if every one of the 50,000 practicing chiropractors in our profession were to do this just once. We'd have a great deal of literature documenting what we do. We'd have a great deal of literature elucidating and supporting our unique interactions with patients

and the results of those interactions on their physical, emotional, social and spiritual well being.

> *"I have known Jimmie now for nine years — and neuropsychologically, he has not changed in the least. He still has the severest, mostdevastating Korsakov's, cannot remember isolated items for more than a few seconds, and has a dense amnesia going back to 1945. But humanly, spiritually, he is at times a different man altogether — no longer fluttering, restless, bored, and lost, but deeply attentive to the beauty and soul of the world, rich in all the Kierkegardian categories— the aesthetic, the moral, the religious, the dramatic...Empirical science, empiricism, takes no account of the soul, no account of what constitutes and determines personal being. Perhaps there is a philosophical as well as a clinical lesson here: that in Korsakov's, or dementia, or other such catastrophes, however great the organic damage...there remains the undiminished possibility of reintegration by art, by communion, by touching the human spirit; and this can be preserved in what seems at first a hopeless state of neurological devastation."*[21]

If you ever have any questions or would like some help preparing a Case Study for publication, please feel free to contact me, I'd be more than happy to help.

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Orofacial myofunctional therapy: A case report.

Joy L. Moeller, BS, RDH

Introduction:

The purpose of this case report is to help the reader learn how to identify orofacial muscle disorders, habit patterns, or restricted frenum attachments. Once gaining some familiarity with the assessment of orofacial muscle disorders then there can be understanding when and who to refer to, and the importance of training to successfully address the underlying cause of many related structural problems. Orofacial myofunctional therapy (OMT)[1] can be part of an interdisciplinary team incorporating chiropractic and dentistry to help treat symptoms of temporomandibular joint disorders (TMD) and obstructive sleep apnea (OSA) or sleep breathing disorders (SBD)[2]. Also included will be an overview of some outcome assessment forms utilized by some OMTs for diagnosis and treatment of TMD and/or OSA/SBD.

Orofacial myofunctional therapy, a neuro-muscular re-education of the oral facial muscles, is a modality that promotes the stability of the stomatognathic system. Studies have been performed for years to understand the relationship of skeletal form and muscle function[3]. When the tongue is resting against the hard palate (thus maintaining the proper oral volume) it enhances and/or creates stability for the TMJs. If the tongue is habitually resting down and forward in the mandible, as may happen with a lack of patency of airways and/or lack of chewing beginning with baby foods, prolonged use of bottles and pacifiers, presence of digit sucking[4] or a restricted frenum[5], normal form and function may be disrupted[6].

While a primary function of the tongue is to protect the airway, improper oral resting posture of the tongue will have a negative influence on the development of the oral cavity. Add that to the modern diet of processed foods (soft foods may lead to low muscle tone by diminishing the frequency and intensity of mastication[7]), a smaller oral volume may not support proper upper airways, the stability of the TMJs, or the development of optimal dental arches[8].

Orofacial myofunctional therapists are trained to promote functional posture[9] (in absence of mechanical obstruction) with behavior modification. The goals for the patient are to become aware of and eliminate noxious habits and achieve nasal breathing, lip seal, and proper mastication. Orofacial myofunctional therapists also promote patient compliance in proper care and use of oral appliances in management of TMD and OSA, as well as minimize muscular discomfort due to the use of those appliances[10-12]. An interdisciplinary team approach for health care is critical for benefit of the patient and treating the cause of TMJ and OSA related disorders.

Case Report:

The Assessment:

The patient was a 48 year old female referred by her chiropractor, who had heard about OMT by his referring functional dentist. Her primary occupation was that of an actor. Patient was born with a restricted lingual frenum which may have led to her low tongue-rest position and mouth breathing habit. At the first examination the patient was nervous and constantly putting her hands on her face and her fingers in her mouth. Despite her anxiety regarding her disorder and having been seen unsuccessfully by many other practitioners, she remained positive concerning her choice to consult for OMT. As she tried to cope with her chronic pain there were times when she felt her condition was hopeless.

The patient described her chronic neck pain to be a "9" on a pain scale of "1-10" with 10 being most painful, while her TMD pain was characterized at a "10," and frontal headaches were a constant "9." In a craniofacial evaluation she exhibited an open mouth at rest, was clenching and grinding, and had an overbite, chronic sinus infections, vertigo for eight months, earaches, and intermittent tinnitus. She also presented with chronic indigestion with gastro-esophageal reflux disease (GERD). The patient reported that she had financial hardship due to the fees for previous treatments, and her career had been hampered by the years spent managing her overwhelming health problems.

Health History:

The patient was bottle fed to age 3 or 4, was slow at crawling, walking and talking. She grew up a chronic mouth breather with constant sore throats, colds, and sinus problems. She had a shoulder surgery and was told she had a "frozen" shoulder. She felt her conditions may have worsened when her brother died, two years prior to her presentation at the office. The emotional stress of his early death may have led to a collapse of her ability to cope with her myofunctional disorder.

Examination:

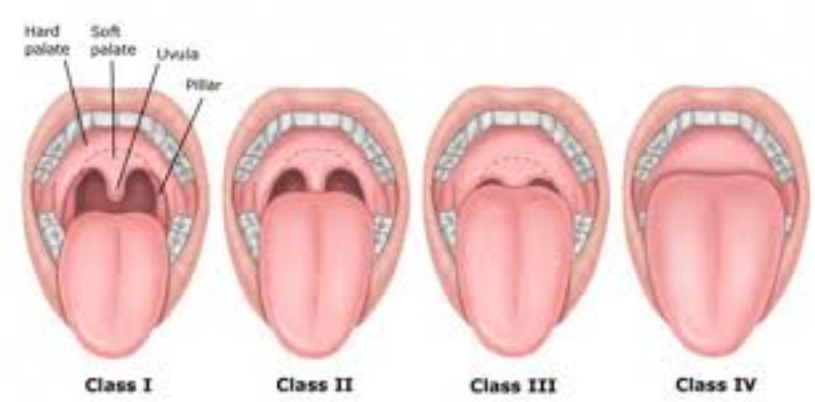
The patient's upper hard palate measurement indicated a high narrow palate, (30 mm from first molar to first molar (average is 38-42 mm). Generally mouth breathers show a narrower hard palate at the level of second premolars and first molars and deeper palate in the level of second premolars when compared to nasal breathers[13]. Her masseter muscles did not palpate as having normal tension or function. She had a 6 mm overbite. The Epworth Sleepiness Scale[14] indicated results within normal range. She indicated she clenched her teeth and bit her nails constantly. She reported GERD and difficulty swallowing pills. Her tongue rest position was on the floor of her mouth and observation of drinking and eating indicated a facial grimace on swallowing. Her Mallampati Score[15] was 3.5 (between 3 and 4).

The focus for OMT care at this office was the elimination or reduction of her chronic pain by normalizing orofacial muscle functions. But there were some challenges since the time required for treatment was difficult for the patient to schedule due to her career. However, the chronicity of her presentation and her initial quick recovery of function encouraged the patient to make the necessary accommodations for OMT.

The patient was made aware of how she had been resting her tongue in the wrong position (down and forward) and how her improper sleep position may be putting stress on her TMJs. The patient became aware that by constantly touching her face and biting her nails, she was likely influencing the proper position of the tongue and lips at rest. Also, her constant leaning on her face and texting was probably contributing to her TMD pain. Because awareness and replacement of negative habits with positive ones may lead to change, behavior modification is known to lead the way to positive functional changes.

The outcome assessment measures utilized for clinical measurements included **s**coring for pain, Mallampati score, oral myofunctional evaluation scores (OMES)[16,17], evaluating function of breathing, swallowing, and general oral habits along with symptoms of OSA and TMD were assessed and evaluated.

Mallampati Scoring



Class 1. Complete visualization of the soft palate
Class 2. Complete visualization of the uvula
Class 3. Visualization of only the base of the uvula
Class 4. Soft palate and uvula are not visible at all.

The Mallampati scoring of the orophyarynx visibility is a simple and "noninvasive method used to assess the difficulty of endotracheal intubation, but its clinical usefulness has not been validated in patients with sleep-disordered breathing.

"The Mallampati score was an independent predictor of both the presence and severity of obstructive sleep apnea. On average, for every 1-point increase in the Mallampati score, the odds of having obstructive sleep apnea (apnea-hypopnea index> or = 5) increased more than 2-fold (odds ratio [per 1-point increase] = 2.5; 95% confidence interval: 1.2-5.0; p = .01), and the apnea-hypopnea index increased by more than 5 events per hour (coefficient = 5.2; 95% confidence interval: 0.2-10; p = .04) [13]."

Nuckton TJ, Glidden DV, Browner WS, Claman DM. Physical examination: Mallampati score as an independent predictor of obstructive sleep apnea. Sleep. 2006 Jul;29(7):903-8.

The oro-facial myofunctional evaluation with scores (OMES) is a valid and reliable clinical evaluation tool for young and adult subjects who may have TMD and/or OSA. It utilizes parameters such as appearance, posture and mobility of lips, tongue, cheeks and jaws, respiration, mastication and deglutition [16,17]. The OMES scoring indicated the patient had a myofunctional disorder.
The examination revealed laterization of her tongue that moved her entire jaw left and right, indicating restriction of her frenum. The patient did not like to chew food; rather, she preferred soft foods or she swallowed foods without adequate mastication and bolus formation. Upon swallowing, her tongue protruded and her mentalis muscle activated. The patient was diagnosed bilateral tongue rest position and thrust with orofacial muscle disorder. Restricted lingual frenum and sleep disordered breathing were also noted.

Orofacial Myofunctional Evaluation Protocol With Scores (OMES)

Date:_____/_____/_____

Name:_____

Birthday: ___/____/____ Age:_____

Adress: _____

APPEARANCE AND POSTURE

Lips Posture		**Scores**
Normal lips closure	Normal	(3)
Lips closure with effort	Activity increased of lips and *Mentalis* Muscle	(2)
Absence of the lips closure (lips incompetence)	Light dysfunction	(2)
	Severe dysfunction	(1)

Vertical Mandibular Posture		**Scores**
Normal posture	With freeway space	(3)
Occlusion of the teeth (or)	Without freeway space	(2)
Open mouth	Light dysfunction	(2)
Excessive Open mouth	Severe dysfunction	(1)

Checks Appearance		**Scores**
Normal		(3)
Increased volume or Flaccid/drooping	Light dysfunction	(2)
	Severe dysfunction	(1)

Face Appearance		**Scores**
Symmetry between right and left side	Normal	(3)
Asymetry	Light dysfunction	(2)
	Severe dysfunction	(1)

Tongue Posture		**Scores**
Contained in the oral cavity	Normal	(3)
Between dental arches	Adaptation or dysfunction	(2)
	Excessive protrusion	(1)

Palate Appearance		**Scores**
	Normal	(3)
Decreased Width	Light	(2)
	Severe	(1)

Treatment/Intervention:

Treatment consisted of jaw stabilization exercises, habit elimination and behavior modification, and re-patterning the oral facial muscles and changing their function for

optimal rest position, chewing and swallowing. The patient was instructed to do exercises three times a day for approximately ten minutes. She was given exercises to develop proper lip seal, tongue exercises for the tip, middle, back and sides of the tongue, and to restore proper function of the muscles of mastication. Lifestyle-type modification included awareness of how sleeping on her sides or stomach may affect her jaw position and function, and she was referred to the Mayo Clinic [http://www.mayoclinic.com/] and Steven Park's [http://doctorstevenpark.com/] websites for sleep hygiene solutions. The patient was referred to a handout from USC on positional sleeping and its effect on sleep disordered breathing. Also, the patient was given a handout from Darrick Nordstrom, DDS, stating that if you do sleep on your back and you suspect sleep disorders, you should raise the head of the bed the height of a brick so the tongue does not drop into the airway.

Results:

At a one week follow up visit, after treatment for jaw stabilization, the patient reported that her pain was gone. The patient was referred back to her chiropractor to stabilize her neck, cranial, and back structures so that the functional training could begin in order to re-pattern the orofacial muscles. Structural support incorporating chiropractic adjustments, , along with eliminating habits and muscle re-patterning, led to long term stability. The multidisciplinary approach, in this case, may also include dental support in the form of a dental appliance or splint and/or an occlusal adjustment or an expansion device. The patient scored her pain a "0", on a pain scale of "1-10" with 10 being most painful, while she reported her initial findings of jaw pain, headaches and neck or back pain at a "10 or 9".

Facial tension was not present during the swallow, and her symptoms of GERD and indigestion subsided. Following OMT her overbite decreased by 2 mm, with her tongue habitually resting up against the palate, along with a significant reduction of her habits of touching her face and nail biting.

The patient's first score on her OMES was below "Normal" by 30 points. The OMES chart shows their control mean standard deviation (s.d.) was at 91 and a typical TMD patient mean s.d. was 85[16,17]. This would indicate that the patient scored very poorly. After myofunctional therapy was instituted the OMES was used to determine if there was any discernible change in scoring.

Because OMT treatment is reversible, there are no side effects. However, not doing the treatment long enough to promote neuromuscular automaticity or poor compliance may compromise or limit long-term success. Long-term stability may involve changing the patient's occlusal relationship. As her tongue rests in the palate and her lip seal improves, her teeth may move slightly and require guidance from her dentist.

Table 1. Oro-facial Myofunctional Evaluation Scores (OMES): Initial 02/11/13								
Posture:	Lips	2	Mandible	2	Face	2	Tongue	2
Mobility:	Lips	10	Tongue	14	Mandible	12	Cheek	10
Functions:	Breathing	1	Degution	12	Mastication	7		
							Total = 70	

Table 2. Oro-facial Myofunctional Evaluation Scores (OMES): Follow-up 04/16/13								
Posture:	Lips	3	Mandible	3	Face	2	Tongue	3
Mobility:	Lips	11	Tongue	6	Mandible	14	Cheek	12
Functions:	Breathing	2	Degution	14	Mastication	9		
							Total = 89	

Regarding stability of treatment, the outcomes are better if the program is followed for about a year to allow the neuromuscular automatization to take place. The patient should continue with the treatment (exercises and ergonomic modifications) along with the structural support offered by the chiropractor, as the muscle exercises and habit elimination help change muscle patterns.

Discussion:

There are various types of assessment tools to evaluate if a patient is presenting with OSA, such as the STOP[18] or STOP BANG[19] Questionnaires, 4-Variable Screening Tool[20], Pittsburgh Sleep Quality Index (PSQI)[21], and Epworth Sleepiness Scale (ESS)[14,22] (the one used in this study). The ESS has been used frequently to assess daytime sleepiness, particularly in the context of clinical sleep disorders.

The 8-question ESS is easy for the patient to answer and offers good historical data. This information, combined with the clinical findings, help to select which patients may be good candidates for further detailed sleep studies[23,24]. Therefore the ESS is not considered a stand-alone evaluation tool to diagnose OSA or SDB.

Other OSA assessment tools such as the STOP[18] is a validated questionnaire that utilizes four yes/no questions related to snoring, tiredness during daytime, observed apnea, and high blood pressure (STOP). The STOP BANG[19] questionnaire also combines clinical findings of body mass index, age, neck size, and gender (BANG). The STOP BANG has a high sensitivity, especially for patients with moderate to severe OSA. For instance, with the STOP BANG assessment tool a score of 3 or more out of a possible 8 was taken to indicate high risk for presence of OSA.

