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CONFERENCE PROCEEDINGS

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2019 OCTOBER SOT RESEARCH CONFERENCE

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2019 OCTOBER SOT RESEARCH CONFERENCE

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, like all prior conferences, 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]."

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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].

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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 decision 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 exaggerated 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]."

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SOT Research Conference Proceeding Author Biographies

(Listed in alphabetical order)

Dr. Thomas Bloink specializes in cranial-dental integration in Silicon Valley at the California Cranial Institute, which was founded in 1992. Dr. Bloink was on the board of advisors to help create SOTO USA and is actively involved in promoting the organization, presenting at research conferences throughout the world, and developing novel treatment approaches for functional neurological conditions. He works closely with many different specialists including dentists, orthodontists, and oral-maxilla surgeons. ENT's and others to ensure the best possible outcome for his patients.

Dr. Charles L. Blum is in private practice Santa Monica, California and past president of SOTO – USA, now their research chair. Adjunct research faculty at Cleveland Chiropractic College, associate faculty at Southern California University of Health Sciences teaching the SOT Elective and TMD Care, as well as at Palmer College of Chiropractic West teaching the SOT Elective. Dr. Blum is a Certified SOT Cranial Practitioner, and on the peer review board of the Journal of Craniomandibular and Sleep Practice (CRANIO), Association of Chiropractic College Conference Peer Review Committee, and Journal of Chiropractic Medicine. He has lectured nationally and internationally, has written various SOT related texts, compiled SOT and cranial related research, and has extensively published in multiple peer reviewed indexed journals and at research conferences from 1984 to the present.

Dr. Bruno Bordoni, is an Osteopath, Physiotherapist, and Researcher at the Rehabilitation Cardiology Institute of Hospitalization and Care with Scientific Address, S Maria Nascente Don Carlo Gnocchi Foundation, Milano, Italy, from 1994.
PhD, Doctor of Philosophy in Osteopathic Clinical Sciences, Honoris Causa, National University Medical Science, USA ,
Professor at the National University Medical Science, USA as well as a contract Professor at the University de Madrid and at University of Tor Vergata Roma. Dr. Bordoni is an author of 122 publications on PubMed to date.

Dr. Robert Cooperstein is a Professor at Palmer Chiropractic College West in San Jose, California, where he also serves as Director of the Departments of Technique and Research. He mostly instructs in hands-on chiropractic technique, but also teaches pathology. He is a peer reviewer for several journals and is on the Editorial Board of the Journal of Chiropractic Medicine, Journal of Chiropractic Humanities, and the Journal of Chiropractic Education. He has authored numerous journal articles, as well as several textbooks and textbook chapters. Dr. Cooperstein is also in private practice in San Leandro, California and has presented at the SOT Research Conferences over the years.

Dr. John Edwards is a pregnancy and pediatric chiropractic specialist who serves Cape Coral, North Port, Florida. He is a leading researcher in pregnancy chiropractic and teaches perinatal chiropractic technique around the world for the International Chiropractic Pediatric Association. In 2017 Dr. Edwards was the first chiropractor in Southwest Florida to complete the Academy of Chiropractic Family Practice's 400 hour post-graduate program and the first doctor in the Southeastern USA to become a Spinning Babies Aware Practitioner.

Dr. Harvey Getzoff graduated with a BS from Philadelphia University in 1966 and with a DC from Columbia Institute of Chiropractic in 1973. He became a board certified Craniopath in Sacro Occipital Technique (SOT) in 1982 and was board certified in SOT in 1981. He received fellowship and diplomatic status in SOT by the Sacro Occipital Research Society International Board of examiners in 1990. Dr. Getzoff is the author of several published articles; papers and 2 books on SOT related subjects. He co-authored 3 articles that were published in the Journal of Manipulative and Physiological Therapies (JMPT) 1994-1996. Dr. Getzoff has been a chiropractor in Marlton NJ, since 1973.

Dr. Rachel Hamel has completed advanced training in Applied Kinesiology, Sacro-Occipital technique, SOT Cranial Technique, Craniobiotic Technique, IASTM, Rocktape, Webster Technique, Neuro Emotional Technique; and is working towards her ACN in nutrition, as well as certification in Cranial-Dental diplomat. She is a member of ACA, SOTO-USA, BABI (Bay Area Birth Information) and ICPA (International Chiropractic Pediatric Association). She received her Bachelor's with honors in Health Science from Whitworth University in Washington State, and her doctorate degree where she was valedictorian from Palmer West Chiropractic College.

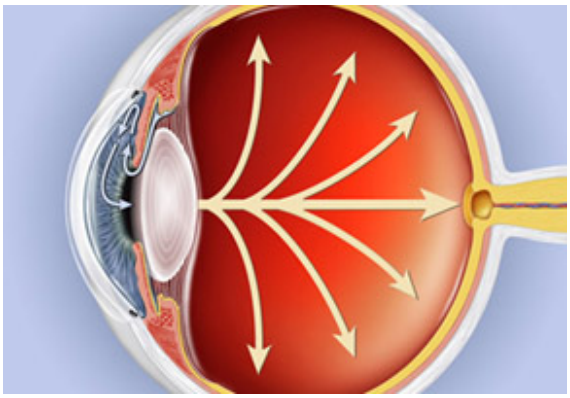
Dr. Jason Scoppa practices at his clinic, Northwest Structural Medicine, located in Bellevue, WA, as well as in Lynwood, WA at Balance Epigenetic Orthodontics as part of a Cranial-Dental comanagement team. He is a certified SOT Craniopath (CSCP), certified chiropractic sports practitioner (CCSP), and has a TMD and cranially focused practice.

Sacro occipital technique (SOT) and dental co-treatment of two patients (11 and 52 year old) with increased eye pressures and related dysfunction: Two case reports

Thomas Bloink, DC, Charles Blum, DC

Introduction:

Intraocular pressure (IOP) is the fluid pressure inside the eye. Increased IOP inside the eye is caused by an imbalance in the production and drainage of fluid in the eye (aqueous humor) and when the channels that normally drain the fluid from inside the eye do not function properly. The most common drainage pathway is through the trabecular meshwork and Schlemm's canal and is a primary site of increased resistance to aqueous humor outflow in glaucoma leading to increased IOP.[1]



Elevated IOP is a well-known risk factor in glaucoma development and progression. As most glaucoma risk factors are not modifiable, IOP remains the sole focus of medical and surgical therapy.[2] Glaucoma prevalence continues to increase and "intraocular pressure (IOP) is the most significant modifiable risk factor to prevent onset or progression of glaucoma."[3] Ultimately raised intraocular pressure IOP is also the most important risk factor for developing glaucoma, the second most common cause of blindness globally.[4]

Tonometry is the procedure eye care professionals perform to determine the IOP, the fluid pressure inside the eye. It is an important test in the evaluation of patients at risk of developing glaucoma. Most tonometers are calibrated to measure pressure in millimeters of mercury (mmHg). The Goldmann applanation tonometer (GAT) is considered the most commonly accepted reference device[5] even though it may have "limitations and confounders."[6] There are new techniques and devices for determining IOP, "such as noncontact tonometry, the Tono-Pen, the ICare tonometer, dynamic contour tonometry, TGDc-01 tonometry, and the ocular response analyzer."[7]

According to the Glaucoma Research Foundation, the normal IOP pressure range is 12 to 22 mm Hg.[8] A population-based, longitudinal study [N=3666] noted that "mean intraocular pressure (IOP) was associated with open-angle glaucoma risk only in participants with higher IOPs and not in those with lower IOPs.[9] A study by Wang et al that adjusted for ocular and systemic parameters "included 3135 eyes of 3135 participants with a mean age of 64.1 ± 9.6 years (mean ± standard deviation). The mean IOP was 14.7 ± 2.8 mmHg. The 95% percentile and 97.5% percentile of the IOP distribution decreased from 20 mmHg / 21 mmHg in individuals aged 40 to 54 years to 18 mmHg / 19 mmHg in individuals aged ≥80 years."[10]

There appears to be multifactorial causes of IOP that include multiple systemic diseases[2] as well as the presence of coronary artery calcium regardless of conventional cardiovascular risk

factors.[11] Other factors include systemic inflammation, reflected by serum CRP levels, in subjects with and without metabolic syndrome[12], patients with obstructive sleep apnea syndrome in prolonged supine positions[13], with physical stressors during a Valsalva maneuver (e.g., heavy lifting, straining when defecating, coughing, etc.)[14] and secondary to various types of surgeries.[15-18]

Allopathic treatments include modifications such as antihypertensives and corticosteroids[19], as well as latanoprost[20], betaxolol[21], dipivefrin[21], guanethidine[22] and pilocarpine[22]. In resistant cases where a patient's risk of glaucoma has increased due to IOP pressures, there are various types of surgical interventions available.[23]

Two patients (52-year-old male and 11-year-old male) presented to this office with eye discomfort and increased IOP along with other findings. The 52-year-old Caucasian male presented with increased eye pressures of three-years' duration measured at 21mm Hg in both eyes with a left "bloodshot" eye when waking. His ophthalmologist determined he had an enlarged left-optic nerve. The 11-year-old Caucasian male presented to the clinic due to an ophthalmologist examination revealing significant eye pressure increase over the past year from 16mm Hg bilaterally, to 29mm Hg in his right eye and 23mm Hg in his left eye. It was noted this condition coincided with him undergoing orthodontic treatment.

Methods and Intervention:

52-Year-Old Male Patient:

Sacro occipital technique (SOT)[24,25] and SOT cranial[26,27] examinations revealed cervical spine pain/dysfunction, pelvic torsion, and multiple craniomandibular disorders. Specific craniofacial finding included the maxillary deficiency (under development of the maxilla), malocclusion, anterior premature contact of the incisor teeth, as well as significant maxillary exostosis likely due to clenching. Temporomandibular joint (TMJ) assessments revealed decreased TMJ translation bilaterally. Palpatory pain was noted at the left zygomatic-temporal joint, left zygomatic-maxillary joint, left maxillary-frontal joint, left sphenoid greater wing, left inferior coronal suture, left squamosal suture, and locally to the left TMJ. SOT cranial evaluation also noted that his left temporal bone was restricted into extension (internal rotation) cranial distortion.

Pelvic torsion with sacroiliac joint reduced sacral nutation (category one) was noted as well as cervical spine being limited in active rotation to 10-15° bilaterally. There was palpatory pain and hypertonicity at the right suboccipital and along the cervical paraspinal muscles.

He was treated with category one SOT block placement along with cranial adjustments bilaterally to the zygomatic and spheno-maxillary bones along with guiding the left temporal bone into a neutral functional position. Upper cervical spine adjustments were also performed. He was also co-treated by a dentist who fabricated a lower occlusal splint to stabilize and decrease any incisor occlusal forces. This patient was treated (chiropractic) two times a week for four weeks and then once a week for three weeks following his chiropractic treatment he was

sent to his dentist who immediately followed with dental treatment to equilibrate the splint and balance the patient's occlusion.

11-Year-Old Male Patient:

Sacro occipital technique (SOT)[24,25] and SOT cranial[26,27] examinations revealed decreased translation of his TMJ bilaterally. Sensitivity to extracranial palpation was noted bilaterally to the TMJ and along the zygomaticomaxillary, maxillofacial, zygomaticotemporal, coronal, and squamosal sutures as well as greater wings of the sphenoid. Intraoral palpation noted restriction of bilaterally of the zygomatic, maxilla, and palatine bones. Pelvic torsion with sacroiliac joint reduced sacral nutation (category one) was noted with a left temporal bone in an extension (internal rotation) cranial distortion pattern.

The patient was treated with category one SOT pelvic block placement along with cranial adjustments to release and balance the zygomatic, sphenomaxillary, maxillopalatine, palatosphenoid, and allow the left temporal into a functional neutral position. The patient was also treated with chiropractic and cranial care at this clinic an average of every three weeks during the course of his orthodontic treatment (one year).

Results:

52-Year-Old Male Patient:

Reexamination by ophthalmologist revealed IOP measurements of 16mm Hg. bilaterally and optic nerve pressure had reduced and the patient no longer would awaken with a left "bloodshot" eye. Dental occlusion/TMJ translation had improved with normalization of his cervical spine motions and reduced pain. At six-month follow-up, without chiropractic treatment, his eye pressure was still well below 20mm Hg. (Icare ic100 tonometer[28]) and remained symptom-free.

11-Year-Old Male Patient:

The patient was treated twice in one week and had one follow-up visit the following week. Treatment incorporated SOT/cranial care to balance his pelvis and cranium and support cranial compliance of orthodontic forces to his teeth and craniomandibular regions. At the third office visit following treatment it was noted his IOP had returned to a normal reading of 16mm Hg. (Icare ic100 tonometer[28]) bilaterally. During the one year of orthodonture care the patient was seen every three weeks for chiropractic and cranial care noting consistent normal IOPs during that time period.

Discussion:

There have not been many studies demonstrating chiropractic care of patients with increased IOP. [29,30] An interesting study by Wingfield and Gorman discussed a 25-year-old uniocular female patient with congenital glaucoma who sought chiropractic treatment for spinal pain, headache, and classic migraine. "Before commencing chiropractic spinal manipulative therapy,

an ophthalmologic examination was performed, and visual performance was monitored through a course of treatment. Immediately after the first treatment, significant visual field improvement was recorded in the remaining eye. Independent reexamination by the patient's regular ophthalmic surgeon confirmed the results."[31]

Other studies that incorporated sacro occipital technique (SOT), cranial, TMJ, and dental cotreatment related to eye pathology involved successful treatment of a patient with an orbital pseudotumor[32] and another patient with diplopia[33]. Christine suggested that dysfunction of the craniosacral system may include osseous, dural membrane, and fascial restrictions leading to asymmetric temporal bone movement[34], as discussed with these two cases. It is also not unreasonable based on the pilot study by Sandhouse et al. to consider that treatment of cranial distortion patterns and asymmetry may result in "beneficial effects on visual function in adults with cranial asymmetry."[35] While no studies were found that evaluated orthodontic treatment's effect on IOP, orthodontic treatment has been observed to cause considerable stress to the dural membranes and aggravate cranial bone distortion clinically for a subset of patients.[36]

As with any case study it is difficult to extrapolate the findings to the population at large due to lack of a control group, other similar subjects for comparison, and the inability to rule out placebo/ideomotor effects or regression to the mean. However, the clinical history and interventions with these two patients in this study suggest a possible conservative therapeutic regimen for a subset of patients with increased IOP that fit criteria of craniofacial, cranial, and TMJ related imbalance and/or asymmetry. It maybe reasonable to consider that SOT, cranial, and TMJ care might be helpful for patients with elevated IOP and TMJ dysfunction who are also resistant to medications or not good surgical candidates.