Epworth Sleepiness Scale
SITUATION: 1. Sitting and reading 2. Watching TV 3. Sitting inactive in a public place (e.g., a theater or a meeting) 4. As a passenger in a car for an hour without a break 5. Lying down to rest in the afternoon when circumstances permit 6. Sitting and talking to someone 7. Sitting quietly after a lunch without alcohol 8. In a car, while stopped for a few minutes in traffic
0 = no chance of dozing **1 = slight chance of dozing** **2 = moderate chance of dozing** **3 = high chance of dozing**
The scores for the eight questions are added together to obtain a single number. A number in the 0–9 range is considered to be normal while a number in the 10–24 range indicates that expert medical advice should be sought. For instance, scores of 11-15 are shown to indicate the possibility of mild to moderate sleep apnea, where a score of 16 and above indicates the possibility of severe sleep apnea or narcolepsy. Johns MW. A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep 1991;14(6):540-5.

Another validated assessment tool for moderate-to-severe OSA is called the four variable screening tool[20], which consists of only 4 variables: sex, blood pressure level, body mass index, and self-reported snoring. Lastly, another assessment tool that can be utilized to measure OSA could be the PSQI[22]. This tool has its benefit in that it gathers more data but its limitation is that it is not as quick or easy for the patient to fill out.

It was helpful that the patient was familiar with OMT and compliant with her treatment. The following photographs illustrate some changes in facial appearance, TMJ function, tongue function, and dental function. Although EMG measurements would have helped to further demonstrate the functional changes in an objective manner, for the patient, the changes and improvement of her activities of daily living were reported as “profound.” Also, although the patient noted that most of her symptoms worsened with dental work (maxillary veneers), the patient refused to have veneers re-done.

Conclusion:

The purpose of this study was to show the benefits of myofunctional treatment working in a multi-disciplinary team with TMD patients. As with any case study, the findings from care for this patient may not be generalized to the population at large without a control group, sham procedures, and randomization. Yet the pre- and post-therapy

assessments and the temporal relationship between the interventions and her chronic unremitting discomforts suggest that OMT may have played a significant role in her recovery. Due to the finding of this study, greater research into OMT relationship to interdisciplinary are in the field of OSA, orthodontics, TMD, and co-treatment may be warranted.

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Resolution of acid reflux and associated symptoms in two infants undergoing chiropractic care.

Karen Orgel, BA

Introduction:

Infant colic is most commonly defined as crying for more than three hours a day for more than three days a week over three weeks in an otherwise healthy infant. [1-6] Colic occurs in between 10 to 40 percent of the population and is the most common complaint in an infant's first year of life.[2] Infant colic usually begins between birth to twenty four weeks of age.[3] Colic can be very stressful for parents and a big concern for the infant is shaken baby syndrome, abuse and neglect.[2-4] Some of the other risks for infants with colic include; being taken off breast milk, being prematurely put on solid foods, given unnecessary invasive testing, and given unnecessary medication among others.[4] Infants with colic have been reported to have behavioral problems, more tantrums and sleep problems as toddlers, as well as lower academic achievement in later years.[3,6,8]

Infant colic can occur due to gastrointestinal factors such as; gastro-esophageal reflux, intolerance to cow's milk, other food sensitivities, hormonal alterations and disturbances of the autonomic nervous system, as well as non-gastrointestinal factors and other pediatric conditions. [2,6]

Gastroesophageal reflux disease (GERD) is defined as the reflux of gastric contents into the esophagus, causing symptoms such as regurgitation, vomiting, poor weight gain, dysphagia, abdominal or substernal pain, esophagitis, and respiratory problems.[9] In addition to impaired expulsion of gastric reflux from the esophagus, GERD can also be due to incompetence or relaxation of the lower esophageal sphincter, or hiatal hernia.[10] If this sphincter muscle doesn't close well, food, liquid, and stomach acid can leak back into the esophagus. This is called gastroesophageal reflux that can cause damage to the esophagus.[11]

"GERD in otherwise normal children can persist through adolescence and adulthood in a significant proportion of patients who continue to have GERD symptoms and signs, and use antisecretory medications. Childhood GERD is a risk factor for GERD in adolescence and adulthood."[12]

Gold notes that the emerging "evidence suggests that GERD in some subjects is a chronic, potentially life-long condition that begins in childhood, and in those in whom disease onset is early, there may be a higher risk for long-term severe disease sequelae" [13]

Medical interventions for colic include administration of drugs such as, simethicone (which has not demonstrated conclusive benefit), dicyclomine (which was used until mid 1980 and has been contraindicated in its use in infants less than 6 months old)[14,15] and methylscopolamine (which is neither effective nor safe).[7,14] Among other side effects, additional risks of these medications include apnea, seizures and coma.[14]

Some of the conservative methods for treating GERD in infants focus on physical modifications such as positioning during feeding or smaller feedings. Some low-risk dietary interventions include the removal of cow's milk from the infant's diet as well as the addition of fiber enriched formulas or changing to soy formula. Changing breastfeeding mother's diets to hypoallergenic, low allergen diets may also be helpful. Even though these interventions may have a beneficial effect on symptoms of colic, the research is not conclusive, so more and better studies are needed.[4,14]

Case Report:

Patient History

Two infants presented for chiropractic evaluation and possible care with complaints of acid reflux and trouble falling asleep with frequent waking and crying. Mothers reported difficulty breast-feeding as well as infants gagging and regurgitating following feedings.

The first infant, who was five months old upon initial evaluation, was previously diagnosed with GERD by his pediatrician and prescribed Ranitidine. The medication did not seem to help alleviate symptoms. The history of the infant's birth revealed a cesarean delivery, due to breech presentation, where the mother received drugs.

The second infant, who was six weeks old upon initial evaluation, was also previously diagnosed with GERD and prescribed Prevacid. In addition to Prevacid the infant was given Vitamin D and Gripe water. The mother complained that symptoms occurred daily, affecting their routine as well as sleep quality and duration. The mother reported symptoms were worst in the evening and they were getting progressively worse. History of infant's birth revealed a long delivery of twenty-two hours, which was induced due to the mother's post term status.

Physical Examination

Physical examination of the two infants consisted of the analysis of four of the five components of VSC (vertebral subluxation complex). These five components developed by Dishman and Lantz include: Spinal Kinesiopathology (including visual postural distortion due to compensation, ranges of motion of areas of the spine as well as motion palpation and leg checks), Neuropathophysiology (paraspinal trigger points), Myopathology (paraspinal muscle spasm), Histopathology (supraspinous ligament inflammation), and Biochemical changes.[16] The Pathophysiology (x-ray) component was not assessed due to the age, history and presentation of the patients.

Using the VSC diagnostic components as developed by Dishman and Lantz and described by Kent[16] to evaluate these two infants physical examination of the first infant revealed a right leg half inch shorter than left in prone position. The infant had a decrease in range of motion in cervical right rotation. Neuropathophysiology and left paraspinal trigger points at C1 and C2 on the left as well as L4 and L5 on the right. Myopathology,

consisting of paraspinal muscle spasm was also found at C1/C2 on the left and L4/L5 on the right. Histopathology, consisting of supraspinous ligament inflammation, was found at C1/C2 on the left and L4/L5 on the left. Working diagnosis was abnormal posture, cervical subluxation, lumbar subluxation and muscle spasm. Management consisted of chiropractic visits twice a week for two-weeks and then once a week for ten-weeks.

Physical examination of the second infant revealed a left leg quarter inch shorter than left in prone position. The infant had a decrease in range of motion in cervical left rotation. Neuropathophysiology and left paraspinal trigger points at C1-C3 on the left as well as at L2/L3 and L4/5 on the left. Myopathology, consisting of paraspinal muscle spasm, was also found at C1-C3 on the left as well as L2/L3 on the left and L4/L5 bilaterally. Histopathology, consisting of supraspinous ligament inflammation, was found at C1/C2 on the left as well as L2/L3 and L4/L5 on the left. Working diagnosis was cervical subluxation, unequal leg length, sacral subluxation and abnormal posture. Management consisted of chiropractic visits twice a week for two-weeks and then once a week for ten-weeks.

Technique

At every visit, the infants were assessed for subluxations (spinal segmental asymmetry in position and/or function) using motion palpation and were adjusted using Full Spine/Diversified Technique. This technique is based on a segmental model. This model analyzes subluxations in terms of alterations in motion segments. Full Spine Technique/Diversified Technique uses high-velocity; low amplitude manipulation to correct their subluxations with the goal of restoring the body to normal biomechanical and neurological function.[16,17]

A vertebral subluxation is defined as "a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health."[18] Neurological interference may be caused by cord compression, nerve root compression, local irritation, vertebral artery compromise, as well as ANS (autonomic nervous system) dysfunction.[16] Studies show a relationship between the VSC (vertebral subluxation complex) and ANS (autonomic nervous system) function. This relationship is referred to as a somatovisceral reflex.[19] Spinal manipulation has been described to have an affect on local neurophysiological function,[20] its interrelationship with ANS function[21] and visceral function[22,23] due to modulation of central autonomic control mechanisms.[24]

Intervention and Outcomes

Following the parent's consent the infants were checked and adjusted using Full Spine/Diversified Technique modified for infants size. They were checked for subluxations using motion palpation assessments. The adjustments were performed on a flat bench chiropractic table using sustained contact manual adjustments. Following their adjustments the infants were rechecked for range of motion, leg check and posture analysis.

Both infants experienced a resolution of symptoms, as reported by their mothers, and discontinued medication by the end of initial care. The mothers reported their infants had a better disposition as well as better quality and duration of sleep. Components of VSC were decreased and range of motion increased. Both infants are currently continuing chiropractic care for maintenance and wellness. They continue to be regularly checked and adjusted as needed.

Discussion:

There have been challenges assessing the value of chiropractic care in the treatment of pediatric conditions.[25] Simultaneously, our scientific community has made inquiries in an attempt to isolate the subset of patients with non-musculoskeletal conditions that might best respond to chiropractic care.[26-30] While there is a scarcity of published literature relating to the chiropractic treatment of non-musculoskeletal conditions,[8] particularly of pediatric patients,[31] some degree of evidence for chiropractic treatment of gastric related conditions has been found in the literature.[1-4,6,10,32-36,38,39,44,45]

Chiropractic care is concerned with the preservation and restoration of health, and focuses particular attention on the location and correction of vertebral subluxations.[16,18,37] At this time there has not been any extensive comparative study determining which specific chiropractic technique may be best suited for treating non-musculoskeletal conditions such as infant colic or GERD.

Hipperson had two cases of infant colic that both had complete resolution of symptoms following a short duration of chiropractic care using diversified technique.[33]
Elster presented a case series (n=16) on infant patients with colic and GERD. All sixteen infants were completely symptom free following two to eight weeks of upper cervical care.[34] Buchakjian utilized "light-force" chiropractic and cranial care, 19-treatments over the course of 2-months, to successfully treat a 5-month-old female with vomiting, gastro-esophageal reflux, and fussiness.[36] Sacro occipital technique (SOT) and chiropractic manipulative reflex techniques (CMRT) were used in two separate cases to eliminate symptoms of GERD in a 3-year old male child in 5 office visits[10]and hiatal hernia and esophageal reflux in a 1 year old female child in 4 office visits.[35]

Since medications are commonly used in allopathic care models it may be of value to compare the adverse side-effects of pharmaceutical interventions to chiropractic care which may offer a lower risk and beneficial treatment for infant colic, GERD, and other gastrointestinal disorders found in children. The standard medical care of infant colic and GERD is the prescription of medications such as omeprazole,[40] lansoprazole,[41] and esomeprazole.[42] Even though the efficacies of these medications are questioned and have harmful side effects, they continue to be commonly prescribed during the infant's first year of life.[43]

According to Roberts and Neu in the treatment of colic[44] and GERD[45] medications have not been found to be an effective option, therefore other low-risk options such as chiropractic may be a viable consideration.

Wiberg, et al performed a study on fifty infants. Twenty-five of the infants received the drug dimethicone and twenty-five received spinal manipulation. They found that the group that received the spinal manipulation had better results as reported by parents than the group receiving dimethicone. They also concluded that spinal manipulation has a positive short-term effect on symptoms of colic.[46]

A study by Alcantara and Anderson showed a significant decrease among in hours of crying by a child undergoing chiropractic care that was unresponsive to omeprazole.[47] Further studies investigating chiropractic care of infantile colic are indicated since while one randomized study[48] noted that chiropractic care for colic was no different than a placebo, another study[49] noted that chiropractic care may well be a viable option. Since the evidence suggests that chiropractic care of pediatric is a low-risk intervention,[50-54] it is notable that Humphreys states with chiropractic care, "serious adverse events are rare and much less than for medication commonly prescribed …"[55]

In addition to Wiberg's study, illustrating short-term improvement associated with chiropractic care, other studies have been shown chiropractic to have a long-term benefit with other conditions associated with colic and GERD. For instance infants who were under chiropractic care for colic experienced reductions of incidents of temper tantrums as well as improvements in their quality and duration of sleep, which continued into toddlerhood.[6,7]

As with any case study, it is difficult to generalize the findings of a patient's apparent response to care to the population at large. With case studies there are limitations such as lack of a control as well as the placebo and ideomotor effects. It is not uncommon for outcomes to also be attributed to a patient's natural progression or regression to the mean. Of note is that both infants in these cases responded well to care, were able to be removed from their prescribed medications with complete resolution of symptoms, and from the parent's perspective were pleased with the chiropractic treatment their child received.

Conclusion:

The case reports suggest that chiropractic care and adjustments of subluxations in these two cases seemed to improve, decrease and resolve symptoms of colic and GERD in both infants and that infants with similar presentations of colic and GERD might also benefit from chiropractic care. Since pharmaceutical options are not always effective and have harmful side effects, offering low-risk options such as chiropractic would appear to be a reasonable option. More research is warranted in the areas of infant colic and GERD and the effectiveness of chiropractic care for these disorders as well as on other non-musculoskeletal disorders.

Acknowledgments:

would like to express my thanks to Dr. Jacob Wilson for providing me with the case studies for this paper and for the care of these patients. Special thanks to Dr. Charles Blum and Dr. Matthew McCoy for their mentoring and continued support of research and love of Chiropractic.

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Conjugate gaze visceral release in female chronic pelvic pain: A case study.
Vincent L. Perri, DC, PhD

Introduction:

Chronic pelvic pain in women is generally characterized by pain in the pelvic or uro-genital region. [1-6] This is the area below the umbilicus and between the anterior superior iliac spines (ASIS's) of the pelvis. In women chronic pelvic pain is not well localized and is generally present for six months or longer and is often secondary to a primary disease, but can be a primary disorder in its own right. [1-4] Chronic pelvic pain presents with great patient variability and is usually different in clinical presentation from woman to woman. The pain is also variable and can range from mild to moderate pain to one that is steady and severe. [3] The pain often makes it difficult for the affected patient to live a normal life as it is often associated with painful sleep and work. Chronic pelvic pain can be affected by disorders or diseases of both the peritoneal and perineal cavities including irritable bowel syndrome (IBS), inflammatory bowel disease (IBD), cystitis, urinary tract infections (UTI's), endometriosis, adenomyosis, uterine fibroids, adhesions from previous surgeries or infections, and even women with a history of sexual abuse. [7, 8] Female chronic pelvic pain will often transition from mild sensory or nociceptive pain to a more widespread inflammatory pain that may become neuropathic in nature activating wide dynamic range (WDR) neurons in the cord. [7, 8]

The patient in this case study is a forty-five year old woman who presents with chronic pelvic pain. She commonly suffers with dysuria, painful coitus, abdomino-pelvic spasm, chronic constipation, dysmenorrhea, recurrent urinary tract infections, and colic. She has suffered with lifelong endocrine dysfunction and has subclinical thyroiditis and autoimmune abnormalities characterized by positive ANA's and positive anti-DNA antibodies. Her past medical history includes adenoid cystic carcinoma of the left parotid gland status post radical neck dissection, tubal ligation and uterine ablation. Based on her current weight of 180 pounds, height of 5 feet 6 inches, blood pressure of 130/70, increased waist/hip ratio, and abnormal lipid profile she meets the criteria for metabolic syndrome. Her laboratory analysis of serum estrogen, DHEA, DHEA-S, cortisol, FSH and LH presented abnormalities commonly associated with a probable diagnosis of pregnenelone steal syndrome.