Conclusion:

Two patients had successful outcomes at this office after presenting with eye discomfort and increased IOP and receiving chiropractic and dental care for concurrent craniofacial and dental related imbalances. Secondary iatrogenic findings are not uncommon during pediatric orthodonture care; however, correlation to increased eye pressures has not been sufficiently studied in the literature. Further research is needed to determine if SOT/cranial care can be helpful for adult and pediatric treatment of eye pressure disorders, as well as a subset possibly secondary to orthodonture interventions.

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Sacro occipital technique (SOT) care of a patient with acute low back pain utilizing R+C factor analysis and orthopedic pelvic block placements: A case report

Charles L. Blum, DC

Introduction:

Low back pain (LBP) "is a common problem affecting both genders and most ages, for which about one in four adults seeks care in a six-month period. It results in considerable direct and indirect costs, and these costs are financial, workforce and social." [1] Most acute-onset LBP episodes resolve; however, approximately only one in three resolves completely over a 12-month period. "About three in five will recur in an on-going relapsing pattern, and about one in 10 do not resolve at all."[1]

"A global review of the prevalence of low back pain in the adult general population has shown its point prevalence to be approximately 12%, with a one-month prevalence of 23%, a one-year prevalence of 38%, and a lifetime prevalence of approximately 40%. Furthermore, as the population ages over the coming decades, the number of individuals with low back pain is likely to increase substantially." [2] However, other "studies have found 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." [3]

Although most acute LBP patients recover quickly with conservative care, proper evaluation is imperative to identify rare cases of serious underlying pathology. "Certain red flags should prompt aggressive treatment or referral to a spine specialist, whereas others are less concerning. Serious red flags include significant trauma related to age (i.e., injury related to a fall from a height or motor vehicle crash in a young patient, or from a minor fall or heavy lifting in a patient with osteoporosis or possible osteoporosis), major or progressive motor or sensory deficit, new-onset bowel or bladder incontinence or urinary retention, loss of anal sphincter tone, saddle anesthesia, history of cancer metastatic to bone, and suspected spinal infection." [4] The evidence suggests that most commonly acute LBP, defined as less than six weeks in duration, in the absence of "red flags" or serious pathology often does not require diagnostic imaging and laboratory.[4,5]

This study discusses the care rendered to a 66-year-old male patient with severe acute low back pain noting that his symptoms began after a weeklong back packing trip and were unresponsive to ergonomic modifications and medications. He had bilateral sciatica (worse on his left side), profound antalgic posture that needed him to be positioned at in 90° forward flexion when standing or moving around, and would cry out in pain sometimes with slight movement. He was seen at his home due to his significant pain and discomfort, and no imaging was available to assess his low back osseous or soft tissues. He did not present with any red flags or concurrent serious pathology.

Intervention and Outcome:

Sacro occipital technique (SOT) assessment/treatment revealed bilateral psoas spasms and resistance plus contraction (R+C) cervical spine indicators revealed a significant left-sided L5/S1 and L4/L5 disc compression. [6,7] His psoas muscles were released, pelvic blocks placed in positions to reduce his acute pain (category three) [8,9], and gentle manual decompression locally to the left side of L5-L4 was performed based on cervical indicator's sensitivity (orthopedic block procedures). [6,10]

Results:

Within minutes following the treatment the patient could completely stand and walk upright. While he was able to move better and his pain had reduced significantly over the ensuing weeks, he still had some continued disabilities (e.g., inability to walk for more than 2-3 minutes, posterior thigh radiculitis, guarded movements when changing position, etc.) so magnetic resonance imaging (MRI) was performed that confirmed a L4/5 left-sided discopathy, coinciding with the R+C indicators.

Discussion:

Acute low back pain is common, and spinal manipulative therapy (SMT) has become a conservative treatment option. Paige et al performed a systematic review and meta-analysis of the benefits and risks of spinal manipulative therapy for acute LBP. They found that in "patients with acute low back pain, spinal manipulative therapy was associated with modest improvements in pain and function at up to 6 weeks, with transient minor musculoskeletal harms." [11]

Since imaging and extensive diagnostic studies are not indicated in cases of acute LBP without red flags or serious pathology[4,5], other methods are useful in their absence to help determine where care is best directed other low risk and cost diagnostics are worthy of further study. It is particularly valuable if these diagnostics might function as pre- and post- assessment to drive conservative interventions such as SMT that utilize pelvic blocks (wedges) allowing gravity. The slow changes that occur with the pelvic block positioning and decompression allow for modifications in block position in response to the patient's reduction in pain and relaxation of any associated myofascia. [6-10]

As with any case study it is difficult to extrapolate the findings to the population at large due to lack of a control group, other similar subjects for comparison, and the inability to rule out placebo/ideomotor effects or regression to the mean. However, it is compelling to consider the temporal relationship of the patient's unresponsive pain to medication or ergonomic modifications for a week and his ability to stand upright and move with significantly less pain immediately following the chiropractic intervention.

Conclusion:

This study discussed the care of a patient with intractable low back pain that caused him to move only in a forward flexed position without severe pain. Using SOT cervical indicators and orthopedic block placements with directed gentle decompression manual pressures he appeared to be able to recover function and pain reduction in minutes follow care. Further research is needed to determine if SOT cervical indicator findings might be correlated to diagnostic imaging findings, since this quick and low-cost assessment process might facilitate treatment in urgent care settings.

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Sacro Occipital Technique (SOT) assessment and treatment of two patients pre and post bilateral total hip replacement (THR) surgery: Two case reports

Charles L. Blum, DC

Introduction:

Hip joint replacement surgery [Figure 1] focuses on treating the disorders of hip joint surface characteristics and their dysfunctional kinematic juxtaposition. Causation is considered to be due to genetic, repetitive misuse, infection, trauma, or other local factors.

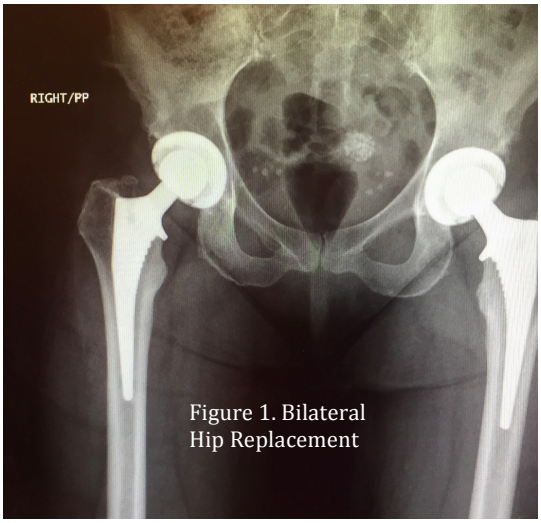

Figure 1. Bilateral Hip Replacement

As our population ages, it is estimated that the need for total hip replacement (THR) will increase. The 2010 prevalence of total hip in the total U.S. population was 0.83%. Prevalence was higher among women than among men and increased with age reaching 5.26% for total hip replacement at eighty years. These estimates correspond to 2.5 million individuals (1.4 million women and 1.1 million men) with total hip replacement in 2010.[1] Due to the "high prevalence of arthritis, the growing demand for increased mobility and quality of life, and the success of joint replacement surgery over the recent decades has resulted in an estimated 7 million individuals living with artificial hips and knees in the United States."[1]

While there has been great success in hip joint replacement surgery, there are still some significant risks.[2] One study found that "ischemic heart disease is the leading cause of death in the 90 days following total joint replacement, and there is an increase in postoperative deaths associated with digestive system-related disease following joint replacement."[3] Another study found men having an increased risk of multiple adverse events including death, surgical site infection, cardiac arrest, return to the operating room, and readmission. Women had increased risk of urinary tract infection and blood transfusion.[4] Preventable and modifiable risks associated with THR include obesity, comorbidities, medical complications, and system-related factors (hospital) and non-modifiable factors involve variables such as age, sex, and ethinicity.[5]

Two-female patients were treated at this clinic, a 65-year-old (patient for 30-years) and 62-year-old (patient for 15-years). They both had a history of asymmetrical internal hip/thigh rotation (one side reduced internal rotation and other reduced external rotation) appearing related to pelvic torsion/chronic sacroiliac joint (SIJ) instability (SIJI) and associated myofascial (e.g., piriformis, iliopsoas, and gluteus medius) splinting.

Methods and Intervention:

The patients were treated with sacro occipital technique (SOT) protocols addressing SIJI (category two) and asymmetrical hip/thigh rotation. This type of care helped reduce the patients' pain and improve their function as well as reduce their pelvic torsion and increase SIJ stability. SOT related myofascial release techniques were performed to both hip joint capsular tissues and along the Iliotibial bands to reduce the chronic myofascial use. They were given a seated stretch [Figure 2] to create symmetry in their hip rotation pattern. When performed regularly (15-20 minutes per day) they would have more symmetrical hip rotation bilaterally. However, over the years the local joint surfaces appeared to continue to be compromised even with care and rehabilitative exercises such that both patients chose to have THR surgery.

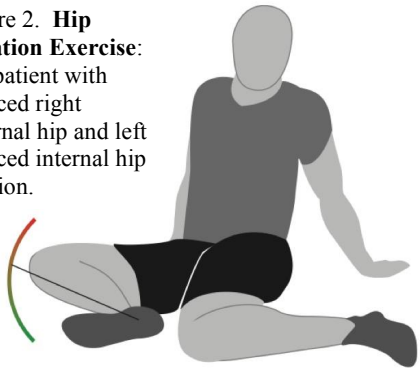

Figure 2. **Hip Rotation Exercise**: For patient with reduced right external hip and left reduced internal hip rotation.

Results:

Following the THR surgeries both patients had normal ranges of hip rotation in the initial three years. However, during the following three years the same asymmetrical hip/thigh rotation patterns returned even though the SIJ was stable and hip joint surfaces were not compromised in the implants. There appeared to be a chronic myofascial contribution to their asymmetrical hip function, however when they performed the seated exercises regularly post-surgery they could sustain symmetrical hip motions for days and weeks at a time without chiropractic care.

Discussion:

At this clinic over the past 40 years it has been consistently found that a subset of patients present with significant asymmetry in hip rotation, often related to untreated SIJI. When this asymmetry persists to the point that their ability to function is compromised this pattern will commonly pre-stage a need for THR surgery later in life (over 10-20 years). Generally the patients who had chiropractic maintenance care and performed the rehabilitative exercise (Figure 2) are able to function adequately in later life and not have need of THR surgery. These patients that had THR surgery and continue to perform the same rehabilitative exercise and maintenance chiropractic care demonstrate benefit 3 years post surgery and appear to be fully functional.

There are not many studies that discuss chiropractic care of patients' pre and post THR surgery. One study discussed the short term benefit of chiropractic care on patients with hip osteoarthritis awaiting a future THR.[6] The pain reduction and improved function helped patients reduce reliance on nonsteroidal anti-inflammatory medication and opioids. Another study found benefit of chiropractic care on pelvic and hip joint dynamics post THR.[7] Since THR revisions (a second replacement surgery on the same hip) is problematic[8] improving pelvic and hip joint function is crucial for THR surgery patients.

The two cases presented in this study, similar to others seen at this clinic, there appeared to be a deep-seated myofascial and neurological condition which even persists post THR surgery. It is not uncommon that post THR surgery the hip joint the patient is left with anatomical leg length inequality (LLI) . Interestingly, in a study by Betsch et al, they showed that simulated LLIs lead to greater changes in pelvic position ($p<0.05$) in patients with a THR than in the non-THR control group.[9]

A case study by Hinkeldey and Morgan[10] discusses chiropractic care for post THR surgery related LLI which appeared to contribute to a patient's pelvic torsion, scoliosis, and myofascial imbalance. Therefore chiropractic interventions may function as a conservative care option[11] that allows a patient to function with a degree of LLI and help prevent the need for THR revision surgery.

As with any case study it is difficult to extrapolate the findings to the population at large due to lack of a control group, other similar subjects for comparison, and the inability to rule out placebo/ideomotor effects or regression to the mean. However the clinical history and interventions over decades of care with these two patients in this study along with their similarities to other patients treated at this clinic over four decades suggest a possible therapeutic regimen for a subset of THR surgery patients. This care could be preventative as well as facilitating optimal function post THR surgery to prevent a need of a THR revision. It is does seem as though there may be a contribution to hip joint asymmetrical function that is less focused on the actual joint surface and more on myofascial patterns and/or central nervous system proprioceptive kinematic accommodations (visual, vestibular, and plantar righting reflexes[12]).

Conclusion:

This case report presented two female patients who over the course of decades of chiropractic care needed THR surgery. They both had good outcomes to the surgery but started to develop the same hip rotation asymmetry that they had prior to THR surgery at approximately 3 years post surgery. Chiropractic care may be of value in preventing the need for pharmaceutical medications pre THR surgery and improve optimal functional outcomes post THR surgery. Further research is needed to determine if some hip disorders may not be related to local joint characteristics but possibly related to deep-seated myofascial or central proprioceptive patterns.

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Sacro occipital technique (SOT) and cranial treatment for hemicrania continua: A case report

Charles L. Blum, DC

Introduction:

Hemicrania continua (HC) is an indomethacin-responsive primary headache disorder[1] which is currently controvertibly classified under the heading of trigeminal autonomic cephalalgias.[2,3] In recent years, HC has become a well-recognized primary headache disorder known for its chronicity and resulting disability in a subset of patients with headache. The core clinical features have been well described: unilateral, side-locked headaches that are continuous (although interrupted by frequent severe exacerbations), associated with autonomic symptoms and a response to indomethacin.[4]

Recently, neuroimaging research has provided new insights into the underlying pathways involved in the disorder, in particular activation of the contralateral posterior hypothalamus and the ipsilateral dorsal rostral pons.[4] Despite its well-known response to indomethacin, many patients still endure long delays in the appropriate diagnosis and treatment.[5] Prakash and Patel[6] estimated the mean delay of diagnosis of HC is 8.0 ± 7.2 years noting also that HC is not rare. They, in fact, noted more than 1000 cases in the literature and HC tends to represent 1.7% of total headache patients attending headache or neurology clinic.[6] Ultimately there remains a need for new treatments given the morbidity associated with long-term indomethacin use.[7,8]

A 55-year-old female patient presented at this office for treatment of HC of 4-year duration necessitating daily indomethacin usage to control her severe headaches. She sought treatment since she was beginning to notice secondary adverse reactions to her chronic indomethacin use and was concerned since nothing else she tried controlled the pain and subsequent disability. She noted that her pain would start in the right side of her neck and travel up towards her right eye with a sharp stabbing sensation.

Intervention:

The patient was treated with sacro occipital technique (SOT) protocols and cranial/TMJ therapies. These protocols/therapies included treatment for pelvic torsion associated with sacroiliac joint hypermobility syndrome (category two)[9], cervical stairstep adjusting[10], cranial sutural steps one through four affecting the cervicocranial myofascia and craniofacial sutures, and TMJ procedures and rehabilitative exercises.[11]

Results:

At the three month mark in care (six office visits) the patient reported that she hadn't had a headache in three weeks and was no longer taking indomethacin. Quadruple Visual Analogue Scale (QVAS)[12] and Headache Disability Index[13] scores noted significant improvements

between initial office visit and at six months later. At one and two-year follow up visits, her headaches had not returned.

Discussion:

Bryans et al[14] have discussed evidence-based guidelines for chiropractic treatment of headaches. The authors noted, "for migraine, spinal manipulation and multimodal multidisciplinary interventions including massage are recommended for management of patients with episodic or chronic migraine." [14] "For cervicogenic headache, spinal manipulation is recommended. Adverse events were not addressed in most clinical trials; and if they were, there were none or they were minor." [14] Their guidelines concluded, "evidence suggests that chiropractic care, including spinal manipulation, improves migraine and cervicogenic headaches." [14]

A randomized controlled study [n=12] by Chicabi et al[15] found that "headache frequency improved at all time points in the chiropractic spinal manipulative therapy and the placebo group. Headache index improved in the chiropractic spinal manipulative therapy group at all time points, while it improved at 6 and 12 months' follow-up in the placebo group. The control group remained unchanged during the whole study period. Adverse events were few, mild and transient. "[15] Both the Bryans[14] and Chicabi[15] studies note that chiropractic care for headaches had low risk and generally offered some benefit.

There are various theories why pelvic imbalance might affect cervicocranial relationships. One compelling theory relates to coupling action at the superior and inferior aspects of the spine associated with the visual and vestibular reflex control. [16,17] The reduction of pelvic torsion and sacroiliac joint stabilization (SOT category two) has been associated with local improvement of lumbar ranges of motion[18], improved cervical spine extensor isometric strength[19], and temporomandibular joint disorders.[20.21] Conversely the improvement of lumbosacral pain by balancing temporomandibular joint disorders has also been discussed in the literature. [22]

An interesting case study by Hochman discussed a 32-year-old male patient with prior coccyx and skull trauma and headaches of seven-year duration. The patient presented having been diagnosed by his prior allopathic physicians with migraine and trigeminal neuralgia. He had been previously treated pharmaceutically and physically, including with chiropractic, but was unresponsive to that care. The patient's coccyx and sphenoid bones were adjusted incorporating SOT cranial procedures, and the patient had resolution of his headaches. [23] Other studies have discussed successful care of headaches or migraines utilizing cranial[24-26] and/or cranial/TMJ[27] interventions

As with any case study it is difficult to extrapolate the findings to the population at large due to lack of a control group, other similar subjects for comparison, and the inability to rule out placebo/ideomotor effects or regression to the mean. However it is compelling to consider the temporal relationship of the patient's dependence on indomethacin to control her headaches for four years and her ability to function without medication and headaches after six office visits over a three-month period. At a one- and two- year follow up she was still headache free.

Conclusion:

This study discussed a patient diagnosed with HC unresponsive to any intervention other than indomethacin, which over time had begotten adverse side effects. She sought care at this office as a last resort since while she was struggling with the HC and medication's side effects. She noted improvement following each office visit with a relief of symptoms and was able to stop indomethacin, being headache free for over two years. Further research is needed to determine if a subset of patients with HC might be responsive to SOT and cranial therapeutic interventions.

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Whiplash and temporomandibular joint disorders: A review of the literature

Charles L. Blum, DC

Introduction

Whiplash-associated disorders (WADs)[1], can be defined as a collection of neck-related symptoms following a car accident [2] and is among the leading car crash-related injuries with respect to burden on patients, the healthcare system and insurance organizations. The incidence of whiplash injury has been increasing during the past decades [3], ranging from 16 to 200 per 100,000 population, and varying by geographical location [1,4].

While the literature is clear on cervical spine related WADs that occur post automobile accidents [5], this review of the literature seeks to determine if there might be a relationship between temporomandibular joint (TMJ) disorders (TMD) and whiplash (automobile related) accidents. If a relationship may exist do chronic WADs lead to chronic TMDs related presentations.

Methods:

A search of Pub Med was made for the search phrases: Whiplash, Temporomandibular Joint, TMJ, and TMD. While searching if an article appeared to be related to this topic, "similar articles" would be accessed and a search of all those lists would also be performed. The goal was to review literature pertaining to any possible relationship between WAD and TMD.

Results:

Post-Traumatic Whiplash Related Disorders (WADs) and Temporomandibular Joint Disorders (TMDs)

While the mechanism of the relationship between WAD and TMD is not fully understood a review of the literature does show a clear relationship. In a review by Epstein et al [6] they discussed how TMDs may be associated with WADs and include jaw pain or dysfunction in addition to headache, dizziness, hearing disturbances, neck pain and dysfunction following an MVC.[7-10] Reduced or painful jaw movement may also occur in patients with WAD.[11]

In two related studies Kolbinson et al, the authors found WAD related TMD subjects reported more severe facial pain, neck pain, earache and headache as well as sleep disturbances with greater tenderness in the masticatory muscles, neck muscles and TMJ in the trauma group. [12] The disabilities associated with these TMD subjects had a significant impact on their work and recreational activities. Post-trauma TMD patients received more types of treatment and more medications (including analgesics, muscle relaxants and antidepressants), had more health care visits, were treated over a longer period and had poorer outcomes.[13]

A systemic review by Häggman-Henrikson et al noted that "patients with comorbid TMD/whiplash present with more jaw pain and more severe jaw dysfunction compared with

TMD patients without a history of head-neck trauma." [14] Similarly Landzberg et al in a narrative review found that TMD subjects with a history of WAD present with "an increase in symptom severity" as well as "more severe subjective, objective, and psychological dysfunction compared with typical patients with TMDs." [15] Klobas et al, found in their study that "the prevalence of TMD was higher among individuals with chronic WAD compared with an age- and sex-stratified cohort of patients in a general dental practice."[9] Their results indicated, "that trauma to the neck also affects temporomandibular function."[9]

Is there an explanation for this relationship between WADs and TMDs?

While the evidence clearly supports a relationship between WAD and TMD what is emerging in the evidence are explanations for the mechanism of how this relationship might take place. A case controlled WAD/TMD study by Lampa et al, noted that in the WAD/TMD group that "jaw-neck sensory-motor function [was] impaired already within 1 month after a whiplash trauma." [16] Aside from a neurologically driven cause O'Shaughnessy suggests that a kinematic chain relationship between the TMJ and cervical spine and determined that a a kinematic of forces associated with musculoskeletal system explains WAD associated TMD presentations. [17]

Another theory was implicated by Häggman-Henrikson et al, who note that WAD related "neck trauma can derange integrated jaw and neck behavior"[18] adversely affecting "the functional coupling between the jaw and head-neck motor systems." [18] Eriksson et al also found that with WAD cervical spine trauma "is associated with deranged control of mandibular and head-neck movements during jaw opening-closing tasks, and therefore might compromise natural jaw function."[19]

A systematic review studying TMD after WAD found that the "prevalence and incidence of TMD pain is increased after whiplash trauma."[20] In general WAD/TMD subjects had poorer outcomes compared to patients with non-WAD related TMD presentations. The poorer treatment outcome of the WAD/TMD subjects suggests that "TMD pain after whiplash trauma has a different pathophysiology compared to TMD pain localized to the facial region."[20]

It does appear that complex TMD symptoms following WAD events represent a "component of a symptom cluster of potentially regional and widespread pain impacted by psychosocial factors. Oral health care providers must be aware of the relationship between" TMD, WAD, and "trauma since the complex nature of these symptoms need specific diagnosis and management."[21]

Does chronic WAD lead to TMD presentations?

While there does seem to be evidence that there is a relationship between WAD and TMD in acute situations it is important to determine whether some TMD presentations could represent chronic long-term effects secondary to WAD. "Although most patients recover from acute whiplash injuries, those with chronic whiplash syndrome develop signs of central nervous system (CNS) amplification of pain and have a poor prognosis. In this context, specific pain generators from acute whiplash have been identified through clinical, biomechanical, and animal studies."[22]

A follow up study by Häggman-Henrikson et al corroborated the prior study and found "that individuals with a recent whiplash trauma report more jaw pain and disability compared with controls without a history of neck trauma."[23] They noted that "the correlation between jaw and neck pain intensity implies that intensity of neck pain in the acute stage after whiplash trauma might be a possible risk factor also for development of chronic orofacial pain."[23]

In a controlled prospective study by Salé and Isberg they studied WAD induced short-term and long-term temporomandibular joint (TMJ) pain/dysfunction and found "one in three people who are exposed to whiplash trauma is at risk of developing delayed TMJ symptoms that may require clinical management."[24]
In another prospective 15-year follow-up study it was determined that the development of TMJ symptoms, both immediate and delayed, is common in WAD patients.[25]

While most studies have studied secondary affect of WAD cervical spine trauma's contribution to TMD, it is possible that successful management of WAD related chronic cervical spine dysfunction may warrant treatment of any concomitant TMD presentation. For instance, Hülse and Losert-Bruggner investigating WAD/TMD patients with chronic cervical spine presentations found "relief from suffering can often not be achieved without treatment"[26] of the subject's TMD.

Discussion:

From a review of the literature it does appear that a relationship between WAD and TMD exists in both acute and chronic presentations. Some specific points appear to be clear about the review of the literature:

1. WADs are associated TMD presentations along with accompanying conditions such as headache, dizziness, hearing disturbances, neck pain and dysfunction. [6,7,10]

2. The relationship between WAD and TMD presentations has various possible causations: jaw-neck sensory-motor dysfunction, kinematic chain imbalanced function, deranged functional coupling between the jaw and head-neck motor systems, a WAD/TMD specific pathophysiology, and a symptom cluster of potentially regional and widespread pain impacted by psychosocial factors. [16,17,20, 21,27]

3. There are various studies that suggest a relationship between WAD and TMD chronic presentations and that delayed presentations of TMD post-WAD is fairly common. [9, 22-25]

4. Of interest one study noted that some patients with chronic cervical spine pain and dysfunction and TMD following a WAD, might only have relief of their WAD related cervical spine pain when their concurrent TMD condition was treated. [26]

There does appear to be a relationship between WAD and TMD and Friedman and Wiesberg "concluded that the TMJ and surrounding musculature should be examined similarly to other joints, [following WAD accidents] with no preconceived notion that TMD pathology after

whiplash is unlikely."[28] Krogstad et al,[29]noted that a difference did appear between patients with WAD/TMD and those only with TMD alone with somatic complaints and psychologic distress. Their comparative study [n=16] determined that the WAD/TMD group had a poorer response to care with residual somatic and psychological distress compared to the "TMD only" patients who "showed improvement on all treatment criteria." [29]

Therefore physicians treating patients with WAD should determine if the patient might have a TMD presentation. It may also be important when treating patients with TMD to determine if they had a WAD prior to their TMD condition since outcomes may vary and multidisciplinary therapeutic involvement would likely be needed for optimal outcomes. Likewise, physicians treating patients with cervical trauma related WAD should assess if a patient has a concomitant TMD since this may complicate the patient's recovery.

Conclusion

This narrative review was not comprehensive since the volume on the relationship between WAD and TMD is quite vast. The goal was to seek to determine if there is evidence to support this relationship and if there might be chronic TMD sequelae secondary to accident related WAD. The literature does support the relationship between WAD and TMD, and also does support a delayed response for TMD presentations post accident WAD. Greater study is necessary to determine the specific causations associated with WAD/TMD, which will hopefully lead to improved therapeutic applications and outcomes.

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Assessing The Need for Dental/Chiropractic TMJ Co-Management: The Development of a Prediction Instrument

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INTRODUCTION: Historically the evolution of interdisciplinary care of temporomandibular joint (TMJ) began in the last 20th century. It may be that for some proportion of patients who eventually develop a full-blown TMJ disorder, there is an adaptive stage whereby the related musculature in the cervical spine and other posturally related muscles may be able to accommodate so as to mitigate TMJ restriction or crepitus. The challenge for dentists, planning to treat a patient with TMD, remains a guessing game as they continue unaided in attempting to determine whether or not a patient would prophylactically benefit from chiropractic co-treatment in order to prevent the onset, or minimize the effect, of musculoskeletal symptoms secondary to dental TMD intervention. The purpose of this paper is to help begin the process of developing an assessment tool for dentists to assist them in determining when a patient might not be able to easily adapt to related postural changes that may occur secondary to dental modifications of occlusion or TMJ balancing.

METHODS:

Qualitative Assessment of Risk Factors: In-depth interviews were conducted with groups of dentists specializing in the treatment and the consistent request from the vast majority was the need for a tool to guide them in determining which patient's would best benefit from chiropractic co-treatment.

Development Of A Predictive Tool: Based on the preliminary interviews and a review of existing, valid and reliable measures, a preliminary assessment tool that measures the following five domains was developed; (1) musculoskeletal manifestations (2) the patient's perception of pain, (3) somatisization of psychological stress,
(4) physiological reserves to deal with stress and (5) the patient's self-reported quality of life.

Preliminarily Selected Instruments: The preliminary assessment tool is composed of three instruments:. (1) The SF-12, which is a general measure of health status. (2) The general symptom survey for musculoskeletal dysfunction determines if the patient has had a history or is currently suffering from headaches, neck, shoulder, hand, lower back, knee, or foot pain. (3) The functional evaluation form tests proprioceptive abilities, static and dynamic postural balance tests and cervical ranges of motion.

DISCUSSION: The interviewed dental professionals observed that posture can

be a determinant of occlusion functionality outcomes in some of their patients. They have identified a need for an assessment instrument that would help them to identify patients who may be at risk so that referral could be made before the initiation of occlusion modification. The goal of the assessment form, which includes functional analysis tests, is to help determine which "appropriate situations" or conditions are best for referral for chiropractic care.

CONCLUSION: While the selected assessment instruments were not originally developed or validated for their predictive capabilities, they are posited to measure health domains that may have some transferability to measuring predictive factors associated with the development of musculoskeletal reactions secondary to dental TMJ treatment. As new data becomes available, this instrument will be modified to reflect improved understanding of predictive elements. Concomitant with the development of a predictive assessment tool is the process goal of expanding interdisciplinary dialogue, which may help lead to standardization of TMJ dysfunction terminology and a "common language." A starting point is needed and a reasonable attempt has been made to begin the daunting process of developing an instrument that would help inform dentists as to which patients may be likely to become symptomatic to peripheral musculoskeletal regions secondary to occlusion modification.