Relevant Review of the Literature:

In addition to the numerous published texts in visceral manipulative techniques and their established clinical outcomes, the more current literature provides ample academic support for manual therapies in chronic pelvic pain or dysfunctional uro-genital syndromes. [9-11, 12-15, 16-20] This case study will lend support for the use of specific reflex based therapeutic manipulations in conjunction with conjugate eye movements to help restore the normal non-painful state in dysfunctional uro-genital syndromes. [21]

Intervention/Methods:

Examination

A comprehensive examination of the abdomen presented with hypoactive bowel sounds, tenderness over the general epigastrium to both superficial and deep palpation with localized tenderness over the common bile duct, sphincter of Oddi, and tubo-ovarian regions bilaterally. There were no palpable masses or abdomino-pelvic bruits. Fascial restrictions were noted in all four quadrants of the abdomen and over the oblique plane of the common bile duct. The fascia overlying the tubo-ovarian regions was guarded and restricted, and all the fascial planes were unresponsive to manipulative movement.

Therapeutic Intervention

In order to understand the therapeutic intervention employed in the Conjugate Gaze Adjustive Technique a brief explication of conjugate eye movements, their role and utility in central nervous system (CNS) facilitation, and their observable effects is warranted. In conjugate eye movements, the eyes conjointly move laterally to either side of the body. [21] This occurs through activation of the contralateral cerebral hemisphere which activates the ipsilateral abducens nucleus on the side of conjugate gaze and then activates a retrograde conduction through the medial longitudinal fasiculus to activate the contralateral oculomotor nucleus.[21, 22] Thus, the ipsilateral lateral rectus and the contralateral medial rectus conjointly move the eyes. This combination of neural inputs occurs as a coordinated effort within the center for conjugate gaze in the paramedian pontine reticular formation.[21, 22]

As it regards the Conjugate Gaze Adjustive Technique, it has been further documented that the mobilization or conjugate movement of the eyes is a prioritized movement within the CNS in relation to body movement, and always occurs with the eyes moving 20 milliseconds before the CNS activates movements of the head or limbs.[23, 24] Similarly, when the eyes, head or limb are moved in a triadic movement the eyes always arrive at their target at least 200 milliseconds before the body.[23, 24] It was concluded that the movement of the eyes and its subsequent visual focus insures both the effectiveness of the action once it is activated, and the facilitation of the CNS on the side of eye movement or conjugate gaze. [23, 24, 25-28] Thus, CNS motor activity or facilitation is increased on the side of conjugate gaze. [21]

With the patient in the recumbent position, a four quadrant organ specific manipulative reflex intervention was employed. Seated at the patient's right, the superior contact hand was first placed over the gastroesophageal region at the 5th through 7th ribs from the xiphoid process and across the left costal margin. This follows the fascia's line of direction commonly referred to as Langer's lines. This is also a postganglionic contact for the gastroesophageal region and is anatomically associated with both the myenteric and Meissner's plexus. The inferior hand was placed under the patient's thoracic spine along the sympathetic chain ganglia at the lower thoracic segments to feel for vasomotor effects commonly referenced by DeJarnette in chiropractic manipulative reflex technique. [12]

In this study the manipulative reflex technique utilized was employed by performing gentle non-forceful traction along the medial to lateral transverse plane of Langer's lines and followed an imaginary anatomical clock as a reference point. In this method the fingers of the manipulative hand point toward the three o'clock position when working across the transverse plane. The manipulation proceeds from its point of origin toward the three o'clock position followed by a transverse manipulation toward the nine o'clock position. This is then followed by manipulative releases inferiorly and superiorly from the six o'clock position to the twelve o'clock position respectively. In this method all four quadrants are gently activated along the precise anatomical plane associated with Langer's lines and the enteric and autonomic nervous systems. [29-33]

In this patient, gross anatomical restriction of the fascia was noted in the medial to lateral plane and was associated with mild tenderness and a feeling of tension in the left upper quadrant. It should further be noted that there were no palpable vasomotor responses at the level of the sympathetic chain ganglia during the manipulative procedure. In order to activate CNS and autonomic facilitation toward the side of fascial restriction the patient was instructed to perform three conjugate gazes toward the side of the fascial barrier in this case her left. On the second conjugate gaze an immediate release of the fascial barrier occurred with palpable vasomotor responses at the level of the cord. The patient experienced an immediate sense of relief in the left upper quadrant and was without palpable tenderness or restriction on palpation. This procedure was used in all four quadrants and over the fascia of the common bile duct and sphincter of Oddi with similar results commensurate to the degree of fascial restriction.

Results:

The patient rated her pain before treatment as a 7/10 on NPS 0-10. At the end of her first session she rated her abdominal and uro-genital pain a 2/10. Following three manipulative sessions over the course of one to two weeks the patient reported a return to normal bowel movements, and stated she was no longer taking antacids for her indigestion as this had begun to resolve. Following another two to three manipulative sessions over the course of approximately two weeks the patient's urogenital symptoms began to decrease in intensity and her chronic pelvic pain began to resolve. At this point in time the patient is without any significant abdominal or urogenital symptoms.

Discussion:

The practitioner must be certain that there are no active inflammatory, infectious, or malignant neoplastic disorders present when visceral fascial manipulations are performed. Visceral fascial manipulations should not be performed on any patients who are actively bleeding or recovering from recent surgery in the abdomino-pelvic region. These are distinct contraindications and should be properly determined by an appropriate physical examination and patient interview. [9]

Periodic interval examinations are performed with this patient to insure long term positive clinical outcomes. At present she is relatively symptom free, but returns for evaluations between one and three months following treatment depending on the onset of symptoms. Clinically it has been documented that CNS and ANS pathways can be activated by low threshold mechanoreceptor inputs that facilitate signaling pathways via proprioceptive signals to the cord. [1, 9, 14, 15, 34] There is also more limited documentation that pre-motor and motor pathways may be reflexively integrated with eye and head movements. [21, 23, 25, 27, 28] Conjugate eye movements and/or patient assisted movements may recruit CNS motor facilitation to a peripheral reflex contact in a feedforward manner similar to posture and gaze control mechanisms.[22, 25, 28] These pathways may be similar to the longstanding pathways commonly associated with such ancient healing methods such as acupuncture, meridians, and chakras. [12-14]

Due to the intrinsic complexity of these pathways it is difficult to precisely determine just how the neural mechanisms are processed; however, the neural pathways and their autonomic outflow are well defined academically.[22] It should be possible and feasible to perform these manipulations and the conjugate gaze applications under both electroencephalographic and electromyographic analysis to determine the precise responses to the manipulative technique.

The conjugate gaze applications as they are described herein are part of a complete therapeutic approach to the patient known as the Conjugate Gaze Adjustive Technique.[21] This approach is presently an intellectual explication of a developing theory and practice, and should only be employed by licensed practitioners within the scope of their license and regulating agencies. The Conjugate Gaze Adjustive Technique can be used on its own merits, or it can be used to compliment SOT's CMRT methods once the basic neurology of the technique is understood.

Conclusion:

The purpose of this case study is to elucidate the development of the Conjugate Gaze approach to visceral and somatic dysfunctions, and how it might help expand upon DeJarnette's CMRT. This case study and academic perspective discusses some neural pathways also mentioned by DeJarnette in his pre and postganglionic contacts. It is hoped that this may facilitate creating an academic paradigm to further investigate CMRT interventions in recalcitrant organic dysfunctions. Further research is needed to determine if the results of this case report can be generalized to the population at large or if a subset of patient may be better suited to this care.

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Chiropractic care and its effects on a patient with a moderate traumatic brain injury.

Ryan Pollard

Introduction:

Chiropractic is a health care profession that has an emphasis on disorders of the musculoskeletal and nervous systems. Chiropractic care is used to treat neuromusculoskeletal complaints, including but not limited to back pain, neck pain, joint pain and headaches[1]. There has been emerging evidence that suggests chiropractic care may play a role in treatment of head injuries.

According to Ghajar, "with the increase in the attention to traumatic brain injuries, there has been a call to find ways treat these injuries. A moderate traumatic brain injury has been defined as having a Glasgow coma scale score of 9-13 and includes symptoms like lethargy and stupor[4]." Ghajar goes on to note that "… neurological damage does not all occur immediately at the moment of impact but evolves afterwards (secondary injury). Most secondary brain injuries are caused brain swelling with an increase in intracranial pressure and subsequent decrease in cerebral perfusion leading to ischemia[4]." Some mild traumatic brain injuries and most severe injuries can cause permanent impairments[5]. A persistent headache is a common symptom following a minor head injury concussion possibly related to simultaneous injuries of structures of the cervical spine[6]. Headaches that result from head trauma are often accompanied by other symptoms such as dizziness, difficulty in concentration, nervousness, personality changes and insomnia. These constellations of symptoms are known as "post traumatic syndrome[7, 8]."

Chiropractors use multiple techniques to analyze the biomechanics, structure and functions of the spine to assess how the vertebrae may be affecting the neuromusculoskeletal system. The effects of vertebral neuromuscular dysfunction are termed "subluxations" within the chiropractic profession. A subluxation is defined as a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health[11,12]. There are various techniques used to analyze and treat subluxations. The technique that was used in this case was Sacro-Occipital Technique (SOT), developed by Major Bertrand DeJarnette DO, DC. Dr. DeJarnette created three specific categories that are associated with the anterior and posterior aspects of the sacroiliac joint and lumbosacral region. These categories have methods of identification (called indicators) offering pre and post treatment assessment, protocols, and a system based approach to care[9, 10].

The purpose of this paper is to discuss how conservative chiropractic care and specifically SOT may be utilized to treat a patient suffering from the long-term effects of brain trauma.

Case Report: *Patient History*

The patient presented for chiropractic care in 2003 presenting with secondary symptoms related to injuries from a moderate traumatic brain injury. He had been thoroughly evaluated multiple times by both an orthopedist and neurologist prior to presenting at this clinic. Those examination findings were incorporated into the chiropractic evaluation and assessment.

The patient was injured in 2003 while working as a construction supervisor on the set of a television program. He was struck twice in the head. The second blow rendered him unconscious. He was taken to the urgent care and treated by a worker's compensation doctor who sutured the open head wound was told to rest.

Subsequent to being dismissed by the urgent care physician he experienced neck pain as well as difficulty with thought processes, difficulty with concentration, irritability and short temper, phonophobia, difficulty reading and comprehending, short and long term memory, blurred vision, balance difficulty, hot flashes and night sweats, fatigue, sleep difficulties, dizziness, severe headaches, and sensations of disconnectedness.

A review of the reports from the urgent care doctor, neurologist, and orthopedist note that the patient had a well healed laceration on his head, with no battle signs or raccoon eyes noted. His blood pressure at the time of their evaluation was 120/70, 70 per minute pulse, and 12 breaths per minute. The urgent care doctor reported that the patient had trouble concentrating and providing full history. At that initial post-accident examination he showed no deficits with his neurological exam, though he did have diminished grip strength in his right hand and a trace drift.

An MRI following the urgent care visit was performed that found a 2x2x1 centimeter mass of mixed signal in the right cerebellar peduncle involving the right superior pars. It noted a subacute hemorrhage and calcification suggestive of an injury to the skull. The medical radiologist reviewing the study suggested that the signal consistent with a cavernous angioma.

The neurologist's report following the injury described that the patient had decreased sensory finding with spotty distribution without clear dermatomal pattern loss. Deep tendon reflexes were brisk on the left as compared to the right. Plantar stimulation was ambivalent bilaterally. His gait was moderately wide and ataxic. He was unable to perform tandem gait, and Romberg was positive. He was diagnosed with post closed head trauma with residual post traumatic head syndrome, including headaches, concentration difficulties, problems with coordination, difficulties with speech and mentation, emotional liability and fatigue. The neurologist remarked that it is unclear how much of the patients deficits are due to direct frontal trauma or how much is secondary to his midbrain pathology.

Chiropractic Examination

The chiropractic assessment questioned the patient regarding his function prior to the injury and he reported that he worked full time and was a high functioning martial artist. He described some exercises he commonly would perform prior to the accident which involved standing on a 4 inch by 4 inch post that was 2 feet off of the ground for one hour while performing leg kicking and then moving to the other foot and repeating this exercise. He was deeply concerned that following his head trauma that not only would he never do that exercise again but that he would be unable to stand on his own two feet securely.

The patient was observed to have difficulties with dizziness, cognition, headaches, as well as loss of balance. The patient was assessed while walking, standing, sitting, and lying in prone and supine positions. The assessment involved visual, palpation, assessing muscle strength and flexibility with the goals of looking for body asymmetry in position and function.

The patient was observed to have hypertonicity on the left of his body which appeared to affect his neck, left shoulder, scapula, rib cage, pelvis and hip. These presentations were consistent with a person exhibiting a possible upper motor lesion. Along with his multiple presenting symptoms, lack of balance, disorientation and having lost consciousness at the time of the trauma all these findings were highly suggestive of a moderate traumatic brain injury. Based on SOT evaluation protocols he was found to have left scapular fixation and increased tension at the left diaphragm, quadratus lumbar, and iliopsoas muscles. Reduced internal rotation of the right hip along with reduced external rotation of the left hip was noted. Based on cervical transverse process sensitivity he was determined to have a spinous rotation of L3/4. Findings of a posterior sacroiliac joint chronic instability syndrome (category two) was noted and it was unclear whether this was due to his fall at the time or injury or due to his unsteady awkward gait. The cervical spine was assessed with SOT's cervical stairstep procedure and a thorough cranial assessment was performed determining some cranial dural and CSF pulsation imbalance as well as temporomandibular joint dysfunction (TMD).

Interventions/Methods:

The patient was initially seen twice a month for 3 months and then approximately once a month for two years. He is still under care 10 years later and seen approximately 6 times per year. At this time a typical pattern of presentation and care has been determined. He commonly presents with tension in the myofascia on the left side of the pelvis to the left scapula and initially is treated supine as follows:

1. Release left iliopsoas muscle with SOT psoas release.

2. Release left quadratus lumborum with SOT's CMRT psoas kidney procedure.

3. Release left diaphragm anterior and posterior crural tension.

4. Release left scapula muscles so scapula can move freely.

The patient is then directed to turn over and is treated in the prone position:

1. Right restricted hip internal rotation is released with SOT hip extremity technique to free posterior hip external rotators as they attach to the posterior hip joint capsule. This technique is performed by rotating the bent leg at 90 degrees while pressure is applied to the posterior hip joint capsule.

2. He commonly presents with right C3-5 transverse process pain and swelling which relates to L3-L1 anterior transverse process rotation based on the Lovett brother relationship or the R+ C factors as described by DeJarnette[12]. He is treated with orthopedic blocking; one block placed between the left ASIS and greater trochanter and pressure is applied on the right spinous process with pressure from right to left and is held until the right cervical transverse process pain subsides (approximately 2-3 minutes).