Assessing The Need for Dental - Chiropractic TMJ Co-Management: The Development of A Prediction Instrument

INTRODUCTION
Historically the evolution of interdisciplinary care of temporomandibular joint (TMJ) began in the last 20th century. In the 1970s multidisciplinary clinical management of temporomandibular disorders (TMD) was in its beginning stages. [1] The *Journal of Craniomandibular Practice* (CRANIO) was started in the early 1980s and was dedicated to the multidisciplinary study and investigation of temporomandibular joint (TMJ) disorders, TMD and craniomandibular joint dysfunction (CMD). In 1990 the American Academy of Head, Neck, Facial Pain and TMJ Orthopedics wrote a position paper attempting to describe aspects of multidisciplinary examination, diagnosis, and treatment modalities. [2] Later, during the 1990s, a group of organizations working together to build a more cohesive future for diagnosis and treatment of temporomandibular joint disorders was formed called the, "American Alliance of TMD Organizations." Just recently in the *Journal of Craniomandibular Practice* a guest editorial was written regarding chiropractic and dental co-treatment in the 21st Century. [3]

As awareness of complementary alternative medicine has increased, multidisciplinary cooperation, dentistry and chiropractic have begun to see rationale for co-management of TMD. In two studies examining the use of complementary alternative medicine (CAM) therapies among patients with TMD, respondents who used CAM for their TMD reported being most satisfied with the "hands on" CAM therapies (massage, acupuncture, and chiropractic care). [4,5] In another study they determined that the only single type of treatment more commonly used than CAM treatment was medication (28.6%). The most common type of CAM treatment was relaxation therapy (12.7%), followed by chiropractic treatment (9.5%). [6]

Pullinger, Seleigman and Solberg com-

pleted a epidemiological study using a sample, which was compatible with prior epidemiologic findings, and matching the age range of most subjects seeking treatment for TMJ disorders. They found that "the prevalence of TMJ signs and symptoms was notable even though two thirds reported only mild or early symptoms, with only 3% reporting severe symptoms. This population was noted for the absence of locking, the low frequency of severe pain or severe TMJ dysfunction, and the low prevalence of restricted ranges of mandibular movement and TMJ crepitation. TMJ clicking was not always clinically confirmable in subjects with widespread muscle tenderness." [7] It may be that for some proportion of patients who eventually develop a full-blown TMJ disorder, there is an adaptive stage whereby the related musculature in the cervical spine and other posturally related muscles may be able to accommodate so as to mitigate TMJ restriction or crepitus.

Patient assessment forms are commonly used to evaluate patient's perceived outcomes of care. Practitioners may utilize these outcome instruments to gage the effectiveness of their care plan and to inform their considerations for continued care, referral and/or discharge. While there is a TMD assessment form [8] to help doctors determine the need for TMJ care there presently is no specific evaluation instrument (form) to assist the dentist in predicting a patient's potential need for chiropractic and cranial co-treatment. The literature contains few references to any instruments aimed at predicting treatment responses (and none that have been validated) to any health interventions. This does not alter the vital importance of attempting to develop a method of early identification of patients who would benefit from early or prophylactic initiation of TMD co-management. Some practitioners within the chiropractic profession have gained greater expertise into treatment of the TMD [9-13]. Additionally, the importance of co-treatment with the dental profession has become apparent to both chiropractors and dentists treating TMD as it is not uncommon for patients to report musculoskeletal related sequelae secondary to TMJ treatment. [3,14-6] Yet, the challenge for dentists, planning to treat a patient with TMD, remains a guessing game as they continue unaided in attempting to determine whether or not a patient would prophylactically benefit from chiropractic co-treatment in order to prevent the onset or minimize the effect of musculoskeletal symptoms secondary to dental TMD intervention.

The literature provides examples of a proposed association between occlusion and posture, although many of these studies relate the postural modifications to the shoulder girdle and cervical spine. [17- 20] It is from this research that, assessment related to the upper extremity, cervical spine and previous history of headaches has been included as part of the TMD differential diagnosis process. Additionally, some research is suggesting that the pelvis and TMJ might be related in relationship to the manifestations of TMD, [14, 21-2] The purpose of this paper is to help begin the process of developing an assessment tool for dentists to assist them in determining when a patient might not be able to easily adapt to related postural changes that may occur secondary to dental modifications of occlusion or TMJ balancing. The preliminary step in development was accomplished through a series of in-depth interviews with dental practitioners specializing in TMJ care. The second step was to take this qualitative information and devise an assessment tool. The third step will be to take this instrument into the field to collect data and analyze the instrument's predictive

utility.

METHODS

Qualitative Assessment of Risk Factors

Typically, an assessment questionnaire is comprised of various domains that attempt to account for all the variability in the particular concept that is being measured in order for it to reach a high level of reliability, validity and generilizability. In-depth interviews were conducted with groups of dentists specializing in the treatment of TMD at TMD seminars and study groups. During that time the consistent request from the vast majority was the need for a tool to guide them in determining which patient's would best benefit from chiropractic co-treatment. One finding in some TMD patients that the dentists reported during the interview was neck, head, lower back and related extremity conditions related to posture. Also the dentists described that some TMD patients have issues related to swallowing, night time breathing, and that patients reported that their TMD symptoms were affected by psychological stresses. Repeatedly, during interviews and meetings, the dentists expressed the expectation that the chiropractic profession should be able to develop an assessment form and specific examination assessment procedures that would facilitate determining the necessity of possible co-treatment.

Development Of A Predictive Tool

The literature contains a few references that support the domains elicited from the interviewed dentists. A study investigating effects of dental conditions on patients' quality of life found that there were numerous impacts on quality of life (e.g. decreased physical function, social function and mental functioning) and these impacts were particularly severe for the TMJ patients [25]. Another study suggests that populations at risk might "consist of people with weak psychological and physiological constitution, who more easily than others may develop long lasting back pain as well as other disorders." [26]

Based on the preliminary interviews with the dentists questioned and a review of existing, valid and reliable measures, a preliminary assessment tool that measures the following five domains was developed; (1) musculoskeletal manifestations (2) the patient's perception of pain, (3) somaticization of psychological stress, (4) physiological reserves to deal with stress and (5) the patient's self-reported quality of life.

Preliminarily Selected Instruments

The preliminary assessment tool is composed of three instruments, which contain four total subscales and incorporate the five domains identified in the literature and through the interviews with the dentists.

The first instrument is the SF-12, which is a general measure of health status [27-8]. It was developed to minimize respondent burden, is a briefer version of the SF-36 [29-30], and includes both physical and mental health concept areas. Each concept area is measured by multiple categories, including (1) the patient's self-report of behavioral functioning, (2) the patient's perceived well being, (3) social and role disability, and (4) and the patients perceptions of their general health status. [31-2]

The general symptom survey for musculoskeletal dysfunction (GSSMD) [Table 1: Part Two] determines if the patient has had a history or is currently suffering from headaches, neck, shoulder, hand, lower back, knee, or foot pain. While it is not conclusively determined that modification of occlusion will affect all

these areas, some studies have noted improved TMJ function with modifications of posture ultimately affecting the low back, cervical spine and its related structures. [33] Other questions in the GSSMD assess issues of balance, respiration [34] through the mouth, and swallowing, [35-6] which can be related to the TMJ and cervical spine.

The functional evaluation form [Table 2] tests proprioceptive abilities, static and dynamic postural balance tests and cervical ranges of motion. These physical examination and assessment procedures are considered in order to help uncover patient's who might be at risk for a reaction to occlusal modification. [37] These functional tests help answer questions such as: "Does the patient exhibit signs of mechanical dysfunction, signs of postural accommodation, or proprioceptive balance issues?" General global postural characteristics are evaluated standing, sitting and with motion. [38] Proprioceptive testing is used to determine reduced vestibular functioning, which can sometimes be challenging for patients with TMD. [19] Since occlusal modifications often can affect cervical vertebral position and its affect on the stomatognathic system, limitations in cervical ranges of motion are also evaluated. [11,39-41]

The instrument will be preliminarily pilot tested in a population of dental practitioner/TMJ specialist patients to evaluate the effectiveness in predicting which patients go on to have an adverse musculoskeletal response secondary to occlusion modification. The association between the scale scores and adverse musculoskeletal responses will be assessed through logistic regression. This analysis will assist in characterizing responses patterns on the instruments that might predict an increased likelihood of an adverse response. The findings from this analysis could then be utilized by dentists at the initiation of TMD treatment to identify patients who might benefit from concurrent chiropractic care.

DISCUSSION

The interviewed dental professionals, who treat TMD, have observed that posture can be a determinant of occlusion functionality outcomes in some of their patients. They have identified a need for an assessment instrument that would help them to identify patients who may be at risk so that referral could be made before the initiation of occlusion modification. The rationale and utility for greater relationships between chiropractors and dentists has previously been discussed in the literature, [3,15-6, 23] with some reports of patient TMD musculoskeletal problems resolving secondary to dental-chiropractic co-management. Wyatt suggests that no orthodontic procedure can be performed in isolation without considering its possible effect on the temporomandibular joint. [23] Gregory takes that one step further and notes that "before fitting dental splints or equilibrating the occlusion, the sacroiliac joints should be examined for proper function and any sprain should be reduced. Correspondingly, after occlusion-altering (or potential occlusion-altering) dental procedures, the sacroiliac joints should be examined for proper function to determine if they show ongoing functional stability." [14]

Recently there also have been some studies that related TMD to the sacroiliac and lumbosacral spine dysfunction, which helps corroborate the inclusion of these regions of the body. [21]. Steenks and de Wijer note, "because of other diseases mimicking the symptoms of temporomandibular dysfunction (TMD), differential diagnosis is of the utmost im-

portance. " They determined that "headache and neck pain often accompany TMD. In appropriate situations it is advised to refer to the proper specialist, before starting treatment for TMD." [42] The goal of the assessment form, which includes functional analysis tests, is to help determine which "appropriate situations" or conditions are best for referral for chiropractic care.

CONCLUSION

The specific aim of this study has been to begin the process of developing an assessment tool that could ultimately serve in predicting the need for TMD co-management. The first phase of this study has focused on interviewing interested dental groups, who have requested assistance in determining the need for co-treatment, so as to identify applicable domains that may be relevant to predicting adverse musculoskeletal outcomes secondary to dental occlusion modification. The next phase of this endeavor has been to begin evaluating currently available outcomes assessment instruments that match the domains reported by the interviewed dentists. While the selected assessment instruments were not originally developed or validated for their predictive capabilities, they are posited to measure health domains that may have some transferability to measuring predictive factors associated with the development of musculoskeletal reactions secondary to dental TMJ treatment.

Clearly this process will require ongoing input from dentists and chiropractors co-treating and managing cases. Ideally dentists who see patients with TMD for treatment will continue to notice characteristics of patients who fit a profile relating to difficulty in posturally accommodating to occlusal and TMJ modifications. As new data becomes available, this instrument will be modified to reflect improved understanding of predictive elements.

The multifactorial origin of TMJ dysfunctions has led to confusion about etiology and multidisciplinary treatment. Because of the many disciplines involved in treatment, differences in terminology have surfaced. Concomitant with the development of a predictive assessment tool is the process goal of expanding interdisciplinary dialogue, which may help lead to standardization of TMJ dysfunction terminology and a "common language." [43] A starting point is needed and a reasonable attempt has been made to begin the daunting process of developing an instrument that would help inform dentists as to which patients may be likely to become symptomatic to peripheral musculoskeletal regions secondary to occlusion modification.

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Health Status Questionnaire (HSQ-12)

1.	In general, would you say your health is:		
	(*Circle one number*)		
	Excellent	1	
	Very Good	2	
	Good	3	
	Fair	4	
	Poor	5	

The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much? (*circle one number on each line*)

		Yes, limited a lot	Yes, limited a little	No, not limit at all	
2.	Lifting or carrying groceries	1	2	3	
3.	Climbing several flights of stairs	1	2	3	
4.	Walking several blocks	1	2	3	

5.	During the **past 4 weeks** how much difficulty did you have doing your work or other regular daily activities as a result of your physical health? (*circle one number)*		
	None at all	1	
	A little bit	2	
	Some	3	
	Quite a bit	4	
	Couldn't do daily work	5	
6.	During the past 4 weeks, to what extent have you accomplished less than you would like in your work or other daily activities as a result of emotional problems (such as feeling depressed or anxious) ? (*circle one number)*		
	None at all	1	
	Slightly	2	
	Moderately	3	
	Extremely	4	
7.	During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups? (*circle one number)*		
	Not at all	1	
	Slightly	2	
	Moderately	3	
	Quite a bit	4	
	Extremely	5	

8.	How much bodily pain have you had during the past 4 weeks? (*circle one number*)		
	None	1	
	Very mild	2	
	Mild	3	
	Moderate	4	
	Severe	5	
	Very Severe	6	

These questions are about how you feel and how things have been with you during the **past 4 weeks**. For each question please give the one answer that comes closest to the way you have been feeling

How much of the time during the **past 4 weeks . . .**

		All of the time	Most of the time	A good bit of the time	Some of the time	Little of the time	None of the time	
9.	Have you felt calm and peaceful?	1	2	3	4	5	6	
10.	Did you have a lot of energy?	1	2	3	4	5	6	
11.	Have you felt downhearted and blue?	1	2	3	4	5	6	
12.	Have you been a happy person?	1	2	3	4	5	6	

Part Two: "Roland Morris 18"

When your back hurts, you may find it difficult to do some of the things you normally do. Put an "X" in the box next to the sentences that describe you today.

1.	I stay at home most of the time because of my back.	❒	
2.	I walk more slowly than usual because of my back.	❒	
3.	Because of my back, I am not doing any jobs that I usually do around the house.	❒	
4.	Because of my back, I use a handrail to get upstairs	❒	
5.	Because of my back, I lie down to rest more often	❒	
6.	Because of my back, I have to hold on to something to get out of an easy chair.	❒	
7.	Because of my back, I try to get other people to do things for me.	❒	
8.	I get dressed more slowly than usual because of my back.	❒	
9.	I stand up only for short periods of time because of my back.	❒	

10.	Because of my back, I try not to bend or kneel down.	❒	
11.	I find it difficult to get out of a chair because of my back.	❒	
12.	My back is painful almost all of the time.	❒	
13.	I find it difficult to turn over in bed because of my back.	❒	
14.	I have trouble putting on my socks (or stockings) because of pain in my back.	❒	
15.	I sleep less well because of my back.	❒	
16.	I avoid heavy jobs around the house because of my back	❒	
17.	Because of back pain, I am more irritable and bad tempered with people than usual.	❒	
18.	Because of my back, I go up stairs more slowly than usual.	❒	

Part Three: General Musculoskeletal Questions

If any of the following questions pertain to a condition you have presently or have had in the past then please put an "X" in the box next to the sentences.

1.	I have or have had neck pain when I am at rest.	❒	
2.	I have or have had neck pain during normal daily activities.	❒	
3.	My neck pain can sometimes cause headaches.	❒	
4.	My neck pain can sometimes cause me shoulder pain.	❒	
5.	I have or have had wrist or hand pain when I am at rest.	❒	
6.	I have or have had wrist or hand pain during normal daily activities.	❒	
7.	It is hard to keep my head stationary when I swallow.	❒	
8.	I have or had foot and/or knee pain.	❒	
9.	My feet hurt when I stand or walk.	❒	

Physical Assessment Outcome Tests

Symmetry Pelvic/Shoulder Heights Standing	1. Iliac Crest Height: standing (posterior)	a. + = Rt/Lt b. - = even heights			
	2. PSIS standing (stationary)	a. + = Rt/Lt b. - = even heights.			
	3. PSIS standing (w/flexion)	a. + = Rt/Lt b. - = even heights			
	4. Shoulder height standing	a. + = Rt/Lt b. - = even heights			
			Left	Right	
Pelvic Coordination Standing	5. One-Leg Stand (eyes open)		_____Sec.	_____Sec	
	6. One-Leg Stand (eyes closed)		_____Sec	_____Sec	
			Pain Levels		
Ranges of Motion Lumbar Standing	7. Standing Lumbar Extension		+1	0	-1
	8. Standing Lumbar Flexion		+	0	-1
Posture Standing	9. Forward Head Carriage			❒	
	10. Rounded Shoulders			❒	
	11. Hyperpronation (Flat Footed) when Standing			❒	
	12. Hyperpronation (Flat Footed) when Walking			❒	
Symmetry Pelvic/Shoulder Heights Sitting	13. PSIS sitting	a. + = Rt/Lt b. - = even heights			
	14. Shoulder height sitting	a. + = Rt/Lt b. - = even heights			
			Patient	Normal	
Ranges of Motion Cervical Sitting	15. Cervical Flexion			50°	
	16. Cervical Extension			60°	
	17. Right Lateral Flexion			45°	
	18. Left Lateral Flexion			45°	
	19. Right Rotation			80°	
	20. Left Rotation			80°	

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Cranial Osteopathy: Obscurantism and Enlightenment

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Abstract

The application of cranial osteopathic manipulative medicine (OMM) is always controversial in the literature. Primary respiration related to the movement of spheno-basilar synchondrosis in the adult goes against the knowledge of complete ossification that occurs at this articulation after the pubertal phase. The idea that the operator's hands can communicate with the meninges is difficult to accept. The anatomy shows us that the fascial system involves the meninges and that from the microcellular point of view there are no layers that divide one tissue from another. The backing of new sciences, such as quantum physics, suggest that cranial palpation allows the osteopath to come into contact with the meninges. Recent scientific evidence shows that meningeal afferents can affect extracranial areas and that the pericranial musculature itself is able to influence these afferents. The article highlights some reflections in support of cranial osteopathy, based on scientific information that could help the osteopath to improve clinical work.

Categories: Medical Physics, Physical Medicine & Rehabilitation, Anatomy
Keywords: osteopathic, fascia, quantum physics, neurophysiology, cranio

Introduction And Background

In the scientific landscape, the approach with the cranial osteopathic manipulative medicine (OMM) is much debated [1]. At present, there is still no absolute recognition of the effect of manual cranial manipulations in the field of international literature. The latest revisions on the OMM are negative, describing the fallacious scientific depth and the poor methodology applied in carrying out the research, thus relegating this medical discipline to the borders of the credible [2-3]. We know that the synchondrosis between the occipital bone and the sphenoid bone, articulation underlying the concept of primary respiration and cranial bone movement, begins to ossify from 11-13 years to complete ossification at the end of puberty [4]. The process begins at the level of the endocranial surface, to finally continue ectocranially [4]. From this point of view, the cranial model devised by Dr Sutherland should be reviewed. Brain meninges are subject to physiological calcification, with age or due to previous head trauma or craniocervical surgery [5-7]. The ossification puts into question the manual techniques for draining the dura mater's sinus or for influencing the cerebrospinal fluid (CSF) or the lymph of the glymphatic system [8-10]. The choroid plexus region can ossify bilaterally [5]. This information reminds us that the production, circulation and absorption of liquor is still a matter of debate by researchers [11]. Probably, liquor does not circulate, but disperses depending on the molecular weight of its components, and is absorbed differently by the ventricles and sub-arachnoid space [11]. Scholars who are not used to putting their hands on the patient's skull are inclined to rely only on this information, in order to demonize the OMM, but every coin has always two sides. To understand a phenomenon one must not be prejudicial,

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but follow every information and scientific field to correctly define the contours of the event to be studied. If such a research strategy is lacking, full awareness cannot be reached (knowing or not being able to know), but a self-imposed scientific limit is reached, which does not correspond to the final goal of the scientist and scholar. In this way, obscurantism is created.

Review

Metanalytic reviews forget which are the foundations of evidence-based medicine, that is, the fusion of the operator's clinical experience, the patient's experience and experimental research: "External clinical evidence can inform, but can never replace, individual clinical expertise, and it is this expertise that decides whether external evidence applies to individual patients at all, if, how it should be integrated into a clinical decision" [12]. The synchondrosis between the occipital bone and the sphenoid bone when ossified does not create movement (flexion-extension), but the most recent scientific notions show that most cranial sutures or synarthrosis are patent, even in very old subjects (Figure *1*) [4].

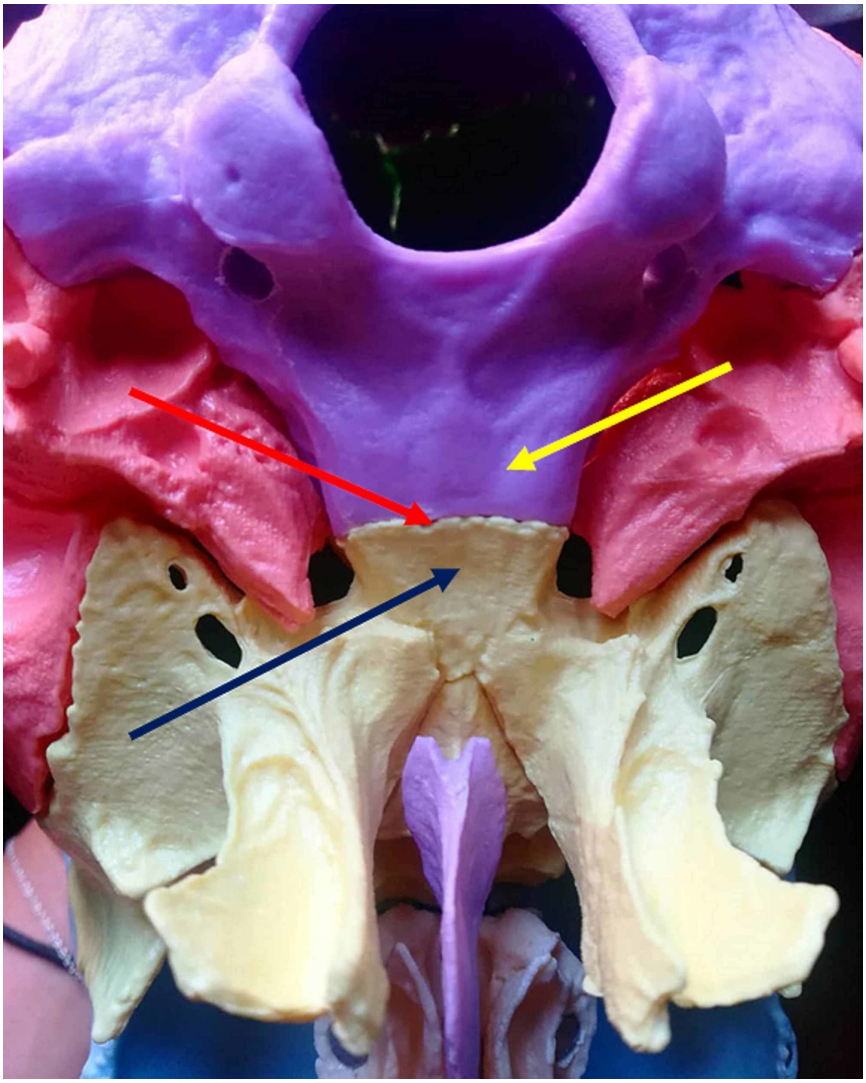

FIGURE 1: The figure illustrates the synchondrosis articulation between the occipital bone and the sphenoid bone, with a view of the base of the skull. The red arrow indicates the synchondrosis articulation; the yellow arrow indicates the basiocciput; the blue arrow indicates the body of the sphenoid.

The sutures consist of extracellular matrix, proteoglycans, collagen fibres and water; the synarthrosis with interdigitations, for example, the occipitoparietal, have a modulus of elasticity and absorption of mechanical stresses are greater (Figure *2*) [4].

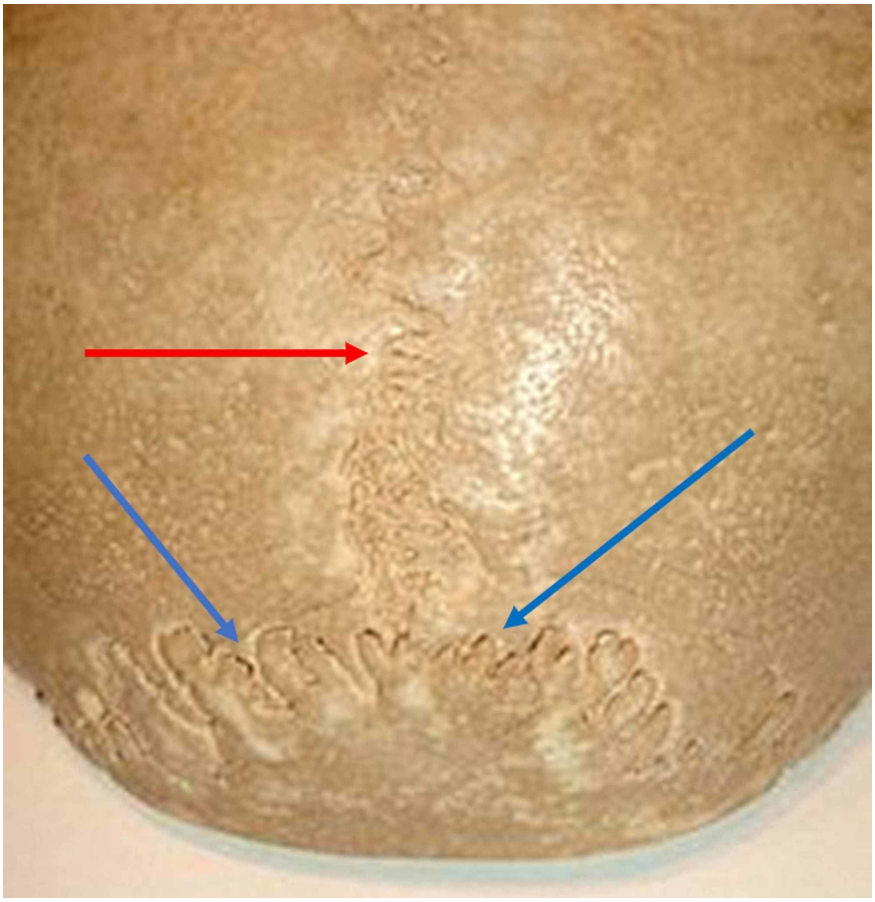

FIGURE 2: The figure illustrates the occipitoparietal sutures. The red arrow shows the suture between the parietal bones; the blue arrows show the occipitoparietal sutures.

The sutures play different mechanical roles, including cushioning the extracranial tensions

towards the skull and those intracranial towards the outside, thanks to the presence of cranial meninges [4]. We know that the cerebral mass moves (caudomedially and craniolaterally), through the solicitation of the heartbeat and the respiratory diaphragm [13]. The same cerebral mass, in particular, the neocortex and the limbic area oscillate during inspiration. The dura mater can change the mechanical tension of the extracranial musculature and the cervical tract, just as the deep pericranial musculature influences the mechanical dural tension. As regards the bi-univocal relationship of the dura mater and the pericranial musculature/fascia, the presence of trigeminal dural nerve endings external to the skull has been demonstrated; the latter cross the sutures and innervate the myofascial system of the skull (muscles and tendons) (Figure *3*) [14-15].

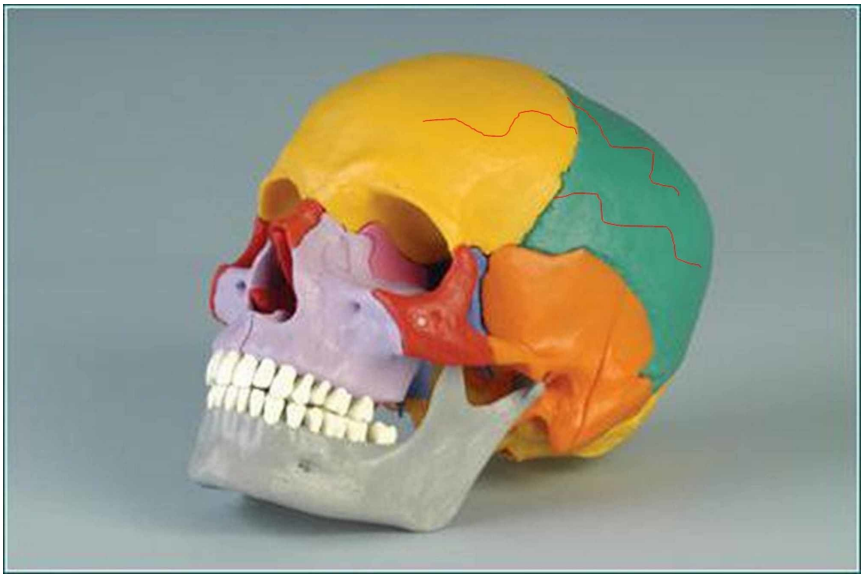

FIGURE 3: The figure shows a model of the skull with red lines drawn above the frontal bone and the parietal bone. The figure demonstrates the presence of trigeminal dural nerve endings external to the skull, whose terminations cross the sutures and innervate the myofascial system of the skull.