3. About 10% the time he will present with a positive sacral cup, which is weakness and pain on prone straight leg extension, which becomes strong and pain-free with P/A pressure to a sacral segment. When the sacral segment is found that improves function it is adjusted P/A with constant thumb pressure as he raises and lowers his straight leg. It can vary which leg and which sacral segment needs the specific pressure.

He then turns over to be treated in a supine position:

1. Consistently he presents as a Category Two and with pelvic torsion (physiological left short leg). His category two indictors relate to sensitivity at his inguinal ligament, medial/lateral knees, and particularly with asymmetrical scalenus muscle tension (most commonly on the left side). Category two blocking is both a mechanical and neuromuscular approach to affect whole body balance by reducing pelvic muscular and osseous distortion. Treatment entails the placement of wedged blocks (patient is supine) underneath the iliac crest one side and the opposite side block placed under the greater trochanter [14]. During the pelvic blocking the pain in the inguinal ligament and knees subside. Sensitivity of the scalenus muscle subsides becoming symmetrical compared to the right side. Once the sensitivity in the inguinal ligament and knees subside and the scalenus muscles become symmetrical the blocks are removed.

2. The patient's cervical spine is assessed with a cervical stairstep procedure as utilized within SOT but modified with the head laterally flexed to analyze the ipsilateral articular facet position and function. When a compromised articular facet is found, most commonly fixated, the joint is held at the particular cervical stairstep step with the head laterally flexed and pressure is applied vectored to the

cervical vertebra to facilitate tissue relaxation. The whole cervical spine is assessed and treated in this manner until normal coupling motion is attained throughout the cervical spine.

3. Following balancing the cervical spine motion and position then the cranium is assessed and treated. Generally the internal periosteal/meningeal dura is assessed and balanced using sphenobasilar symphysis technique, which assesses the cranial dura in flexion/extension, torsion, side bending, lateral and vertical strain patterns, and A/P or lateral compression strains. Theoretically the intraspinal membranes enable the cranium and sacrum to function in unison[15]. If any cranial dural strain patterns are found they are treated with gentle (commonly indirect cranial) procedures until normal cranial motion is attained.

4. Lastly his CSF pulsations are assessed by palpation and balanced so pulsation symmetry is found throughout the cranium side-to-side and anterior to posterior.

While there were no return to full function the treatment rendered appears to reduce pain and neurological imbalance for periods of time, sometimes lasting for a few weeks. The care aids with his balance, walking, and general flexibility. Following care the patient finds it easier to sleep and perform activities around his home. He has not worked since the 2003 accident At this time the care is considered supportive and the focus is to prevent worsening of his condition and facilitate sustaining his quality of life by helping him be as independent as possible.

Results:

The initial goal of his treatment was to maintain as much balance as possible in the myofascia until such a time as his nervous system could recover greater inhibitory function. There were noted improvements in his cervical range of motion that was based on doctor and patient observation. Following care the patient's gait was slightly improved, with less widened base, but any improvements were not long standing due to lapse in care. Any time care lapsed for more than a month there would be degeneration in the patient's progress.

Discussion:

Traumatic brain injury and Sacroiliac dysfunction

There have been some studies that discuss the relationship between the sacroiliac sprain, cervical spine and TMJ, but in this case this relationship is not clear. [17-20] With any form of traumatic brain injury, application of a high velocity low amplitude adjustment (HVLA) may not be indicated to the cervical spine. Prior to treating the cervical spine, treatment was aimed to reduce any reciprocal lumbar imbalances through orthopedic blocking [21]. Hochman illustrated a relationship between blocking placement to the pelvis;

category two blocking not only increased range of motion in the lumbar vertebra but also within the cervical spine[14]. Giggly and Tepee also found that orthopedic blocking had a positive effect on cervical spine extensor isometric strength[22].

Chiropractors practicing SOT have traditionally found that patients can present with ascending problems from the lower extremities to the pelvis, spine and the cervical and craniomandibular regions. Other times there may be descending presentations which are lumbosacral or cervical spine dysfunctions secondary to craniomandibular, temporomandibular, or occlusal imbalances[21]. From an SOT perspective it is suggested that most patients present with mixed kinematic patterns of ascending and descending influences.

The patient appears to have an upper motor neuron dysfunction affecting the left side of his body. His altered gait and imbalance appears to ascend through his body's kinematic chain as he attempts to maintain balance via his compromised visual and vestibular righting reflexes. The patient is found to have an extremely hypertonic psoas. Knutson notes that the psoas courses in front of the sacroiliac joint and some of its fibers intermingle with the anterior ligaments[16]. So it is theorized that the increase in psoas tonicity, may be splinting secondary to his pelvic instability along with his unusual ambulatory gait. DeJarnette questioned the use of HVLA thrust into an unstable sacroiliac joint and preferred using supine blocks (category two) to slowly reduce pelvic torsion and improve joint force closure. The loads imposed through blocking are thought to allow the sacrum to slowly approximate its position to the ilium ultimately into normal juxtaposition[22].

Traumatic brain injuries and temporomandibular dysfunction

It would be reasonable to assume both impacts to the patient's forehead may have caused a cervical whiplash injury and possibly contribute to his TMD presentation[23-25]. In the first year of treatment the patient was noted to have altered dental occlusion, TM joint translation, masticatory muscle tension, and nighttime bruxism and clenching. While treated with chiropractic cranial therapy the condition continually returned. He was referred to a dentist who produced a nighttime dental splint to protect his teeth and facilitate TM muscle balance. He was also given specific exercises utilizing tongue position to improve his TM joint translation.
Treatment of the cervical spine utilized the cervical stairstep treatment which is a gentle technique that involves no thrust into the cervical spine. When an articular facet motor unit is determined to have altered motion, then the cervical spine is held at that level. While held at that level a very small group of motions can be applied one at a time[10].

SOT cranial technique uses active and passive cranial palpation evaluation assessments[26]. In various locations in the body the fascia arranges itself along a transverse plane. This occurs at the pelvic diaphragm, the respiratory diaphragm, the thoracic inlet, the cranial base and tentorium cerebelli. The fascial gliding mobility tends to be more apparent in the longitudinal direction than in the transverse. Upledger determined that fixation or restriction within any transverse planes of the fascia can easily impair the normal gliding

mobility of the longitudinal fibers[14]. By affecting the sphenobasilar and releasing the fascia he could affect the transverse fascia that may affect whole body kinematic chain function[15,27].

Gregory, noted TMD was improved following chiropractic (SOT) treatment for a sacroiliac sprain and suggest that cranial treatments could help pelvic balance, and pelvic balance could be associated with helping TMJ function[28]. Gregory stated that through category two blocking unrelated symptoms have been found to diminish. Gregory found success in easing TMD and sacroiliac joint pain with as few as two separate visits performing category two blocking[28].

Traumatic Brain Injury

Data from the TBI model systems' national database suggest that change is more common than stability for long term global outcomes of subjects with moderate or severe TBI, who require rehabilitation. After ten years as many as 1 in 3 persons decline from previously achieved outcome with most deteriorating two levels on the Glasgow outcome scale[4]. There is evidence that a subset of TBI's trigger progressive degenerative processes is affecting cognitive and/or motor function[5], much like in the patient's case.

Advances in critical care such as imaging have lead to reductions in death and disabilities resulting from TBI. The next advance maybe related to prevention associated with pre-hospital recognition and the treatment and care of TBI's[4]. Too often research has focused upon a reductionist model for the treatment of TBI, when sometimes recovery is a multifactorial process[29]. Hopefully future multidisciplinary care will be employed so that traumatize patient can be properly triaged. Hurst states that subjecting all aspects of clinical practice to audits in the chiropractic realm would demonstrate an attempt to achieve higher standards[30].

Protocols and procedures in management of traumatic brain injuries

Ideally assessments and treatments of TBI, would involve an interdisciplinary approach[31] in management of many conditions associated with TBI's. It could involve chiropractic care, neuropsychologist, speech therapist, physical therapist for balance and rehabilitative exercises, biofeedback, acupuncture, and other integrative low risk interventions.

Chiropractors as well as other health care providers need to keep in mind that treating TBI's is not a "cookbook approach" and programs need to be tailored specifically to each individual. Age, gender, socioeconomics, and culture all play a pivotal role in the patients' recovery[32]. Patients should receive a battery of questioners and physical assessments, to keep a baseline and monitor progress. The patient should be tested on the Glasgow assessment questionnaire as well to denote progress or deterioration[4].
Chiropractors treating TBI patients need to continually assess are the patient's vision, eye movement, pupil reaction, hearing, balance, coordination, mood, gait, and cardiac condition. These key elements play an important factor in a TBI patient's recovery[32,33].

With rehab of the muscles, removal of neuronal interference and normalization of the visual and vestibular apparatus, the patient may slowly improve balance and gait control. Chiropractors should encourage patients to keep a journal to help keep track of thoughts, incorporate improved memory and prevent frustration due to lack of memory. Improving sleep may be another key factor in TBI patient recovery[34]. With TBI patients stress management[35] may play an important factor since maintaining emotional stability helps the patient both personally and socially.

This case discusses a patient with chronic long-term effects from a work related head trauma causing TBI with a CNS and global whole body effect. Supportive care[36] at this clinic has focused on preventing a worsening of his condition with the hopes of over time he may develop strategies for improved function and coping. It is possible the patient might have had an improved outcome if the patient had access to greater care offering various therapeutic interventions (biofeedback, physical therapy, cognitive therapy, etc.) along with chiropractic care.

Conclusions:

This case report discusses the care of a patient who suffered head trauma and may have had a subsequent bleed of a prior cavernous angioma creating neurological related complications affecting his ability to function. The chiropractic supportive care has as its focus supporting his activities of daily living, preventing worsening of his symptoms and asymmetry, and continually working toward the possibility of improvement. With challenging TBI cases low-risk interdisciplinary care may hopefully represent future healthcare options for these patients. Further research is indicated for chiropractic's role in the treatment of TBI patients. Also to be studied is whether supportive care represents an important strategy for TBI patients to prevent losing ability to function, having a decreased quality of life, and becoming an increased burden to society.

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A comparative study between the effects of side-lying sacroiliac adjustments and Sacro Occipital Technique on the muscle strength of the gastrocnemius muscle in asymptomatic adult males.

Grant Pretorius, M-Chiro (RSA), Chris Yelverton, M-Chiro (RSA), and Malany Moodley, M-Chiro (RSA)

Introduction/Background:

Comparative studies of the effectiveness of chiropractic techniques have not been readily described in the chiropractic literature. One study attempted to rate specific chiropractic technique procedures for common low back conditions[1] while two others studies[2,3] compared assessment and outcomes for Sacro Occipital Technique (SOT) and other chiropractic techniques.

The purpose of this unblinded, randomised pilot comparative study was to determine if diversified chiropractic manipulation and/or SOT adjustments of the sacroiliac (SI) joint could increase short-term strength of the gastrocnemius muscle. IRB approval was granted by the Technikon of the Witwatersrand (TW).

Methods:

Ninety-asymptomatic male patients between the ages of 20-30 years were randomly divided into three-specific groups and received the diagnostic assessment and treatment intervention specific to that particular group. These patients were recruited by the use of posters placed around the TW campus. Group FA (force adjustment) received diversified[4] adjustments to the sacroiliac joint (SIJ). Group NA (non-force adjustment) received SOT[5] adjustments to the SIJ with SOT blocking technique. Group C (control) received detuned ultrasound over the SIJ. Each patient received only one treatment.

The inclusion criteria required that the patient was male, fall inside the above age range, and presented with asymptomatic SIJ dysfunction as determined by motion palpation or SOT category analysis. Only category one patients (pelvic torsion affecting sacral nutation) were used in this study and treated with pelvic blocks in a prone position whereas the diversified group was treated with a thigh ilio-deltoid technique. The objective data was collected using a plantar flexion isometric dynamometer[6] measuring gastrocnemius muscle strength before and after the treatment.

Results:

Inter-group analysis was achieved using the analysis of variance (ANOVA) technique, which noted a trend. The validity of the procedures was determined with a T-test for paired observations ("Before" and "After" treatment) and the p-value < 0.05. The results indicated that there was a statistically significant increase in gastrocnemius muscle strength in both experimental groups.

Discussion:

Previous studies have shown similar statistical evidence that active muscle strength is positively affected by a diversified adjustment[7], however only proximal muscles were used for assessment purposes. Therefore in this study the gastrocnemius was used to determine if an underlying neurological effect might be associated with the chiropractic treatment.

Since both the non-force and force adjustments groups showed statistically significant increases in muscle strength it was hypothesised that the capsular reflex, and its effect on the alpha motor neuron via the mechanoreceptors of the joint capsule, may have played a role in the production of an increased muscle contraction post treatment[8]. It is of interest that this and prior studies found[2,3] different chiropractic techniques had similar outcomes.

Conclusion:

The positive effect noted in the non-force adjustment group suggests that force may not always be required to produce a therapeutic effect. It is possible that safer and less invasive techniques may thus be indicated on a more regular basis supporting both practitioner and patient alike. This study contributes to information about possible underlying mechanisms of the chiropractic adjustment and may support greater study of non-force chiropractic techniques.

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Chiropractic cranial treatment protocol increases successful outcome of the multidisciplinary care model for traumatic brain injury (TBI) patients: A case series.

Esther M. Remeta, DC, Charles L. Blum, DC

Introduction:

Notoriously, all traumatic brain injury creates challenges that have various levels of negative impact on the patient's life and family. The goal of all TBI treatment plans is to try to achieve the highest state of wellness possible to increase the quality of life for the patient. Since often the prognosis of patients with TBI is dismal, offering a method of care that has low risk, reasonable benefit, and some biological plausibility is preferred. The goal of care should be to relieve patients of disability and pain while facilitating their ability to have normal activities of daily living. This article seeks to share a novel manner of multidisciplinary care, which incorporates the fields of allopathy, chiropractic, psychology, acupuncture, neurorehabilitation, and nutrition.

Case Report:

Case # 1: A 28 year old female suffered TBI from a violent attack resulting with severe debilitating headaches requiring daily bed rest for two years with her condition consistently devolving prior to initial office visit at this clinic. She was diagnosed with chronic migraines and informed that she would need prescription medication the rest of her life.

Case # 2: A 30 year old female sustained a TBI from a motor vehicle accident. PETscans noted decreased bilateral occipital lobe metabolic activity. She had chronic headaches of 2 year duration with transient paralysis of her left extremities and short term memory loss. She was informed by her neurologist that due to the duration of her post concussion syndrome that no recovery could be expected.

Case # 3: A 70 year old male suffered a TBI from a stroke causing complete paralysis of the right upper and lower extremity. He also suffered from swallowing difficulty and speech problems. His neurologist had informed him that he would never work again, would need to walk with assistance, and have compromised use of his right hand.

Treatment/Intervention:

A focal point of this multidisciplinary care at this clinic is Sacro Occipital Technique (SOT) cranial manipulation protocols[1,2] along with specific neurological rehabilitation training and home exercises. Home therapy focuses on physical, mental and emotional balance which increases efficacy of treatment. The care model is implemented for a minimum of 1 year with most patients remaining in the model for 5 years.

Results:

Case # 1: When treatment began there was a significant initial improvement along with a gradual increase in function so that now at 2 years later (1 treatment per week) headaches occur only once every 2 weeks lasting 12 hours. She is off all 10 of her prescription medications except for 1 and is currently tapering off of it under medical supervision. She now is able to live a more normal life with her young 8 year old daughter taking part in her life activities as well.

Case # 2: After 5 years of treatment (1 time per week) she is headache free, has neither short term memory loss nor any paralysis episodes.