To give an example of the myofascial presence above the bone tissue of the skull, the occipitofrontalis muscle has a very large tendinous arch below the galea capitis, which connects the muscular occipital body with the frontal one [16]. This muscle and other contractile and connective tissue districts that superficially cover the bones of the skull are involved by the dural afferents [17]. We cannot exclude the presence of sympathetic and parasympathetic terminations running parallel to the dural endings, with influence also on the intra/extracranial vascular pathways [17]. The dural afferents, beyond the extracranial area, reach the arachnoid space and the pia mater. These afferents/efferences function in an orthodromic and antidromic manner: there is a close relationship between the cranial myofascial system and the dura mater [17-19]. The relationship of the subtentorial dural area with the first cervical roots is always bi-univocal; the mechanical tension of the cervical musculature can be altered by dural information and the tentorial dural area can undergo a tension modification by the cervical musculature [20]. This happens due to afferents coming from the cervicovascular area and from

non-trigeminal tentorial neural afferents reaching the cervical muscular portion [20]. The meningeal system, in which we recognize the dura mater, the arachnoid mater and the pia mater, is connective tissue; its fibroblasts can alter their tensional state, increasing or decreasing it [21]. By altering the dural tensional state, the secretion of some substances by fibroblasts (prostaglandins) is stimulated; from the sympathetic, parasympathetic and myelinated fibres terminations, multiple neuropeptides (noradrenaline, acetylcholine) are produced, as well as from the trigeminal meningeal terminations (calcitonin gene-related peptide - CGRP) [22-23]. These substances, depending on the perceived physiological or non-physiological stress, will influence the metabolic state of the brain and the brain's immune status, the repair capacity of the neuronal cells, as well as the nociceptive or analgesic meningeal response [22-23]. Recall that the meninges are rich in immune cells; the pia mater, with its outermost layer (glial limitans) and near the brain parenchyma, comes into contact with neuronal cells and astrocytes [23]. Palpation can be trained up to perceive measurable objects in microns and considering the close relationship of the cranial myofascial system and the intracranial meningeal system, we can throw new scientific reflections on the validity of osteopathic manipulative medicine (OMM). The tension of the hands resting on the skull/myofascial system is perceived by the extracranial trigeminal afferents, for example by improving brain oxygenation [24]. It must be remembered that there is a close relationship between the dural tissue and the blood vessels; an intra/extracranial mechanical stimulus easily alters dural vascular behaviour (permeability, vasodilation, vasoconstriction) [23]. The dura mater is vascularized and with the presence of lymphatic vessels; blood vessels pass molecules of low molecular weight or kilodalton (up to a maximum of 45kDa), which reach the arachnoid mater. The passage of larger molecules will depend on trigeminal intervention (vasodilation). The arachnoid mater, through the tight junctions, transports the blood molecules into the vessels of the subarachnoid space (in space we find different immune substances) [23]. The vessels of the subarachnoid space will enter the brain with the protection of the pia mater. The blood vessels and their perivascular connective tissue are considered a continuation of the pia mater [23]. We can hypothesize that the stimulation of extracranial trigeminal afferents could improve blood transport, from dura to pia, improving arterial vasodilation. By improving extracranial tension, it improves the intracranial trigeminal response [25]. It must be considered that at the cellular level of the different cranial tissues there are no layers, but an absolute anatomical and functional continuity [26-27]. Quantum physics helps us further. Palpation is interactive communication between the operator and the patient, and all the palpated and not palpated tissues are aware of the mechanical information that comes from the hands placed on the skull (quantum entanglement) [27]. Magnetobiology relates electromagnetic fields and living cells [27]. The operator's hand emits electromagnetic fields (such as on the patient's skull), and these magnetic forces or vibrations deform the morphology of the cell, becoming a mechanical stimulus felt by extracranial terminations trigeminal. The electromagnetic fields travel at higher speeds than the electric flow, crossing the whole body; the touch of the osteopath goes beyond the skull [27]. The fact that the cranial sutures are still patent in old age, could mean that the millimetre movement of the brain during systole/diastole and the contractions of the diaphragm muscle, is amortized by cranial synarthrosis. Probably, the oscillations of some brain areas, such as the hippocampus and the limbic area during breathing, could influence the same movement of the brain mass. Does OMM affect the liquids in the skull? All cells oscillate and aggregate to form tissues; liquids are an important fascial component and form the liquid fascia [28]. Thus we have the extracellular matrix, the interstitial fluids, blood, lymph, liquor and the same cells that are full of water [27]. The oscillations of the cells create further alterations of mechanical tension that travel faster in the liquid tissues, creating a wet network [27]. It is very probable, relying on the notions of physics that the OMM is able to enter into communication with the liquor or the cranial lymph. Can we feel the movement of the cranial bones? The overall movement of the cranial bones, allowed by the patency of the various sutures, is measured in microns, with an amplitude that is around 10-50 µm [29]. The palpatory sensitivity of the operator trained to listen to the smallest movements and variations of tension coincides with the measure of cranial movement [29]. We

still need a lot of information on what happens between the osteopath, his hands and the patient's skull, but it is this need to know which creates the research, the right orientation towards knowledge. The question must always be neutral in order to obtain an efficient scientific response and move forward: this is the enlightenment of research.

Conclusions

The cranial osteopathic manipulative medicine is not always positively shared by the scientific world, but it cannot even be rejected by scholars and scientists since non-knowledge does not preclude the end of knowledge. The article discussed an orientation of the current literature that goes against the scientific nature of the osteopathic manipulative medicine (OMM), showing, however, that there are further reflections that are able to be made in support of osteopathic cranial therapy.References

Additional Information

Disclosures

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Original Article

The Continuity of the Body: Hypothesis of Treatment of the Five Diaphragms

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Abstract

The diaphragm muscle should not be seen as a segment but as part of a body system. This muscle is an important crossroads of information for the entire body, from the trigeminal system to the pelvic floor, passing from thoracic diaphragm to the floor of the mouth: the network of breath. Viola Frymann first spoke of the treatment of three diaphragms, and more recently four diaphragms have been discussed. Current scientific knowledge has led to discussion of the manual treatment of five diaphragms. This article highlights the anatomic connections and fascial and neurologic aspects of the diaphragm muscle, with four other structures considered as diaphragms: that is, the five diaphragms. The logic of the manual treatment proposed here is based on a concept and diagnostic work that should be the basis for any area of the body: The patient never just has a localized symptom but rather a system that adapts to a question.

Introduction: Anatomy and Fascial and Neurologic Connections of The Five Diaphragms

Viola Frymann first spoke of the treatment of three diaphragms[1] and only recently started talking about four diaphragms.[2] Current scientific knowledge allows discussion of manual treatment of five diaphragms: the diaphragm muscle, pelvic floor, floor of the mouth, thoracic outlet, and tentorium of the cerebellum. Previous work has shown the connections between all these structures, with links to fascial and neurologic continuity.[3]

This article addresses the anatomic continuity of the respiratory diaphragm to validate the proposed manual treatment.

During correct respiration, coughing, or any other diaphragmatic physiologic alteration, a symmetric change in the pelvic floor can be observed.[4] For instance, if during inhalation the main inspiratory muscle descends, there will be a corresponding lowering of the pelvic floor.[4] This process has been verified with real-time magnetic resonance imaging of living persons, and one of its aims is controlling—and responding to—any change in intra-abdominal pressure, for example.[4] However, it also ensures the steadiness of the human trunk and, obviously, preserves continence during respiration and coughing.[4] Various studies prove that, before an act of inhalation, electrical activity of the muscles of the pelvic floor can be observed;[4] the same electrical activity is traceable for the musculus transversus and the musculus obliquus internus.[4] The pelvic diaphragm not only plays an important role in supporting the pelvic organs and in resisting increasing pressure but also affects the correct functionality of respiration.[4] The retroambiguus nucleus—which is an important monitoring center for phrenic medullary areas and is housed in the medulla oblongata or so-called bulb—controls the abdominal muscles as well.[5,6] This means that respiration must be supported by the pelvic floor in order to properly control the pressure of intra-abdominal liquid. These same areas, which are connected to the motoneurons of the mouth floor, probably send the premotor order to the pelvic zone.[3]

The phrenic nerve innervates the diaphragm and runs from the roots of C3–C5;[7] the phrenic neurons are housed in lamina IX of the ventral horn in the cervical spinal cord and receive information via presynaptic contacts in the medulla.[8] According to some authors, the path of the phrenic nerve involves the entire brachial plexus and the entire cervical plexus (C1–T1).[9] Along its pathway, the phrenic nerve anastomoses with the nervus subclavius, which innervates the musculus subclavius, specifically the first rib and the clavicle (C5–C6).[9] Therefore, if there is a phrenic disorder, it is possible to contract the subclavius, raising the first rib and reproducing a thoracic outlet syndrome, with the relevant symptoms.[10,11] For example, pressure on C8–T1 can cause problems in the little finger.[12] The scalene muscles, which are innervated by the cervical and brachial plexuses, are equally important.[13] It is worth emphasizing that a

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brachial disorder can provoke phrenic and diaphragmatic disorders.[14] The same occurs for any other anatomic connection. Moreover, the phrenic nerve meets the stellate ganglion (and indirectly the cardiac ganglion), which is located above the first rib and generated from the unification of the median ganglion and the inferior cervical ganglion;[13,15–17] this means that a disorder of the former or of the latter could produce symptoms in the complete cervical tract. There is a close link between the diaphragm and the thoracic outlet.

With reference to neurology, the phrenic nerve along its pathway anastomoses with the vagus, while the vagus runs through the crural region of the diaphragm, innervating it.[13,18,19] The vagus is joined to the medial longitudinal fasciculus by afferent and efferent connections; moreover, it is in contact with the spinal trigeminal nucleus by afferent connections.[13,19,20,21] This means that diaphragmatic dysfunction produces symptoms that are observable in the region of the cervical base, in the mouth floor, and in the dura, as well as in the eyes. It is important to proceed in order. The medial longitudinal fasciculus is composed of fibers that connect the mesencephalon and most cranial nerves, such as the trigeminal nerve (V) and the cranial nerves that innervate the eye (II, III, IV, the first division of cranial nerve V, and VI), the tongue (the hypoglossal nerve, XII), and the cervical base (C1–C3).[21–24] Therefore, the medial longitudinal fasciculus is an important path of connection whose margins go from the mesencephalon-diencephalon to the lumbar spinal cord (L4) and farther, at least according to some sources.[21,25] With reference to the neurologic connections, the nerve of Arnold or C2 enters the cranium (probably via the vagus or the hypoglossal nerve), where it innervates the inferior region of the tentorium cerebelli or tentorial diaphragm.[20] In contrast, the superior area of the tentorium cerebelli is innervated by the nervus recurrens (of Arnold), which is a stem of the first branch of the trigeminal

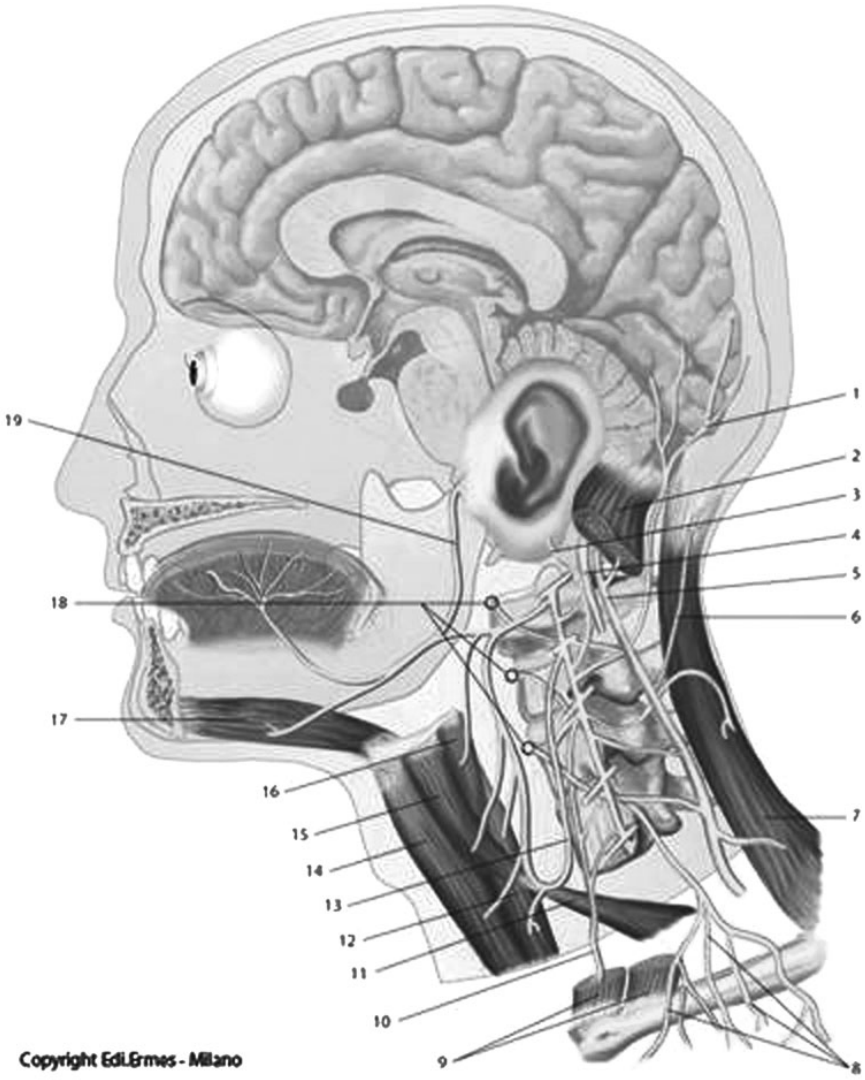

FIG. 1. The cervico-cranial area. 1, occipital nerve or c2; 19, XII cranial nerve; 4, cranial nerve; 5, cranial nerve XI; 17, geniohyoid muscle; 10, phrenic nerve. Reproduced with permission from Anatomia Dell'uomo, 4th ed. 2010, Milan, Italy: Edi.Ermes.

nerve connected to the eye.[20] The reciprocal tension membranes are innervated by the trigeminal system and, according to recent reports, also by vagus nerve and by hypoglossal nerve.[20]

In regular respiration, the genioglossus and other muscles of the mouth floor, such as the hyoglossus, are electrically involved in coordination with the diaphragm, in a period of time that briefly precedes the contraction of the diaphragm itself.[26,27] The genioglossus moves during the respiratory cycle; during expiration, the muscle moves posteriorly, and during inspiration, it moves anteriorly.[28] Their action assists in ventilation. The greater the inhalation phase in terms of rhythm, the greater the electrical response of these mouth contractile areas.[29] This means that the signals of the peripheral neurons combine with orders from the central nervous system.[29,30] As has recently been proven, in case of respiratory problems of any nature this carefully coordinated relationship can be interrupted, with consequential problems in mastication, deglutition, and respiration (Fig. 1).[31–33] It should be noted close relationship between the diaphragm, the buccal diaphragm, and the dura mater.[9]

The fascial system is also involved: that is, the series of layers of connective tissue that connects the diaphragm to the whole body. The fascia transversalis is the continuation of the endothoracic fascia and is related to the diaphragm.[34] It originates in the deep and median cervical fascia (i.e., the neck, including the scalene muscles and the phrenic nerve), and goes to the occipital pharyngeal tubercle, where the dura and the membranes that stand in mutual tension communicate.[35,36] Therefore, the deep cervical fascia reaches the pubis via the fascia transversalis.[36] This fascia covers the epimysium of the transversus abdominis muscle, then arrives at the linea alba of the rectus abdominis, and reaches the inguinal and pubic regions.[37] It is important to remember that the transversus abdominis muscle, along with the respiratory diaphragm and the pelvic floor, plays a significant role in sacroiliac steadiness.[35,38,39]

Another important fascial system is the thoracolumbar fascia, which develops posteriorly, from the sacral region, through the thoracic region, and finally to the cervical region.[40] It involves muscles such as the latissimus dorsi, the trapezius, the gluteus maximus, and the external oblique, as well as the ligaments that connect the ileum to the sacrum (the sacral bone belongs to the system of the pelvic floor).[40,41] The medial and lateral arcuate ligaments of the diaphragm muscle act as a bridge between the thoracolumbar fascia posteriorly and the transversalis fascia anteriorly.[34,37,42]

Manual Treatment of the Five Diaphragms

It is important to remember that, as happens for many methods of treatment, whether manual or otherwise, scientific proof is not available for every existing treatment. This does not mean that, in absence of scientific evidence, something is not valid; if that were the case there would no treatments or any improvement in rehabilitative practice. The operator is more important than the technique, but the good operator knows good techniques.