Case # 3: After 9 months of care he was back at work full time and without paralysis, speech or swallow problems. After 5 years of care (1 treatment per week) there were no obvious symptoms associated with the left parietal lobe infarct despite brain MRI scans showing damage was still present.

Discussion:

Rehabilitation has been found effective using an interdisciplinary approach and "recovery from TBI can continue for at least 5 years after injury[3]." In another study they found, "that traumatic brain injury may cause decades-lasting vulnerability to psychiatric illness in some individuals[4]" and for a "subset of persons with moderate to severe TBI, neuropsychological recovery may continue several years after injury with substantial recovery[5]."

Conclusion:

Success was measured based on improved quality of life and return to activities of daily living along with decreased subjective and objective symptomatology. Barriers to successful outcome included patient non-compliance to treatment plan and patient financial challenges. Highest success was achieved with the 5-year model and with the inclusion of SOT cranial manipulation protocols. The temporal nature of the patient's response to care and their gradual worsening of symptoms prior to treatment at this clinic suggest the patient's conditions would have worsened. This care model gives greater hope for those suffering from TBI as well as gives the health care profession at large more options to create treatment plans resulting in better prognosis.

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Chiropractic sacro occipital technique (SOT) and cranial treatment model for traumatic brain injury along with monitoring and supplementing for neurotransmitter balance: A case report.

Esther M. Remeta, DC, Charles L. Blum, DC

Introduction/Rational:

The purpose of this paper is to present a novel treatment model incorporating laboratory testing to evaluate neurotransmitter balance and chiropractic cranial care for the treatment of a patient with traumatic brain injury.

Recently some studies have investigated a relationship between traumatic brain injury and neurotransmitters[1]. "Traumatic brain injury (TBI) releases harmful mediators that lead to secondary damage. On the other hand, neuroprotective mediators are also released, and the balance between these classes of mediators determines the final outcome after injury[2]."

Cohen et all found that "mild to moderate cases of traumatic brain injury (TBI) are very common, but are not always associated with the overt pathophysiogical changes seen following severe trauma. While neuronal death has been considered to be a major factor, the pervasive memory, cognitive and motor function deficits suffered by many mild TBI patients do not always correlate with cell loss[3]." One aspect of their research focused on the hippocampus, and how "TBI regionally alters the delicate balance between excitatory and inhibitory neurotransmission in surviving neurons, disrupting the normal functioning of synaptic circuits[3]."

Case History:

A 33-year-old female presented at this office for care secondary to an attack that included strangulation and repeated facial trauma. Her main symptom was chronic debilitating headaches unresponsive to rest, medication, or other interventions. Prior to being seen at this office she was under the care of a neurologist and taking medications, which caused her extreme side-effects, yet did not relieve her headaches.

Method/Approach:

She has been under care for three years, which consisted of chiropractic sacro occipital technique (SOT) and cranial treatment[4,5]. Within the past year laboratory tests were instituted to monitor neurotransmitter balance of the HPA axis and used to help direct nutritional supplementation. The patient was seen once per week for chiropractic care and laboratory tests, while usually performed every 4 months, in this case was performed annually. This was due to the patient not performing the laboratory tests in a timely manner, believed due to her profile, which included inability to cognitively function in scheduling situations.

Results/Effects:

Overall all of her symptoms improved which included headaches, which are less frequent, and less debilitating. Her headaches went from being daily constant, and chronic to 2-3 times per week with significantly less intensity and debilitation, allowing her to function in her activities of daily living. Prior to care she could not function when she had a headache. While she was making good progress with the chiropractic care during the 1st two-years, when nutritional supplementation based on laboratory analysis for neurotransmitter balance was instituted, headaches and function improved including better sleep patterns and mental clarity.

Discussion:

With minor TBI or head trauma side-effects can present even in the absence of loss of consciousness. "In fact, there is no significant difference in frequency of reported symptoms in patients who are only stunned or dazed when compared with patients having suffered a brief period of unconsciousness. While occasionally these symptoms may be ascribed to specific injury to certain tissues of the head, experimental studies reflect that the majority of time the injury is to fine processes of the nervous system and to neurotransmitter systems[6]." Also while considered not related to TBI one theory of the cause of complex regional pain syndrome (CRPS) may be due to the "increase in the sensitivity of neurotransmitter receptors may be the cause of CRPS[7]." Alteration in these neurotransmitter receptors secondary to head trauma may be related to patients presenting with TBI and chronic pain.

Patients presenting with complex presentations secondary to TBI often are at a loss at what they might do for care. A study has found that rehabilitation can be effective using an interdisciplinary approach and "recovery from TBI can continue for at least 5 years after injury[8]." In another study they found, "that traumatic brain injury may cause decades-lasting vulnerability to psychiatric illness in some individuals[9]" and for a "subset of persons with moderate to severe TBI, neuropsychological recovery may continue several years after injury with substantial recovery[10]." A recent case series illustrated how SOT cranial care could be an effective tool in the treatment of three patients presenting with TBI[11].

Conclusion:

Treatment of brain trauma is a very individualized process and what may help one patient may not help another. It is not possible with case reports to determine if effective treatment for one patient can be generalized to the brain trauma population at large. However, it is worthy of consideration when a patient does not respond or has an adverse reaction to medications and is non-responsive to traditional approaches that a chiropractor trained in SOT and cranial treatments might be considered for collaborative care. Greater research is needed in interdisciplinary settings to determine how this subset of patients may be best served.

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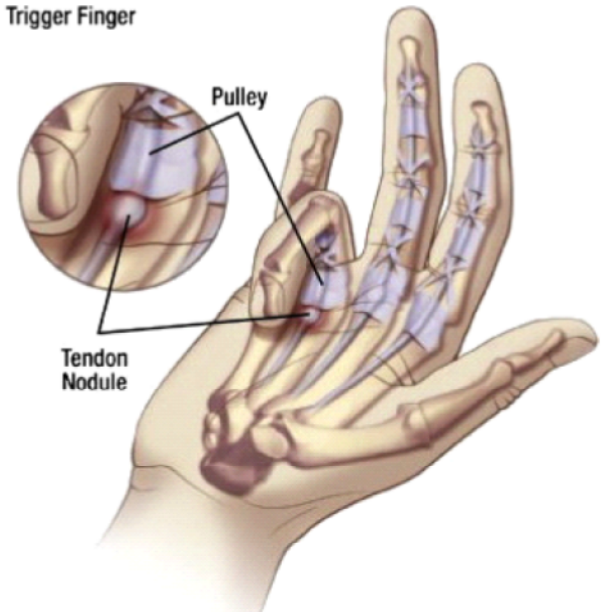
Resolution of a left sided 5th phalangeal 2nd inter-phalangeal joint stenosing tenosynovitis (trigger finger) in a 2 1/2 year-old female: A case report.

Martin G. Rosen, DC

Introduction:

The purpose of this paper is to investigate whether chiropractic care and the application of Sacro Occipital Technique (SOT) protocols utilized for evaluation and adjusting of subluxation patterns may have a global effect on health. While a condition such as stenosing tenosynovitis (trigger finger) is not usually considered neurological or musculoskeletal in nature it is relevant that in this case standard chiropractic care applied mainly at the spinal level appeared to facilitate a complete resolution of the patient's trigger finger.

The standard medical approach to treat tenosynovitis is multi-faceted dependent on the severity of the symptoms and duration. Trigger finger treatment varies depending on its severity and duration. For mild or infrequent symptoms, a standard approach is wearing a splint to keep the affected finger in an extended position for up to six weeks. The splint helps to rest the joint and prevents the patient from curling their fingers into a fist while sleeping. Finger exercises may also be considered and they involve gentle exercises with the affected finger to help maintain finger mobility. Avoiding repetitive gripping is also performed for at least three to four weeks. This includes avoiding activities that require repetitive gripping, repeated grasping or the prolonged use of vibrating hand-held machinery[1].



For more-serious symptoms other approaches tend to include nonsteroidal anti-inflammatory drugs (NSAID's). NSAIDs such as ibuprofen (Advil, Motrin, others) are believed to help relieve the swelling constricting the tendon sheath and trapping the tendon. These medications can also relieve the pain associated with trigger finger. When

the tenosynovitis is not responsive to NSAIDs then sometimes an injection of a steroid medication, such as a glucocorticoid, near or into the tendon sheath may be used to reduce inflammation of the sheath. This treatment is most effective if given soon after signs and symptoms begin and the injections can be repeated if necessary.

Steroid injections may not be as effective in people with other medical conditions, such as rheumatoid arthritis or diabetes[2]. If steroid medication is not successful then a needle injection may be necessary and is called a percutaneous trigger finger release. With this procedure, performed with local anesthesia, the doctor uses a needle to release the trigger finger[3]. This procedure is most effective for the index, middle and ring fingers. When conservative methods do not help surgery may indicated and although less common than other treatments, surgical release of the tendon may be necessary for unresponsive troublesome locking[4,5].

Treatment of children with tenosynovitis is not prevalent in the literature with one study discussing reserving surgical release for children with digits locked in flexion[6] and another advising caution in the treatment of children with concurrent hand infections (pyogenic stenosing tenosynovitis)[7].

Typically chiropractic management of trigger finger often involves myofascial release of the flexor tendons, physical therapeutic interventions (massage, ultrasound, ice, etc,) rehabilitative exercises, ergonomic modifications, splinting, and rest from aggravating activities[8,9]. Also in some instances acupuncture may offer some positive results in treating this condition[10].

Methods/Interventions:

A 2 ½ year old female was seen for her first chiropractic evaluation on June 22, 2012 presenting with stenosing tenosynovitis (trigger finger). Upon her evaluation it was noted that she was unable to straighten her left little finger at the second phalangeal joint without the assistance of the other hand. If she attempted to flex her finger her finger would "lock." Her previous treatment included; NSAID's, restriction of movement, and joint mobilization. The patient's condition was not responsive to these interventions so surgery to release the tendon was recommended.

The chiropractic evaluation also revealed subluxations of C4-C5 and T12-L1 as well as a laterally deviated left scapula and 1st costovertebral junction. Palpatory swelling and decreased range of motion were discovered at the ulnar aspect of the left wrist. The patient was placed on a program of two chiropractic adjustments per week, for three weeks starting on June 26, 2012.

Based upon the examination findings and previous treatment history, chiropractic adjustments using SOT protocols were directed to C4, T6, left scapula, left 1st rib head and left wrist. This adjustment/subluxation pattern was addressed for two visits before a change in the pattern occurred. On July 3, 2012 adjustments were made to C6, C2 and

her left wrist and on July 10, 2012 adjustments to C6, T3 and her left wrist were performed.

Following the July 10th office visit her mother reported that the patient's finger was not "getting stuck every time the child flexed it" and that her daughter "was not playing with the finger as much". Over the next two visits the child's general subluxation/distortion pattern continued to reduce and by her last visit on July 24, 2012 adjustments were made to C6 and T3 only. When further care was suggested to address the child's remaining subluxation patterns the mother decided to discontinue active care since the condition – stenosing tenosynovitis – had resolved significantly.

Results:

After seven chiropractic adjustments this 2 1/2 year-old child's trigger finger was 80-90% resolved. At that point in time the mother decided to discontinue care until such time as she felt further chiropractic adjustments were necessary.

Upon follow up we contacted the mother by email in January 2013 to see how he child was doing. She reported that the trigger finger completely resolved a few weeks after we last saw her and has not returned. The mother was profoundly grateful for the care delivered to her child and particularly that that her child did not have to undergo anesthesia and surgical intervention.

The Amsterdam Severity Scale in Stenosing Tenosynovitis (ASSIST)

Grading of Stenosing Tenosynovitis:

Grade 0	No impairment
Grade 1	Palpable nodule or crepitation, with normal active range of motion (AROM)
Grade 2	A perceptible click or a reduced tempo of active finger flexion in combination with a full (AROM) determined by the maximum passive range of motion (PROM).
Grade 3	Restriction in (AROM) by a tendon obstruction under the pulley's or within the tendon sheath

Discussion:

A search of PubMed, MANTIS, and ChiroIndex.com did not find any chiropractic studies relating to pediatric care of tenosynovitis. There were two studies discussed in the literature of stenosing tenosynovitis in the adult population treated with chiropractic care and ancillary procedures[8,9].

*Quick*DASH-9

INSTRUCTIONS: This questionnaire asks about your symptoms as well as your ability to perform certain activities. Please answer *every question*, based on your condition in the last week, by circling the appropriate number. If you did not have the opportunity to perform an activity in the past week, please make your *best estimate* of which response would be the most accurate. It doesn't matter which hand or arm you use to perform the activity; please answer based on your ability regardless of how you perform the task.

Rate your ability to do the following activities in the last week by circling the number below the appropriate response.

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. Open a tight or new jar.	0	1	2	3	4
2. Do heavy household chores (e.g., wash walls, floors).	0	1	2	3	4
3. Carry a shopping bag or briefcase.	0	1	2	3	4
4. Wash your back.	0	1	2	3	4
5. Use a knife to cut food.	0	1	2	3	4
6. Recreational activities in which you take some force or impact through your arm, shoulder or hand (e.g., golf, hammering, tennis, etc.).	0	1	2	3	4

	NOT AT ALL	SLIGHTLY	MODERATELY	QUITE A BIT	EXTREMELY
7. During the past week, *to what extent* has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours or groups?	0	1	2	3	4

	NOT AT ALL	SLIGHTLY LIMITED	MODERATELY LIMITED	VERY LIMITED	UNABLE
8. During the past week, were you limited in your work or other regular daily activities as a result of your arm, shoulder or hand problem?	0	1	2	3	

	NONE	MILD	MODERATE	SEVERE	EXTREME
9. Arm, shoulder or hand pain.	0	1	2	3	4

A *Quick*DASH-9 score may not be calculated if there is greater than 1 missing item.

***Quick*DASH-9 SCORE = [(sum) x 1.1] x 5/2, a missing response is added as the average of the remaining.**

While as stated earlier direct clinical evidence is not conclusive from one case study it is important to note that in this particular case the patient made no other alterations in her lifestyle or clinical situation other than she discontinued the NSAID's and exercises that were previously suggested. The only other variable appeared to be addition of chiropractic care.

A correlation was noted between the reduction of the patient's subluxation complex and her resolution of her trigger finger. This is interesting since it appeared that a relationship

between general body health, spinal balance with symmetry in structure and function appeared to have both a general and specific effect on the patient's symptom presentation. Theoretically this could have been because with subluxation reduction there was improved neuromuscular function[11,12] leading to reduced local inflammation, balanced trophic function[13] to her fingers, and facilitating neurodynamics in finger use. It is also possible that subluxation reduction may have a positive effect on kinesological, biomechanical and histological imbalances at end organ sites[14].

There are some outcome assessment forms which can be used in assessing and treating stenosing tenosynovits with one specific for this condition, "The Amsterdam Severity Scale in Stenosing Tenosynovitis (ASSIST)[15]" and another more general to assess upper extremity disability, shortened disabilities of the Arm, Shoulder, and Hand Questionnaire (Quick DASH)[16]."

With any case report it is difficult to generalize the findings from this study due to lack of multiple subjects with a control or sham intervention group to rule out effects such as ideomotor, placebo, regression to the mean, or that the outcome may have been coincidental and not causal. However the temporal nature of the patient's response to care along with the unresponsiveness to prior interventions makes the results from this study compelling.

Conclusion

Conservative chiropractic care in this case offered less risk to the patient than both the previous treatment modalities and suggested interventions including: medications, steroid injections, or surgery and appeared to attain significant benefit and a positive outcome in this case. Based on the low-risk aspects of the care rendered in this case further study into the efficacy of chiropractic care in the treatment of stenosing tenosynovitis and the etiology of the corrective process would be of value. At this point in time because medical intervention in this condition appears to be limited and fraught with questionable outcomes and risks, chiropractic care may be a viable and safe initial step to take before exploring the more invasive and costly options. Further study is also indicated exploring the effects of improved structural and functional spinal symmetry and their relationship to specific presentations such as stenosing tenosynovitis.

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Athletes National Running Team Sacroiliac Dysfunction during Competition: A Retrospective Case Series.

Rodrigo Sanchez DC, PT, Christian Veas. DC, PT

Introduction/Objective:

The aim of this retrospective case study was to assess the effects of sacroiliac joint dysfunction (SIJD) in 8 Chilean athletes of the National Running Team in response to treatment via Sacro Occipital Technique (SOT) category II protocol during competition.

Methods/Intervention:

In a chiropractic physical therapy practice that treats athletes a retrospective study was performed evaluating the results of care rendered to a specific group of patients. As a means to determine the efficacy of the care rendered patients routinely were asked to keep track of their competition performance times before, during and after care. The retrospective study gathered the patient's data and incorporated that information to assess if there was any benefit to the care rendered based on competition race time.

Eight Caucasian athletes of the national running team of 4x100 meters (4 males and 4 females; age = 17 to 26 years old) were selected for this retrospective study and represented all the patients treated in this competition at this clinic. All patients were assessed with SOT protocol (posture, first rib, cervical compaction and arm fossa) to find sacroiliac dysfunction (SOT category II syndrome). As was routine in this clinic each athlete was then treated with SOT category II pelvic orthopedic blocking protocol and the indicators were re-assessed and noted in the patients' chart after official competition. Their charts were reviewed to gather the reported performance times comparing the athletes' reported performance at a previous competition three days earlier and the time following having received care.

Results:

All eight athletes presented with a SOT category II syndrome pre-competition which, post-race, all tested negative The female athletes averaged a 48:30 seconds race at their previous competition and 46:49 seconds at their race following having received care. Male athletes averaged 42:08 seconds race pre-treatment and 41:10 seconds after the SOT treatment.

Discussion:

According to Bendova et al[1], the pelvis represents the basis for the axial system, thus its alignment influences posture and stability of the spine. Cooperstein suggests that supine pelvic orthopedic blocking stabilizes the SIJ by approximating or compressing the SIJ[2,3].

Also, Hochman[4] suggests that the mechanical action of Category II orthopedic pelvic blocking reduces pelvic muscular and sagittal plane osseous distortions. He also claims that it reduces stress through the SI ligaments (interosseous and posterior ligaments) and the abdominal oblique muscles and increases stability provided by the pelvic musculatures and ligaments. Unger[5] performed SOT chiropractic Category II pelvic orthopedic blocking procedures to determine if it could change pre-post dynamometric strength measurements taken from the psoas, gluteus medius, pectoralis, anterior deltoids, latissimus dorsi, tensor fascia lata, and the adductor muscles. The author concluded that the category II pelvic orthopedic blocking increased strength of all above muscles.

It is theorized that the runner's sacroiliac dysfunction as determined by SOT chiropractic analysis may have been affected muscular potential and possibly diminished the monosynaptic reflex excitation in the spinal cord motor neuron which feeds the motor units[6,7]. In turn, treatment improved the race time for both male and female athletes. The alterations in performance may well be significant given the professional performance levels exhibited by these subjects. Other factors affecting this retrospective study include temperature, humidity, training, etc., so it is possible that the improved race times finding may have also been coincidental.

Conclusion:

This retrospective case series suggests a positive relationship between SOT category II syndrome protocol for SIJD in Chilean runner athletes. Furthermore, SOT treatment may have improved SIJ function leading to increased speed and faster race times. Large comparative case control and/or clinical trials are warranted to determine if there is a significant relationship between the treatment rendered and patient responses.

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Neuromuscular Dentistry

Ira L. Shapira, DDS

Introduction:

Neuromuscular Dentistry remains an enigma to many dentists who do not understand the purpose of electrodes, TENS (transcutaneous electrical nerve stimulation*)*, computers and how this could improve the care of the temporomandibular joint (TMJ) disorders (TMD). This has led to confusion in the field of TMD care and with the term "Neuromuscular Dentistry." There are several basic premises that underlie Neuromuscular Dentistry[1-3].

Stomatognathic Muscles:

The first premise is that the stomatognathic muscles are the primary determinate of the mandibles position during all jaw functions (when the teeth are not in occlusion) and that rest position is one of the most important positions in dentistry. Rest position is a maxillary to mandibular jaw relation where the teeth are not in occlusion but are prepared to occlude. In Neuromuscular Dentistry, rest is a position of bilaterally equal and low muscle tonicity from which the mandible moves into full occlusion with minimal muscle accommodation.

Following closure from rest position the mandible should return to rest with similarly balanced low muscle tonicity. Rest position is determined not only by the mandible's relation to the cranium but also by the position of the head relative to the body, the suprahyoid and infrahyoid muscles and the position of the hyoid bone. To fully understand the relation of jaw movement to head posture read the Quadrant Theorem of Guzay[4-6]. In essence it shows in engineering terms that after accounting for both rotation and translation of the mandible the actual axis of rotation of the mandible is at the odontoid process of the second vertebrae not at the mandible condylar head.

Occlusion:

The second premise is that occlusion is important in neuromuscular dentistry as a resetting mechanism of the trigeminal nervous system's control of the stomatognathic muscles. Myocentric occlusion is ideally a position in which the muscles move the mandible from a non-torqued rest position into full occlusion with minimal muscle accommodation and no interferences of occlusal contacts until full closure is attained thus eliminating all torque during closure. This means that there are no noxious contacts received by the periodontal ligaments or the muscular proprioceptors that must be avoided by the muscles (accommodation) but rather allow "free" entry into myocentric occlusion. The jaw muscles will return to rest position after closure with the muscles maintaining their healthy low tonicity. Relaxed healthy musculature is the gold standard of neuromuscular dentistry.

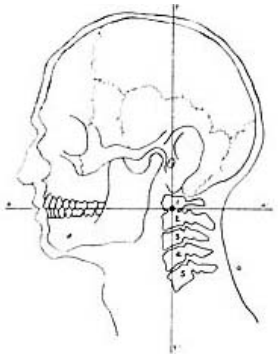


Fig. 1 The apex of the combined muscular control of the mandible in all functioning movements is located at the dens between the atlas and axis cervical vertebrae.

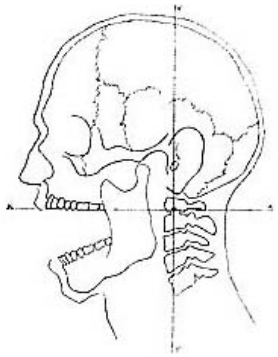


Fig. 2 When the mouth opens the 136 muscles above and below the mandible pivot the jaw at the xy-axis. The condyle translates forward and downward as the mouth opens.

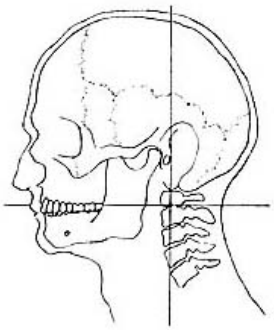


Fig. 3 When the mandibular teeth occlude above the x-x plane, a pathologic Curve of Spee exists and the head of the condyle moves superiorly and distally.

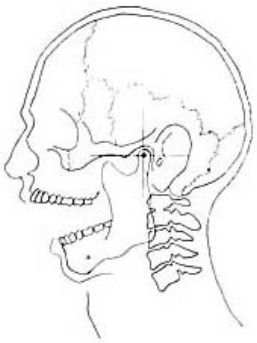


Fig. 4 If the mandible did actually pivot in the TMJ as has been accepted as fact, the mandibular positioning as herein depicted would be able to occur.

Quadrant Theorem of Guzay[4-6]

Swallowing:

Swallowing is a primary activity when the jaw is closed into full occlusion. In order to swallow it is necessary to fixate the mandible and this happens as the teeth occlude. During chewing, speaking and other jaw functions the teeth do not actually occlude in normal function but are separated (during chewing by a bolus of food). Typically swallowing occurs approximately 2000 times a day and is momentary accounting for 6-10 minutes maximum time in occlusion over the course of the day and acts as a neuromuscular reset switch for trigeminally innervated muscles. During a healthy swallow the teeth will move freely without interference into full occlusion with bilateral equal contact and bilateral equal muscle activity and then return to rest position with low muscle tonicity. A deviated swallow as evidenced by scalloping of the tongue, is a sign of a possible TMJ disorder, and 80% predictive of sleep apnea[7].

Neuromuscular Occlusion:

Neuromuscular occlusion (myocentric) occurs when centric occlusion (maximum non-torqued intercuspation of teeth) is coincidental with a balanced muscle closure where the muscles will return to their relaxed state following closure. Myocentric is considered an ideal position for swallowing in Neuromuscular Dentistry.

The dentist utilizing neuromuscular techniques does not determine a specific position of the condyles in the fossa. The position of the disk and condyle are determined primarily by the teeth (bite or orthotic during occlusal correction therapy), in occlusion (myocentric), and during the application of muscle activity.

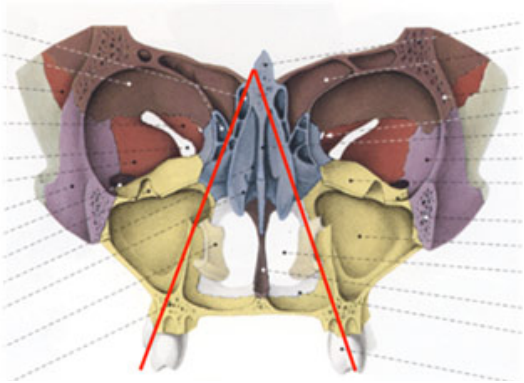
Neuromuscular dentistry allows the patients healthy relaxed muscles to determine the joint relations with the teeth serving as a neuromuscular reset switch during closure. Neuromuscular dentistry rejects the notion that manipulation of the patient's jaw by the intervention of the clinician muscles are more important in determining the relation of the components of the TMJ than the muscles of the patient. Centric relation is not used as a reference position for mounting casts on an articulator. Centric relation is considered a border movement of the mandible and as reported in orthopedic literature joints are rarely used in their border positions.

The HIP plane (defined by hamular notches, incisive papilla and the occipital condyles)[8] and/or Camper's line[9] is used to relate the maxilla to an articulator. When cosmetic considerations are involved photos are used to to incorporate this physiologic plane to soft tissues of the face. Ideally the occlusal plane (parallel to the HIP Plane) will bisect the odontoid process of the axis of the atlantoaxial joint the actual center of rotation for the mandible after accounting for translation and rotation according to the quadrant theorem.

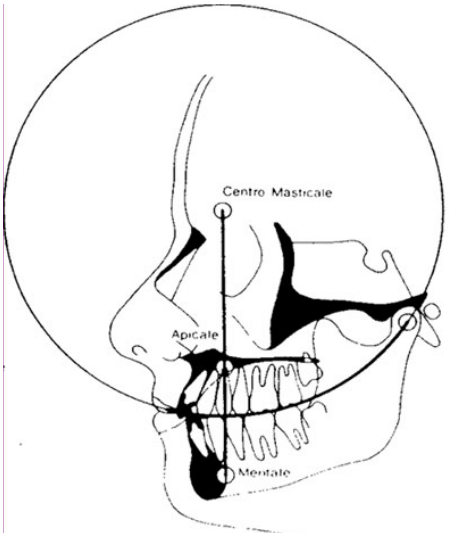
This occlusal plane will be at a 90-degree angle to gravitational force when the head is in an upright position. A neuromuscular bite is used to mount the mandibular casts according to data from EMG recordings and jaw tracings with TENS. The incorporation of the Curve of Spee[10] based on the Centro Masticale (CM) point which continues thru the mandibular condyle. The Curve of Wilson[10] is also based on the CM point that is purportedly involved in stimulation of the autonomic nervous system via tongue reflexes when the lateral border of the tongue touches the lingual surfaces of the teeth[11].

Neuromuscular Dentistry and TMD:

Neuromuscular dentistry considers many of the related disorders associated with TMD to be repetitive strain injuries. Movements become harmful when closure requires excessive accommodation and then the system fails at its weakest link. If the weakest link is muscle health we will see formation of tender sore muscles with eventual formation of taut bands and trigger points. If there is muscle overuse from clenching and/or grinding there will be post exercise pain secondary to anaerobic lactic acid build-up. If the weakest point is in the TMJ then when repetitive strain occurs the muscle



Curve of Wilson



Curve of Spee

accommodation will lead to increased intra-articular pressure. This again will break down the joint at its weakest point. This may occur as a displaced disk or as wear of articular surfaces or many other conditions. It may come at the expense of the bone of the condyle leading to flattening or beaking of the condyle.

Clenching and bruxism are two particularly well-known and harmful parafunctional habits that lead to varied repetitive strain injuries. There are many other parafunctions that can lead to problems. Some parafunctions are actually protective muscle accommodation such as the deviated or reversed swallow that protects the TMJs and masticatory muscles at the expense of altered head, hyoid and spine position and consequent muscle problems.

The second type of problems would be described as I/O or Input/ output errors in computer lingo. The central nervous system (CNS) is often compared to a biological computer and is affected by input from afferent nerves from the body. Autonomic system function include the fight or flight response with concomitant release of adrenaline that alters the heart rate, blood pressure, muscle tone etc. This system effects the hypothalamus pituitary complex with feedback to the adrenals and effects on ACTH and cortisol levels. During periods of acute stress these effects have a positive survival value but during chronic stress become a liability to the individual as described by Hans Selye in his book "The Stress of Life[12]" and his discussion of the General Adaptation Syndrome[13,14].

There are numerous biochemical changes that occur in the brain secondary to aberrant or nociceptive input into the brain and these may be affected by correction of the neurological input, such as using drugs to change the brain chemistry or a combination of alternative approaches. Ideally correction of the underlying cause of these biochemical changes with low-risk interventions is the preferred method of treatment.

The utilization of TENS or transcutaneous neural stimulatio [15] over the coronoid notch has been shown by Mitani and Fujii[16] to block the motor division of the trigeminal nerve and relax the musculature via antidromic impulses (hyperpolarization) to both the alpha and gamma motor neurons without influence from proprioceptive and nociceptive (tooth contacts) inputs. The TENS is then used to create a balanced synchronize pulsing to find the trajectory of closure where a myocentric registration can be obtained. The muscles will return to their relaxed position following closure into a myocentric position.
The use of computerized mandibular jaw tracking[17] allows the dentist to measure and record resting jaw position relative to the cranium at a given head position. The location of myocentric occlusion is determined by the dentist with the aid of information from the recorded tracings.

Electromyography or EMG is used to record relative values of resting muscle activity of masticatory muscles as well as muscles such as sternocleidomastoid or trapezius. While there are no absolute "normal values" of resting muscles the clinician uses his information to compare muscle activity within a given patient. Muscles should be approximately equal activity bilaterally. Thomas[18] demonstrated that Spectral analysis of the post TENS EMG may be utilized to evaluate muscle fatigue and differentiate between muscle atrophy or fatigue or relaxed muscle states. This was later confirmed by Frucht, Jonas and Kappert at Frieberg University in 1995[19].