Manual treatment is useful in most cases of disease, systemic and local, where there is always an alteration of the function and position of the diaphragm. The treatment modality focuses on the operator's manual skills. Many techniques are available, both for treating the diaphragm directly and for treating the body districts previously discussed here (i.e., the thoracic outlet, the buccal diaphragm, the tentorial diaphragm, and the muscles of the pelvic floor). After accurate examination of these areas, it is important to choose the most appropriate rehabilitative manual approach. This paper suggests some corrective procedures that aim to coordinate all the previously mentioned body structures as much as possible. The objective is to relieve symptoms and to obtain a higher percentage of satisfactory functional recovery, always depending on the patient's particular condition. In fact, even if the techniques here proposed should not completely resolve the problem (e.g., an evident and pathologic alteration of the diaphragm) thanks to the previously mentioned connections, these stimuli can improve the general symptomatologic picture, releasing any anomalous tension due to an incorrect current physiology. To make some examples, in case of chronic congestive heart failure and stroke, the diaphragm is positioned in elevation.[43,44] This means that a reduction of the tensions, by manually inhibiting or balancing them, results in the prominence of the preserved functionality and reduced symptoms.[45]

Generally, the diaphragm has a greater excursion in a supine position because it is not engaged in postural control; this results in a higher recorded lung volume.[46] On the contrary, with sitting or standing, the diaphragmatic expansion is reduced because it is involved in controlling posture.[47] The right portion usually has a greater power of movement.[48] The excursion range of the diaphragm in a physiologic or relaxing state is about 1.5 cm, whereas during forced inhalation it reaches up to 6–10 cm.[3]

The strategy suggested here (just one among many) consists of initial treatment of the pelvic floor, moving up to the diaphragm, the thoracic outlet, the mouth floor, and, finally, the tentorium cerebelli. Figures 2–6 show several manual techniques recommended for different body districts. They

FIG. 2. Treatment of the pelvic floor. With the patient supine, place one hand under the sacral bone and the other on the pubis, with fingers turned upward, toward the face. When the patient inhales, carefully help the sacral bone rise, while at the same time helping the pubic bone to descend. During exhalation, perform the process in reverse order, until the previous tensions disappear. This therapeutic approach was first proposed by Dr. J.E. Upledger.

FIG. 3. Treatment of the diaphragm. Place your thumbs and the whole tenar side under the diaphragm, in anterolateral position. The purpose is to search for a tensional balance between the right and left hemicupula, hindering or supporting the different tensions previously observed. Remove hands once an equal, slight tension on both sides can be perceived.

should be used after examination of the aforementioned districts with a general, nonspecific, but nevertheless accurate, attention. Emphasis is given to the techniques of Dr. Upledger, which are simple and easily executable.[49,50] Finally, note that the anatomic features described in books do not always correspond to the subjective anatomic appearance, and the palpation of the operator plays an important role in treatment.[51]

Conclusion

The diaphragm muscle should not be seen as a segment but as part of a body system. To find the correct treatment solutions, one must see the whole and all the links as highlighted in this article. With all these connections, the symptoms can also occur in areas far from the source of the problem, and work with this manual approach can help achieve a higher success rate. It is hoped that this article contributes to the overall view of the patient and spurred new thinking.

FIG. 4. Treatment of the thoracic outlet. Place one hand, with a delicate touch, on the contact point between the two clavicles, and place the other hand under the back, in parallel position. Apply a slight pressure until your hand perceives a release of the tissues, as if there were no resistance in trying to make your hands meet. This therapeutic approach was first proposed by Dr. J.E. Upledger.

FIG. 5. Treatment of the floor of the mouth. Place your fingertips in a medial position to the jawline and apply uniform pressure on both sides to balance the existing muscular tensions. Stop when your fingers perceive that the tissue has softened.

FIG. 6. Treatment of the tentorium cerebelli. Place your fingers in a semicircle. Your little fingers go from the external occipital protuberance to the area above the ears so as to indirectly relax the tentorium cerebelli. This therapeutic approach stops when your fingers perceive that the tissue has softened and when the patient experiences less irritation while leaning his or her head.

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CASE REPORT

Osteopathic approach with a patient undergoing cardiac transplantation: the five diaphragms

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Abstract: The case report presents a patient with a possible neuropathic sternal pain associated with a recent heart transplant procedure. The patient could not breathe deeply and move the upper limbs, with a trunk torsion, feeling a sharp pain under and around the left breastbone. A fascial osteopathic approach in the treatment of the pelvic floor, the respiratory diaphragm, the thoracic outlet, the tongue and the tentorium cerebelli allowed the patient to access to a cardiovascular rehabilitation program. In osteopathic medicine, these anatomical parts of the body are called the five diaphragms. To our best knowledge, this is the first case report that uses osteopathic treatment in a patient with sternal pain associated with an undergoing cardiac transplantation. The clinical importance of the case report is added to other osteopathic research with patients undergoing cardiac surgery (coronary artery bypass graft) and with multiple benefits, without side effects. One of the main goals of osteopathic treatment is to provide the patient with well-being, from many clinical points of view, allowing the person to be discharged from the hospital more quickly and/or with less pain.

Keywords: diaphragm, osteopathic, fascia, cardiac transplantation, pain, heart, case report

Introduction

Incidence of chronic heart failure (CHF) is increasing steadily, predominantly due to population aging. Thanks to scientific and medical advances, much progress has been made in treating heart disease, such as the left ventricular assist device (LVAD) implant surgery. Medical advances increase life expectancy for the elderly patients with heart disease, making the heart transplant an essential option.[1] According to the Registry of the International Society for Heart and Lung Transplantation, the 1-year survival rate after a primary heart transplant is about 85%. However, patients can develop postoperative complications that may decrease quality of life or may lead to death: infections, aortic aneurysm, arterial embolism, rejection, cardiac arrest, heart attack, due to technical (related to the transplant procedure) or unknown causes.[2]

Pain is a non-fatal post-transplant complication that can decrease a patient's quality of life (QoL). Pain perception from 6 months to 5 years after transplantation increased, compared to one general population sample; recent data suggest 11% of the patients reported having severe or very severe pain.[3] A wide range of different factors can cause more pain postsurgery, such as socio-demographic factors, psychological status or other concomitant diseases (for example, gastrointestinal or joint disorders).[3]

A possible cause of chronic post-sternotomy pain syndrome is the formation of adhesions in the mediastinum, between the sternum and the retrosternal tissues up to the pericardium.[4] Whilst postsurgical adhesions can help stabilize the

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pericardium in the mediastinum, they can also cause neuropathic pain. The new adhesions are vascularized and innervated, generating unforeseeable proprioceptive or nociceptive afferents.[4]

It is necessary to find therapeutic strategies that could decrease pain perception, improving the QoL in heart transplant patients and limiting the side effects caused by pain-relieving drugs. In our previous study of patients undergoing sternotomy for cardiac surgery (80 poststernotomy adult inpatients were randomly allocated to either the control group or the experimental group), we used the osteopathic manipulative treatment (OMT) to increase pain threshold and to reduce time course of functional recovery in this patient group, compared to those who were assigned to control group (standardized cardiorespiratory rehabilitation program alone).[5] Osteopathic manual technique was indirect osteopathic approach or fascial unwinding therapy: it is a manual therapy in which a therapist does not induce any movement and not provoke any pain:

> The OMT does not induce any movement but allows the underlying tissue to express intrinsic movements, reflecting the physiological sliding of different fascial layers while breathing. Laying on the hands and following fascial vector directions, the application ends when the subcutaneous tissue becomes less rigid and when the movements expressed by the various palpated body segments are broader and similar to those of the (normal) contralateral side of the body.[5]

We adopted the same OMT approach of the trial. The patient was treated 5 consecutive days, for a 15-min session each day. We treated the pelvic floor or the pelvic diaphragm, the respiratory diaphragm, the thoracic outlet or the thoracic diaphragm, the tongue, and the tentorium cerebelli.

The 5 diaphragms describe the fascial and neurological connection of the body segments mentioned. Posteriorly, the thoracolumbar fascial system relates the pelvic floor musculature, the diaphragmatic area (part of the muscular area and the pillars), and the thoracic outlet musculature (trapezius muscle, deep neck muscles).[6,7] The deep musculature of the neck is anatomically, neurologically and embryologically connected to the lingual complex.[8] The suboccipital muscles, which are an integral part of the thoracolumbar fascia, are in direct contact with the tentorium cerebelli through myodural bridges.[6,7] Anteriorly, the fascial system of the neck connects the lingual complex and the musculature of the thoracic outlet (scalene and subclavian muscles); the fascia of the neck separates at the level of the thoracic outlet to become the endothoracic fascia and the superficial fascia of the thorax. The anterior fascial system of the endothoracic fascia covers the diaphragm muscle and continues as a transversalis fascia, ending as a pelvic fascia covering the pelvic musculature.[6,7]

From a neurological point of view, the tentorium cerebelli innervated by the first roots of the cervical plexus, the vagus nerve and the hypoglossal nerve, as well as the trigeminal nerve; the cranial nerves mentioned involve the motility of the tongue.[8] The phrenic nerve connects to the cited nerves, thanks to the presence of the ansa cervicalis, constituting anastomosis with the stellate ganglion (thoracic outlet).[6,7] The bulbar breath centers regulate the movement of the tongue, diaphragm and pelvic floor musculature during inhalation and exhalation, with a movement of retrusion and protrusion of the tongue, ascent and descent of the diaphragm and pelvic floor, respectively.[6,7]

To our best knowledge, this is the first case report that uses osteopathic treatment in a patient with sternal pain associated with an undergoing cardiac transplantation.

Case presentation

A patient was admitted to our cardiorespiratory department on January 2019 to start a rehabilitation program. The patient (54 years old, male, white race and retired) with an active lifestyle (daily walks) and no particular dietary alterations, no significant genetic alteration known and without comorbidity. The patient had undergone an artificial heart transplant, HeartMate III LVAD as a bridge to candidacy, 5 years before undergoing a heart transplant. The reasons for this artificial heart are related to continuous heart failure, due to previous inoperable stenoses (stenosis on small caliber coronaries) and a probable previous infant rheumatic disease.

In the months leading up to heart transplant surgery, the patient had been treated with antibiotics to reduce the infection derived from the drive line: *Corynebacterium striatum* and *Staphylococcus aureus*. The patient was also positive by rectal swab for *Acinetobacter baumanii*. The patient underwent a heart transplant in November 2018.

In the postoperative course, cordarone was used for supraventricular tachyarrhythmias that were resolved. The first three biopsies revealed a gradual improvement. The first endomyocardial biopsy (EMB) revealed a moderate grade rejection (2R) treated with methylprednisolone. The second EMB revealed lymphoid aggregates in 2/3 of the

fragments, with mild rejection (1R). The third EMB showed a mild rejection (type 1) on two fragments. The following two EMBs revealed no evidence of rejection. In our department, clinical examinations as the echocardiography showed a small amount of pleural effusion, a normal left ventricular size and a preserved ejection fraction; minimal pericardial effusion. The electrocardiogram signaled a right bundle branch block with a heart rate of 90 beats per minute, a blood pressure level of 135 over 85 (135/85) and an oxygen saturation of 97%. Blood tests reported a low white blood cell count (3.18), a low lymphocyte count (0.74) and a postoperative anemia (hematocrit =29,1 and hemoglobin =9,6), hepatic and renal function gradually improved, gamma glutamyl transferase (30), bilirubin (0.75) and creatinine (1.74). Radiographs showed elevation of the left hemidiaphragm associated to the mild left pleural effusion, partially organized in the posterior basal area, in absence of signs of overload (Figure 1).

The pharmacological treatment in our department was as follows: Furosemide Teva 25 mg (1 tablet); Augmentin 1 g (3 tablets); 100 mg acetylsalicylic acid (1 tablet); KCL retard 600 mg (2 tablets); magnesium 2,25 g (2 sachets); Myfenax - mycophenolate mofetil 500 mg (2 tablets); Natecal 600 mg +400UI (1 tablet); omeprazole 20 mg (1 tablet); Sandimmun 100 mg (2 tablets); Stilnox 10 mg (1 tablet); Zoloft 50 mg (1 tablet).

Laboratory tests showed no glycemic abnormalities or elevated glycate values, as well as no abnormal thyroid function. The patient did not carry out tests such as electromyography, as the motility of the limbs did not present anomalies. Routine examinations, such as X-rays or MRI, did not show any somatic or neurological structural anomalies. From the examinations carried out by the psychologist (Coping Orientation for Problem Experiences, Medical Outcomes Study Short-Form 36, Hospital Anxiety and Depression Scale), no behavioral or mood anomalies emerged.

The patient was unable to perform physiotherapy (gymnastics and exercise bike) because he complained of a neuropathic pain in the mediastinum, in an undefined area on the left side of the sternum (by 4th to 6th rib), compounded by breathing, limb movements and trunk rotations. His VAS pain assessment was 8, during movement and with forced breathing. The breastbone was perfectly closed. A cotton pad on the painful sternal area was used to evaluate superficial stimulation discrimination and epicritic sensitivity; a pin for pain assessment was used with slight pressure on the painful area; for the thermal sensitivity we used a test tube with hot water (40–50°C), passing it on the sore skin. The patient had an unaltered sensitivity, in the absence of allodynia, hypoalgesia, hyperalgesia or hypoesthesia. The patient always scored 8 to the numeric rating scale, which means the presence of pain during the evaluations. The patient gave his informed consent for the publication of the pictures and the treatment. The institutional approval was not required and it was not necessary to publish the case report. It was decided to administer ibuprofen 600 mg for 2 tablets a day. After a week, the VAS score fell to 7, but he still could not do physiotherapy.