Utilizing the two modalities together allows the clinician to evaluate the rest position of the jaw and simultaneously the health and functional activity of the muscles.
The EMG also allows tests to evaluate the functional capacity of the muscles and again compare the right and left sides for symmetry. The use of functional recordings (during clenching and closure into centric occlusion) allows the clinician to evaluate whether or not muscle function is satisfactory and functional. The use of EMG also allows evaluation and correction of first contact of closure position within microseconds bases on firing order of the masseter and temporalis muscles. The first point of contact on closure is vitally important and equilibration of orthotics and dentition must be finely adjusted until first contact is evenly dispersed on posterior dentition.

Neuromuscular dentistry is very concerned with the effects of mandibular position on the body as a whole and on the effects of the body on jaw and head position. The work of Sherrington[20,21] and other[22,23] helps elucidate how the righting reflex has a role in ascending and descending disorders and how this can affect a patient.

Incorporating Guzay's Quadrant Theorem[4-6] further integrates the physiological aspects of the balance organ of the inner ear and the vestibular apparatus located in the brainstem as well as visual feedback. The relationships between the autonomic system and cerebellum is quite intricate[24,25] and may also be affected by head position[22].

Correction of the chewing cycle is an important part of occlusal finalization. It must be understood that the chewing cycle is different on the each side and that interferences can occur on both the opening and closing strokes of the chewing cycle. Interferences in chewing strokes are easiest to detect by study of the chewing strokes on computerized

mandibular scans (CMS)[26,27]. Head position during chewing is not is normally in the upright head position but in the feeding position approximately a 30-degree anterior head flexion. Correction of the chewing cycle is at least as important as correction of right, left and protrusive excursions. Chewing is a healthy function of the craniomandibular apparatus where as excursive movements are actually exercises in parafunctional movements. Neuromuscular Dentistry note that Golgi tendon organs and muscle spindles on jaw muscles remain constant and must always be carefully considered during treatment.

Conclusion:

Barney Jankelson's[28] quote, "if it is measured it is a fact otherwise it is an opinion " rings as true today as when he first said it decades ago. Ultimately Neuromuscular Dentistry is about making accurate measurements and the use of those measurements to improve the doctor's ability to make a differential diagnosis, tailor treatment to relieve pain, and create stable restorative dentistry with healthy relaxed musculature.

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Ira L. Shapira, DDS (Biography)

Dr Ira Shapira was an assistant professor at Rush Medical School's sleep center in the 1990's where he treated a wide variety of obstructive apnea patients with commercial and customized intraoral sleep appliances. He was a founding and credentialed member of the Sleep Disorder Dental Society that has become the American Academy of Dental Sleep Medicine, He is a Diplomate of the American Board of Dental Sleep Medicine, on the board of the Illinois Sleep Society, a Diplomat of the American Academy of Pain Management, a Regent Fellow of the International College of Cranio-Manibular Orthopedics and a representative of that group to the TMD Alliance. He is a member of AES, AACFP, Academy of Sleep Medicine and the Chicago Dental Society.

Dr Shapira teaches hands-on in-depth Dental Sleep Medicine courses to small groups at his Gurnee office. A family history of genetic cancer led Dr Shapira into research on stem cells an he also holds several patents (method and device) on the collection of stem cells during early minimally invasive removal of the uncalcified tooth bud of developing third molars. This procedure can be complete in minutes with greatly reduced morbidity compared to current surgical techniques used for removal of developed third molars. He hopes in the future that patients will routinely remove the tooth buds and collect and save the stem cells for anti-aging and regenerative medical uses.

Dr. Shapira personal research in the 1980's as a visiting assistant professor at Rush Medical School examined the jaw relations of patients with obstructive sleep apnea based on neuromuscular evaluations of jaw relations with a Myotronic's kinesiograph and a myomonitor to find neuromuscular rest position. These studies showed jaw relations in the male apnea patients that were strikingly similar to those found in female TMD patients. The National Heart Lung and Blood Institute considers sleep apnea to be a TMJ disorder. The NHLBI published a report, "Cardiovascular and Sleep Related Consequences of TMJ Disorders" in 2001 that can be found at http://www.nhlbi.nih.gov/meetings/workshops/tmj_wksp.pdf

This article was **originally published in the American Equilibration Society magazine.**

Review of Cases using SOT/CMRT on Equine and Canine

Jean E. Thompson, DC

Introduction:

Integrative Health Care Modalities for animals has been on a steep rise in the last decade. These modalities are commonly referred to as CAVM's, or Complimentary and Alternative Veterinary Medicine, however Concurrent Care is a more appropriate name. Education in animal chiropractic has been offered exclusively to chiropractors and veterinarians by Options for Animals College of Animal Chiropractic since 1988. Certification has been offered by the American Veterinary Chiropractic Association (AVCA) and the International Veterinary Chiropractic Association (IVCA). Although the utilization of basic chiropractic methods of analysis and treatment are somewhat standard[1], the methods of analysis and treatment using specific, recognized chiropractic techniques such as sacro occipital technique (SOT) and Activator Methods are still in the formative stages.

In all case reports we utilized a chiropractic technique called occipital fiber analysis and treatment (OFT)[2], which is a method within SOT used to analyze and treat thoracic, lumbar, and sacral segments. The rational for using OFT is to find regions of the body that have some interrelationships through direct musculoskeletal, and indirect reflex, to the occipital region, spine, and possibly to visceral referred pain pathways. Visceral referred pain pathways, both viscerosomatic and somatovisceral, in SOT utilize OFT to determine which vertebral level should receive chiropractic manipulative reflex technique (CMRT) to treat viscerosomatic and somatovisceral related imbalance. This review of four cases illustrates a possible relationship between the utilization of SOT evaluation and treatment on animals, specifically equine and canine and their outcome to this novel intervention.



Case #1: AB, a 12 year old Dutch Warm Blood (equine) began having shortness of breathe during work as a level 3 Dressage competitor. She was diagnosed with a sinus infection and treated multiple times with a variety of antibiotics limited to only short periods of relief. She could not perform due to her condition. Occipital Fiber analysis and treatment was performed while the horse was standing for analysis. Occipital Fiber 2,

line 2, was found and corresponded to a tender T3 nodule (Respiratory Syndrome). T3 was adjusted and CMRT was performed after neutralization of the occipital fiber. The CMRT included lung massage, intercostal massage and a diaphragm release. Following the occipital analysis and treatment procedure the horse took a deep breathe of air and began to relax. The occipital fiber was no longer swollen and boggy. The maxilla and frontal bones remained tender which were evident upon palpation.

Twenty-four hours post treatment the owner was quite upset reporting that AB's symptoms were much worse. She was depressed, refused food, was very restless, and stood and threw her head up and down violently. At approximately 30 hours post treatment the horse threw her head one more time and a large amount of dark thick mucus came out of her mouth and nose. Again AB was able to take a deep breathe of air. She also walked over to her hay and began eating (which she had not been doing). For the next 12 hours she continued to drain from her nose as well as cough up thick mucus. AB showed so much improvement that the owner decided to turn her loose in the pasture. She bucked and galloped off. (Something she had not done for 2 months.) 5 days post treatment the horse was put back into work. 60 days after the first treatment the OF and indicators came back. The above procedures were repeated. AB continues to do well, she has returned to full work and competition[3].



Case # 2: Rio, a 10-year old gelding quarter horse with known symptoms of anxiety and stress induced behavior changes (described by the owner as the appearance of "worry and/or unhappiness") presented for chiropractic care. Occipital Fiber analysis and treatment was performed. Occipital Fiber 6, line 2, was found and corresponded to a tender L4 nodule (Colon Syndrome). A Doctor of Veterinary Medicine auscultated the horses bowel sounds (borborygmi) pre-treatment and they were found to be a +1 in the right upper and lower abdominal quadrants and a +2 in the left upper and lower quadrants (+4 is normal). L4 was adjusted and CMRT was performed after neutralization of the occipital fiber. The CMRT included colon massage, done on the sides and slightly under the horse of all four quadrants. Post treatment, the occipital fiber was no longer swollen or boggy. The horse was very relaxed, calm, and more tolerant during the post exam. Bowel sounds were now more progressively motile. All abdominal quadrants had increased by 3 and 4 fold[4].

Case #3: Kola, a 10 year-old female cattle canine with known chronic symptoms (past 2-3 years) of bloating (canine gastric dilatation-volvulus), mood changes, joint pain, and psoas tension presented for SOT evaluation. Her prior interventions of chiropractic, acupuncture, diet modifications and medication were not successful in alleviating her symptoms.



Occipital Fiber analysis and treatment was performed. Occipital Fiber 5, line 2, was found and corresponded to an L3 nodule (Glandular Syndrome). L3 was adjusted and CMRT was performed after neutralization of the fiber. Post-treatment the fiber was no longer swollen or boggy. The canine was very relaxed, there was decreased joint tenderness, and the psoas tension was notably less. During the days the followed, the canine was noted to have much less bloating. Also, the canine's mood had changed and behavior was more calm and consistent[5].

Case #4: Barnaby, a 12-year-old neutered male German Shepard mix with daily fecal incontinence presented for SOT evaluation. The dog was unresponsive to acupuncture, laser therapy, ultrasound, physical therapy, and traditional chiropractic adjustments. Occipital fiber analysis and treatment was performed. Occipital Fiber 7, line 2, was found and corresponded to an L5 nodule (Colon/Prostate Syndrome). L5 was adjusted and CMRT was performed after neutralization of the occipital fiber. CMRT consisted of Colon Massage in the direction of sigmoid colon, descending, transverse, and ascending colon. The Ileocecal Valve was also balanced using SOT procedure.



Following the occipital analysis and treatment procedure the occipital fiber was no longer swollen or boggy. During the days that followed the treatment the dog's fecal incontinence was reduced to 8 times in 20 days. After 3 weeks, the dog was re-evaluated. Occipital Fiber 6, line 2 was found and corresponded to the L4 nodule. L4 was adjusted and the same CMRT was performed after neutralization of the occipital fiber. During the days that followed the treatment the dog's fecal incontinence was reduced to 2 times a month for the next 3 months. Prior to this treatment the dog would not have any sustained relief from any other modality, including traditional chiropractic care[6].

Methods and Intervention:

Equines and canines have seven occipital fibers just as humans do. We have not found them to have any more or less. We had to take this into consideration due to the difference in spinal anatomy. Humans, canines, and equines all have 7 cervical vertebrae. Canines have 13 thoracic and 7 lumbar vertebrae and equines have 18 thoracic and 6 lumbar vertebrae. For our case studies we followed the human OFT chart (see Fig. 1) but also checked one segment above and below (see Fig. 2) for the animals.

In each case study, the active spinal reflex corresponded to the chart used for humans. The canine incontinence study used the human chart on one occasion and the animal chart on another treatment, based on symptoms.

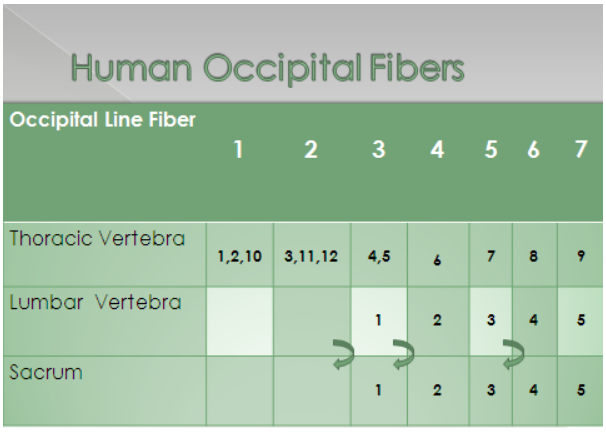


Figure 1

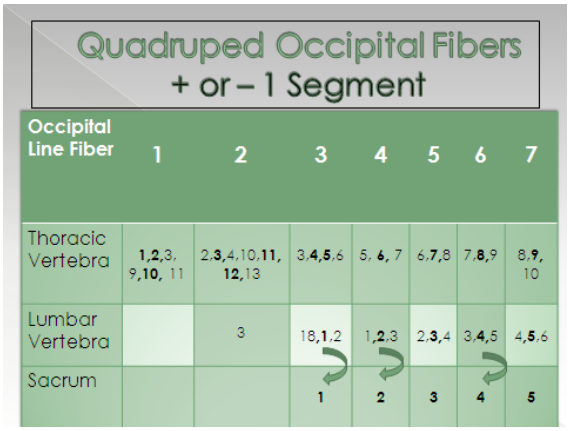


Figure 2

Utilizing OFT on canines and equines requires that we have an animal handler present. The canines were analyzed in a standing position with the head held in a slightly flexed position (for best access to the occipital fibers) (see Fig. 3). The CMRT was done in a lateral recumbent position. Both of these require an extra person. Equines were analyzed and treated in a standing position only with the head slightly flexed (see Fig. 5). This required a handler to hold the animal still. In one case study a second doctor was needed to hold the contact point since the body of the horse was too long for one person to reach (see Fig. 4).



Figure 3



Figure 4

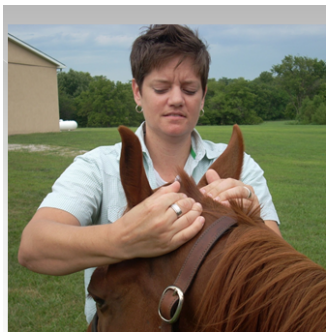


Figure 5

Also of clinical significance when using OFT on animals would be the presence of a Doctor of Veterinary Medicine (in some cases). For instance, a D.C. is not trained in auscultating bowel sounds in an equine as the above case study utilized. Interpreting lab results and performing diagnostic tests could be extremely useful in these cases.

Knowledge of canine and equine anatomy is a must for utilizing this technique. DC's wanting to use this technique must be trained first in animal chiropractic[6] and second in SOT. Specifically joint angles and internal anatomy are different in each animal and the doctor must be knowledgeable of this.

Results:

Following the occipital analysis and treatment procedure, each animal had a decrease in symptoms. In each case, the occipital fiber was no longer swollen or boggy. Case # one[3] described a horse that was about to be euthanized. Horses are often euthanized when unable to function and heal. This horse was put back to work as a dressage competitor, mostly because able to eat and breath properly again after OFT. Case # two[4] presented a distressed horse with bowel function significantly decreased. After OFT, bowel sounds were increased 3-4 fold, a significant increase in function. Case # three[5] discussed a canine with a chronic symptom that had no other relief, including traditional veterinary medicine, except after OFT. Finally, case # four[6] presented a canine with daily fecal incontinence with many failed prior interventions. The incontinence went from daily to 2 times per month with only two treatments of OFT.

Discussion:

In bipedal humans the rational for OFT rests upon visual and vestibular righting mechanisms, which occur as a method of accommodation to keep the head upright and parallel to the horizon[7]. Of interest is whether these reflexes could be found in quadrupeds and if these reflexes were similar to what has been found clinically in bipeds. Of further interest is whether OFT and CMRT would prove beneficial in animals. It did appear from each case that there is a positive correlation between OFT and CMRT typically applied to humans when applied to animals in these studies.

Tenderness was determined by the animal's reaction to pressure in various regions whereas some points of palpation did not elicit any reaction in other areas. Palpation of the points of "tenderness" also noted regions of increased local swelling and had a different texture compared to regions that the animal did not react to during palpation.

Rome and McKibbon discussed the state of animal chiropractic care following a call for cases and internet search of The Index to Chiropractic Literature, PubMed and Google, all of which revealed informative detail on the emerging profession of veterinary chiropractic. However they found little in the way of high-level research on spinal adjustments of animals as the patients. Yet they did find extensive papers on animals as research subjects on this topic. They concluded that while examples of somatic and somatovisceral neurovertebral disorders afflicting vertebrates were presented in their study the majority were anecdotal histories and not at a level approaching formal research[8].

While there are some studies to suggest that there are placebo effects with animals research performed with animals is commonly performed because compared to human subjects they are not as readily considered responsive to the placebo or ideomotor effect[9]. Responses to care tend to be limited to the owner's interpretation in some cases for a reduction in symptoms, particularly when mood or activities change that may not be familiar to the health practitioner.
Since there have been no other case series studies to date published on the use of OFT in animals, this case series is an important first step, and it may encourage others to undertake clinical trials to test the effectiveness of OFT.

Conclusion:

In several case reports investigating an animal that has limited ability to share information pre and post treatment it is difficult to make certain statements regarding a mode of analysis and treatment. However based on a reduction in symptoms and the owner's interpretation of the animal's response before and after treatment there was reason to believe that some positive change had occurred. Due to these findings it is reasonable to assume that further investigation into the use of OFT and CMRT for equines, canines, and possibly other animals is warranted.
In four case reports investigating an animal that has limited ability to share information pre and post treatment it is difficult to make certain statements regarding a mode of analysis and treatment. However based on the diagnostic tools and owner's interpretation of the animal's response before and after treatment there was reason to believe that some positive change had occurred. Due to these findings it is reasonable to assume that further investigation into the use of OFT and CMRT for equines and possibly other animals is warranted.

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Effective Scientific Posters: Quick Reference

George R. Hess
[http://www.ncsu.edu/project/posters/NewSite/documents/QuickReferenceV2.pdf]

A poster is a visual communication tool.

An effective poster will help you …
… engage colleagues in conversation.
… get your main points across to as many people as possible.

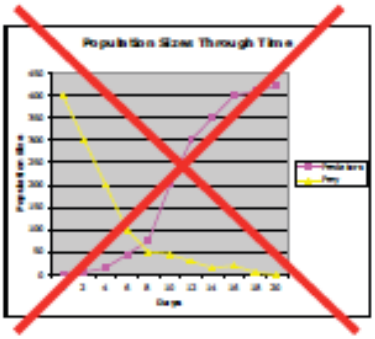
Posters serve as …
» a source of information
» a conversation starter
» a summary of your work
» an advertisement of your work



Tips for Effective Poster Presentations

- Get your message across with effective visual displays of data and small blocks of supporting text. Think of your poster as an illustrated abstract.
- Tell readers why your work matters, what you did, what you found, and what you recommend. Avoid excessive focus on methods – it's the results and implications that count!
- Overall appearance. Use a pleasing arrangement of graphics, text, colors. Your poster should be neat and uncluttered – use white space to help organize sections. Balance the placement of text and figures.
- Organization. Use headings to help readers find what they're looking for: objective, results, conclusions, etc. A columnar format helps traffic flow in a crowded poster session.
- Minimize text – use graphics. Keep text in blocks of no more than 50-75 words – don't create large, monolithic paragraphs of prose.
- Text size. All text should be large enough to read from 1-2 meters, including the text in figures. Title should be larger, to attract attention from far away.
- Use color cautiously. Dark letters on light background are easiest to read. Stick to a theme of 2-3 colors. Avoid overly bright colors – they attract attention but wear out reader's eyes.
- Don't fight reader gravity, which pulls the eyes from top to bottom (first), and left to right.
- Include full contact information. You want to be found – the reader should not have to look up anything to find you.

Clean graphs show data clearly!



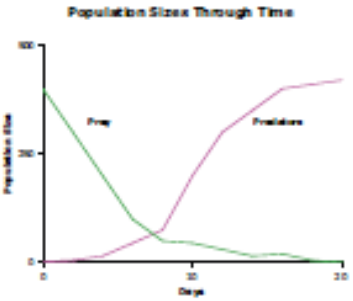
Desired message: Prey decreased as predators increased.
Focus on relationships – exact values are usually not important.

Eliminate "chart junk" to keep focus on data.
Grid lines, detailed ticks on axes, data markers, and grey backgrounds are not needed.

Label data directly, when possible.

Legends force reader to look back and forth to decode graph.

Message is now loud and clear!



Sample Case Report Poster Presentation

Names of Authors and Affiliations

INTRODUCTION

In the introduction section you describe the purpose of your poster presentation. Describe the importance of the topic, why the reader should bother to read this poster, and briefly summarize the poster's focus.

CASE REPORT INFORMATION

This is the place where you share the patient's gender, age, and any pertinent information. Why did they come to you for treatment, is there any unusual information about this patient, and any prior or current treatment they received?

INTERVENTION/TREATMENT

What treatment did the patient receive at your clinic? How long and how many treatments were rendered? Were any unusual tests performed and did they guide treatment?

RESULTS

What was the patient's response to your treatment? Can you objectively quantify their response with outcome assessment pre and post forms? Were there pre and post laboratory, imaging, or other type of findings?



A brief caption under a picture is helpful.

DISCUSSION

Can you give a research or "evidence" basis for why you think your treatment had the purported effect on the patient discussed in this poster?

DISCUSSION (Continued)

Why do you think that the patient would not have gotten better on their own without treatment or that some other treatment they received was not the reason for their response to care? What are the limitations to your study?

CONCLUSION

Summarize your whole poster in a sentence. How could future studies be improved and how is this one a call for further research?

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2. Harms M. **How to prepare a poster presentation**. *Physiotheraphy*. 1995; 81(5): 276.
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May 2014 Sacro Occipital Technique Research Conference

Redondo Beach, California – May 2014

Call for Scientific Submissions
Sacro Occipital Technique Organization - USA
6th SOT Research Conference, May, 2014

This call for scientific submissions invites the submission of original research that will promote the dissemination and discussion of new information. The categories for the 2012 conference are:

1. **Research (Integration)** integrated/integrative healthcare, integration related research topics (e.g., policy, healthcare programs, quantitative/qualitative research, etc)

2. **Research (Basic Science)** (e.g., experimental trials, quantitative basic science research, etc.)

3. **Research (Clinical/Health Care Systems)** (e.g., experimental clinical trials, quantitative clinical research, case reports, qualitative clinical research, public health, etc.)

4. **Research (Innovative)** (e.g., experimental sacro occipital technique or cranial integrative methods assessed with reliable and valid assessment tools, etc.)

Submission Requirements

1. **Blinded submission for peer review - due electronically January 31, 2014**

a. The submission must be a completed study. Incomplete work (e.g., concept proposal, a proposed idea for a research project that has not begun yet, a project has started but no data) will not be considered. If you are uncertain or have any questions about this, please contact the Peer Review Chair prior to the submission deadline.

b. Word limit: submission may be up to approximately **2000 words** (but may be shorter). The 2000 word count allows authors to demonstrate the data/results of their findings and the scholarship quality of their completed work. One file in Word or rich text format (RTF), 12-point type font, double-spaced, maximum 2MB.

c. Do not include author names or institutional affiliations anywhere in title or text.

d. The submission must include appropriate sections such as: Title, Introduction (e.g. Background, Objectives, Purpose), Methods, Results, Discussion, Conclusion, and References sections. References are expected, but are not included in the word count.

e. Due to file size limitations, it is preferred that you submit up to 2 of any combination of the following embedded in the Word/RTF document: diagrams, figures, pictures (JPEG, TIFF or BMP), graphs or tables (e.g. one graph and one table.) Only submit these if they are essential for the peer reviewers to evaluate the proposal. Do not submit tables, graphs or pictures as separate files. Do not submit other visual aids (no videos or power point).

f. Your accepted paper will be published in the Sacro Occipital Technique Research Conference Proceedings 2012 but you will not sign over copyright to this conference and reserve the right to publish your article at another research conference or journal.

2. **Abstract for proceedings if accepted and author information - due January 31, 2014**

a. The abstract should be a structured abstract and include appropriate sections such as: Introduction (e.g. Background, Objectives, Purpose), Methods, Results, Discussion and Conclusion sections.

b. Word limit: **200 words maximum**. No pictures, tables, figures, or references are included in the abstract.

c. Do not include author information or institutional affiliations in the abstract.

d. The abstract will be published on the *SOTO-USA.org* website and within the SOT *Compendium of Peer Reviewed Literature 2010-2015* if submission is accepted.

3. **Signatures of all authors - due postmarked or faxed by January 31, 2014**

a. Signatures of all authors shall be submitted on the authorship statement form

b. Presentations of accepted works are expected. Presenting author(s) must register and attend the conference to present. Only authors may present the study. All presenters must register for the conference. We strongly recommend that funding is secured or confirmed in advance of submission. Submission is a commitment for presenting authors of accepted submissions to attend the conference and be present at the scheduled session.

4. **For studies involving human subjects – a copy of IRB/Ethics approval, expedited, or exemption letter – due postmarked or faxed by January 31, 2014**

a. All studies involving human subjects must go through appropriate IRB/ethics review and state these processes in both the blinded submission and abstract. Case reports are exempt. Any questions should be directed to your institution's IRB or Ethics Committee.
b. For studies involving human subjects research, provide a photocopy of the approval, expedited review or exemption to the peer review chair. For studies not involving human subjects, this document is not required.

Submissions that do not meet the above requirements will be returned to the submitter.

Submission Information

All paper submissions shall be submitted electronically via email to Dr. Charles L. Blum – drcblum@aol.com. A website link relating to the SOT Research Conference and registration for this conference will be posted on the website www.soto-usa.org. The primary author is responsible for proper submission of all items. Non-authors (eg, staff) are not allowed to submit or query about submissions.

Important Information:

1. If the submission does not meet the submission requirements (eg, not a completed research study, missing items), the SOT Research Conference Peer Review Chair will contact the authors. If however the paper cannot be accepted for this conference then notification will be sent to the submitting author. Concept proposals and incomplete works will be returned to the authors and those authors can contact Dr. Blum at drcblum@aol.com for further information.

2. It is the responsibility of the primary author to ensure that all requirements are met. The primary author will be the contact person responsible for submission of all required materials and all correspondence. Do not send communications through a third party, staff member, or co-author.

3. If the Peer Review Board confirms that there is an inappropriate submission, it will be disqualified. Examples of inappropriate submissions include but are not limited to: one that has been presented before at this conference, incomplete submissions, concept proposals, duplicate submissions, no human subjects/ethics review when one was necessary (includes expedited review), non-authors listed as authors, plagiarized work, etc.

4. Only electronic submissions will be considered. No faxed or mailed submissions will be considered.

5. Presentations of accepted works are expected. Authors must register and attend the conference to present. An author who does not register and present an accepted work will be disqualified from submitting/presenting for the following 2

years. It is the author's responsibility to find funding to register and attend the conference. We strongly recommend that funding is secured or confirmed in advance of submission. Presenter information and registration for the conference is required or the invitation to present will be revoked. Only authors may present their work at the conference.

6. Due to time and space limitations, and ability to cover poster presentations, there may be a limitation for the number of poster presentations per primary author/presenter.

All submissions will be evaluated for completeness, strength of contribution to the profession and relevance to the SOT research conference. Submissions will be reviewed by the peer review committee based upon the following criteria:

1. Practical significance

2. Originality

3. Theoretical/conceptual framework

4. Quality of experimental or descriptive design

5. Discussion/findings/results - clarity of presentation of findings

6. Conclusions, interpretation of results, implications for chiropractic education, theory, research, or practice

7. Citation of appropriate literature

8. Applicability for: the chiropractic profession, classroom use, further research, current/critical concerns, etc.

9. Completed study

10. Overall rating of the paper.

Notification: Primary/corresponding authors will be notified of peer review results by April 2014. If accepted, an acceptance communication and other information of the presenting author must be returned to the peer review committee. For submissions that are accepted, an author is required to register and present the work at the conference. If you have any questions or would like to request forms please contact the Peer Review Chair: Dr. Charles L. Blum at drcblum@aol.com

OTHER INFORMATION:

If accepted, the **200 word** maximum *abstract* will be printed on the SOTO-USA.org website and within the *Sacro Occipital Technique Compendium 2010-2015. The paper will be published within the proceedings of the* SOT Research Conference 2014. This will still allow you to publish your completed paper in any journal you wish.

Email a pdf or jpeg scan to drcblum@aol.com, or fax this completed by **January 31, 2014** to:

SOT Peer Review Committee 2014
Attn: Charles L. Blum, DC Peer Review Chair
Email: drcblum@aol.com
Multiple authors involved with one submission may send their forms in separately

The following two submission forms can all be found on the SOTO-USA website by going to www.SOTO-USA.org and clicking on SOT Research Conference Proceedings Submission box.

Authorship Signatures Form

Sacro Occipital Technique Research Conference V

May, 2014

INSTRUCTIONS: This form must be completed, signed, and submitted by **January 31, 2013**

Submission title (print):

By signing this form:

1. I/We confirm that each of us qualify as an author of this submission, am/are responsible for all of its content, and give permission for: 1) its presentation if accepted to the SOT 2013 research conference, 2) the publication of the *abstract on the SOTO-USA.org* website and within the SOT *Compendium of Peer Reviewed Literature 2010-2015*, 3) your accepted paper to be published in the Sacro Occipital Technique Research Conference Proceedings 2013 but you will not sign over copyright to this conference and will retain the right to publish your article at another research conference or journal, and 4) am/are capable of presenting/defending all of its content (for information about authorship visit www.icmje.org)

2. If accepted, I/we understand that registration and presentation of this work at the conference is required and that funding should be secured or confirmed in advance of submission. Submission is a commitment for presenting. Authors of accepted submissions must attend the conference and be present at the scheduled session. I/We understand that withdrawing after acceptance may prevent us from submitting to future SOT Research Conferences.

For studies involving human subjects – a copy of IRB/Ethics approval, expedited, or exemption letter – due postmarked or faxed (310-478-1918) by January 31, 2013. Evidence of IRB or ethics review approval/exemption is required for all research studies involving human subjects. It is recognized that projects that use human subjects are expected to follow appropriate human subjects review procedures depending on the type and nature of the research (more information about human subjects review/ethics review/IRB can be found at http://cme.cancer.gov/c01 and http://ohrp.osophs.dhhs.gov/irb/irb_guidebook.htm).

Primary Author Print name Email address Signature Date
Other Authors Print name Email address Signature Date

_____

_____

_____

If more authors, please sign and date on an additional form. If multiple authors, each may send in their completed forms separately (need not be on the same form).

Patient Case Consent for Publication and Presentation

Title of case study/series:

_____

Author(s)
names:_____

As the patient in this case study/series, I hereby give my consent for clinical information relating to my case to be reported at a scientific conference, in a conference proceedings, and/or published in a scientific journal.

I understand that my name, initials, and/or any protected health information such as my identification number, billing information, address, etc. will not be published and that efforts will be made to conceal my identity, but that anonymity cannot be guaranteed.

I understand that the material may be published in a journal, a website of a journal, and/or in products derived from the publication. As a result, I understand that the material may be seen by the general public.

_____ _____
Name of patient (print) Date

_____
Signature of patient (or signature of the person giving consent on behalf of the patient if patient is a minor or deceased)

If you are not the patient, what is your relationship to him or her? (The person giving consent should be a substitute decision maker or legal guardian or should hold power of attorney for the patient.)

_____

Why is the patient not able to give consent? (e.g., is the patient a minor, incapacitated, or deceased?)

_____

If images of the patient's face or distinctive body markings are to be published, the following section must also be signed in addition to the section above:

As the patient stated above, I give permission for images of my face or distinctive body markings to be published and recognize that I might therefore be identifiable even though my name and initials will not be published.

_____ _____
Signature of patient (or signature of the person giving consent on behalf of the patient) Date

Please keep a copy of this completed form for your records.