Considering the positive results of the previous trial and a previous case report on the reduction of pain in patients suffering a sternotomy, we decided to submit the patient to the same number of sessions, that is, an OMT

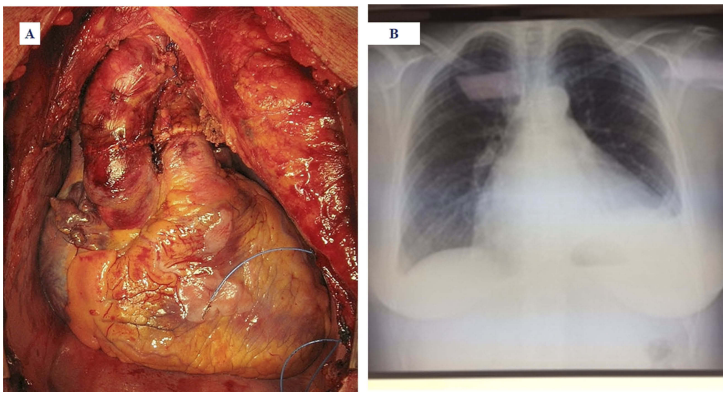

Figure 1 The picture shows a heart transplantation (sternotomy) with autologous pericardium (**A**) and our patient in position for a standard PA (posterior-anterior) chest x-ray (**B**).

Figure 2 The figure shows the approach to the pelvic floor anteriorly (**A**); the approach to the respiratory diaphragm (**B**); the position for the treatment of the thoracic outlet (**C**); the position for the treatment of the tongue (**D**); the position of the operator's fingers for the treatment of the tentorium cerebelli (**E**).

session for 5 days. Considering that the 5 diaphragms involve the body system in a more global way, it was decided to opt for the latter strategy.

Osteopathic treatment

The osteopathic treatment involved the pelvic floor or pelvic diaphragm, the diaphragm, the thoracic outlet, the tongue and the tentorium cerebelli. The osteopathic approach was fascial unwinding and the patient on supine position.

For the pelvic floor, the osteopath placed his hands on the iliac crests, with a slight pressure toward the table to find a normal balance of tension between the wings of ilium, assuming they were in the right mechanical connection to sacrum. The technique was considered successful when the wings of ilium had the same tension and thickness, whether during a manual pressure toward the table or assessing the sacroiliac joint.

For the diaphragm, the osteopath placed his hands on the ribcage, in the posterolateral part of the diaphragm. The technique was considered successful when the movement perceived was homogeneous.

For the thoracic outlet, hands were placed to involve the clavicle (index and middle finger) and the first thoracic vertebra (with thumbs); the operator was behind the table, working behind the patient supine. The technique ended when the tissues perceived under the hands showed no anomalous tensions.

For the tongue, using a gauze, the operator grasped the tongue with his fingers and gently pulled toward the ceiling, just for a few millimeters. He maintained the position until the perceived tension decreased, and the tongue had no preferential vectors.

For the tentorium cerebelli, the osteopath placed the fingers behind the patient's head, following a line between Asterion and the external occipital protuberance (Inion). He maintained the position until he perceived a release of tissue tension. The operator was behind the table.

The techniques have been performed following the sequence described and they have been repeated for 5 days (Figure 2).

The 6th day, the cutaneous evaluations were repeated, without getting worse. The VAS score fell to 3 during limb movements, trunk rotations and breathing exercises. The patient could start the rehabilitation, maintaining anti-inflammatory therapy but reducing the dose to 1 tablet a day.

After a 3-week follow-up, the VAS score remained 3 and he stopped taking painkillers.

No adverse events occurred during and after treatment.

Discussion

Postoperative sternal pain is a common event and usually is defined as post-sternotomy pain syndrome (PSPS). The exact etiology of PSPS is unknown.[4] Probably, in this specific case and as described in a previous paper, adhesions may have caused the sternal pain. The adhesions formed following thoracic surgery may reduce the capacity of tissues to slide past one another, causing an inflammatory environment and the production of further tissue.[4] The

adhesions cannot be evaluated by X-rays and ultrasound or other clinical tests identify them with great difficulty. Generally, the surgeon notices any formations of adhesions, and consequently, surgery can develop complications.

The adhesions are non-resilient formation of cicatricial tissue that involve different layers; they can be asymptomatic or can create side effects in patients; they create nociceptors, altering the mechanical properties of fascial tissues and altering the mechanotransduction of the surrounding tissues.[9,10]

We have chosen to use a global approach to the patient to get the maximum benefit: fascial techniques can reduce pain, inflammatory cytokines and also reduce nociceptive afferents.[4,5,9]

In this case report, we treated the 5 diaphragms of the osteopathic medicine.[6,7]

Probably in this patient, adhesions involved the pericardium and the respiratory diaphragm, already connected by the fascial area of the diaphragm, in a nonphysiological behavior. A healthy diaphragm stabilizes the spine and allows both lateral bending or torsion of the spine and also limbs movements.[9] Instead, a diaphragm muscle in a nonphysiological behavior, as the presence of adhesions or unilateral elevations, creates a motor incoordination and can cause other disorders: as, for example, cervicalgia, swallowing disorders, thoracic outlet syndrome, functional alterations of the pelvic floor and even chronic pain.[9–11]

In the literature and in the osteopathic field, some authors have worked with patients undergoing cardiac surgery (coronary artery bypass graft, CABG). One study applied osteopathic techniques to patients immediately postintervention (10 patients), with results that highlighted improvements in respiratory (saturation) and hemodynamic parameters.[12] Another study treated 17 patients who underwent CABG with different osteopathic techniques; the experimental group following osteopathy were discharged earlier, compared to the control group patients, with an average of about 0.55 days earlier.[13] Probably, the systemic clinical picture, as in our previous trial, improved more quickly.[5]

We have thus chosen to work on the 5 diaphragms to affect both the fascial system and the neurological aspects, trying to restore motion and provides pain relief. The fascial treatment stimulates the parasympathetic system, decreasing tissue tone; this would allow tissues to slide past one another, creating an optimal mechano-metabolic environment, reducing nociceptive afferents and inflammatory cytokine responses.[4] The parasympathetic nervous system indirectly stimulates the limbic system through the solitary nucleus, to increase pain threshold.[10]

The limitation of the case report is the absence of higher patient numbers.

Further studies will be needed to better identify the positive motivations that helped the patient.

Conclusion

The case report presents a patient with chest pain after cardiac transplantation, considerably reduced with a fascial OMT approach. The patient was in our cardiorespiratory department to start a program of cardiovascular rehabilitation, and thanks to the osteopathic approach to the 5 diaphragms, the patient accessed to the cardiovascular rehabilitation program as other patients. To our best knowledge, this is the first case report that uses OMT and the 5 diaphragms for this pathological condition. This case report does not report any adverse event of the patient treated with osteopathy. The clinical importance of the case report is added to other osteopathic research with patients undergoing cardiac surgery (coronary artery bypass graft) and with multiple benefits.

Disclosure

The authors report no conflicts of interest in this work.

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Forward head syndrome and upper dorsal hyperkyphois: A multifactorial approach

Robert Cooperstein, MA DC

Figure 1. Hyperkyphotic bell ringer

A bell ringer comes in with chronic pain and stiffness in the upper thoracic [*Figure 1*]. Physical examination shows hyperkyphosis at the cervicothoracic junctional area, as confirmed by x-ray. This is commonly associated with anterior weight bearing (AWB) of the head and neck. The patient claims the symptoms are progressive and increasingly interfere with the performance of both his occupational tasks and the activities of daily living.

When the center of gravity of the patient's head is displaced anteriorly relative to the rib cage, it increases the amount of work that the upper dorsal and posterior cervical muscles must perform in order to balance the cranium on the lateral masses of the atlas. The upper dorsal hyperflexion is often offset by upper cervical hyperextension in order that the visual axis remain reasonably horizontal with respect to the ground. There is also a dramatic impact on shoulder mechanics, which the reader is asked to confirm: check your own ease and range of shoulder abduction with and without the head cantilevered forward. All this predisposes to upper dorsal fibrosis, tension headaches, thoracic outlet syndromes, shoulder problems, spinal pain and stiffness, and eventual discogenic spondylosis.

Although managing a case like this may involve home exercises, postural training, ergonomic intervention, and even nutritional support, in this article I mostly address the mechanical intervention part. I should also comment that Quasimodo, the hunch-backed bell ringer seen in Figure 1, is a rather extreme case of what is called *forward head syndrome* in medicine, and sometimes *anterior weight bearing* in chiropractic[1]. As far as he is concerned, it may be too late for the corrective procedure described below, an high velocity low amplitude (HVLA) thrust which involves re-positioning the head in a more correct position relative to the rib cage, and then applying a thrust that hyperextends the upper dorsal spine.

Adjusting for Anterior Weight Bearing

Years ago, while commingling with the Pettibon-Harrison milieu at Life West Chiropractic College, I learned a move that was described as the "T2 drop" (I simply don't know which, if any, of these individuals should be credited for having innovated the move). The patient lies face down on a drop-table, which has the following capabilities: the cervical piece is capable of direct elevation (not simply tilting) and there is an upper dorsal table section that can drop. The patient's head is elevated on the cervical section while a thrust is delivered to the T2 area[2]. Although this prone procedure tended to produce noticeable changes in the upper dorsal configuration, there were two important disadvantages: first, it required an out of the ordinary type of drop table; and second, patients found it brutal. I did not use the move enough to develop a sense of whether patients found it beneficial or not, overall.

Early on I worked out another, better tolerated way of performing this maneuver, in the supine position. Dr. Harrison (sadly, deceased) once mentioned to me that he had also shifted to using a supine setup of some kind. The version I employ does not require anything more sophisticated than a plain pelvic bench (no drop sections), a pillow, and a padded wedge, such as a sacro occipital technique (SOT) block. The block is inserted underneath the supine patient [*Figure 2*], such that its superior aspect underlies the T2-3 interspace or nearby, depending on that patient's area of maximal humping, the apex of the thoracic hyperkyphosis. The head must be supported by a pillow, which should be rather large for those patients that present with an unusual degree of anterior weight bearing (usually older patients). To the extent the patient can tolerate it, his or her arms are permitted to hang off the table, to the side, so that there may be some worthwhile traction on the anterior tissues that need to be stretched as part of the overall protocol.

Indeed, it is very useful to allow the patient to lie in this position for at least a couple of minutes, so that some viscoelastic creep is achieved prior to the manipulative thrust. Although this move directly addresses the upper dorsal vertebral kyphosis that is so apparent, its most significant effect may be on extra-articular contractured tissues: the anterior longitudinal ligament, the pectoral muscles, etc.

Figure 2. Block placement

The doctor then takes a very broad contact with the flat of his two hands; with the fingers and palms straddling the pectoral muscles, the clavicles, the sternum, as much of the anterior aspect of the shoulders as can be touched [*Figure 3*]. The thrust is given very sharply, but with minimal travel distance, and thus is very much high velocity, low amplitude. The release which occurs is often very dramatic, equivalent to a virtual lifetime of leaning backward against a chair, trying to self-manipulate his or her own back in order to relieve the spinal tension that accompanies prolonged sitting. The doctor is advised to lighten up on slender individuals, especially females, who often have more intrinsic flexibility in the costochondral joints. Less force is required, and too much force could result in an adverse consequence. Osteoporosis is a relative contraindication, given the stress on the ribs and clavicles; likewise, a history of shoulder, acromioclavicular, or costoclavicular instability.

The move is somewhat startling to some patients and is unfortunately one of those moves that had best be successfully accomplished the first time. Failing that, the patient may be too guarded for the doctor to get another chance. Extra caution is also indicated to not cause female patients to feel their breast tissue is compromised. The doctor can usually arch his or her fingers above the breast tissue, or even thrust from the head of the table (although that is less effective than the more usual stance at the side of the table).

Figure 3. Hand placement

There is an immediate and very noticeable postural improvement for many patients; even following just one or two office visits. I enjoy having the patient rise from the supine position with their eyes closed, so that can confirm when they open their eyes that their gaze is now

deviated upward. This is the net result of having had their dorsal hump somewhat flattened while their largely functional upper cervical hyperextension is still partially unmitigated.

Figure 4 depicts the immediate pre-post change in not just anterior weight bearing, but really the entire postural comportment of the patient. I cannot represent this as what *usually* happens (it really was one of my best days ever in the practice of postural chiropractic) but it does represent what *could* happen.

Figure 4. Immediate pre-post changes following AWB move

Notice that not only is the upper dorsal hyperkyphosis reduced, but also the sway back and forward head. Again, notice the upward gaze in the post photograph, it will take a few seconds for the patient to accommodate to having had his hyperkyphosis reduced, and so lower his visual axis.

This supine anterior weight-bearing move is so effective, so satisfying for the patient, that it may easily seduce the doctor into forgetting all that old-fashioned stuff about "by hands only." However, this move is not meant to replace the other classic hand means we employ to move the upper dorsal area: chair moves, diversified pisiforms, thumb moves, and all the rest. It is intended to supplement these, especially when adjusting patients who come in with a significant postural abnormality, the forward head syndrome. Untreated, this problem develops into the spondylosis syndrome of later life: headaches, discogenic spondylosis, tingling in the upper extremities, weakness in working with the arms overhead, and yoke pain in the shoulder girdle.

Rehabilitation

The adjustive procedure depicted should be seen as just an element, although perhaps the most important element, of a protocol for rehabilitating the AWB and dorsal hyperkyphosis syndrome. The adjustment alone is unlikely to lead to long-term correction without some support in the form of stretching and muscle strengthening. Figure 5 depicts a useful stretch, with the top of the table lined up with the spine of the scapula. A patient attempting to replicate this stretch at home may well just let his or her head hang over the edge, which is not at all what is intended; thus, instructions to the patient must be clear. Some patients cannot tolerate the cervical extension, or may develop dizziness or pain in their eyes or headache. In so many words, this must be done in accordance with patient tolerance, and with support of the head by a friend or family member if necessary.

Figure 5. Upper dorsal stretching

This simple stretching procedure creates extension traction for the upper dorsal spine and elongates the shortened anterior tissues. Allowing the arms to hang as shown stretches the pectoral muscles, although it may produce temporary numbness in the arms of some patients. Having the patient perform this stretch for about two minutes at a time, at least three times per week, will usually produce a very visible improvement in the patient's posture. It is a very important adjunctive procedure for the in-office manipulative approach. Although some doctors

perform this or related stretches in the office, it can be very easily done at home by a compliant patient.

The muscle-strengthening regime is rather obvious: the patient is asked to do rowing exercises. Strengthening the upper dorsal muscles to rehabilitate forward head syndrome can be done in a variety of ways, including through the use of some very inexpensive equipment such as exercise balls and dumbbells.

The final frontier is that the patient must become aware of his or her posture; must take measures to hold the head high whenever possible. The forward head syndrome is multifactorial [*Figure 7*] and so must be the treatment approach. There are muscles to strengthen, and soft tissues to stretch. Although the manipulative procedure I have shown is very useful, ultimately the patient must try harder to keep the center of gravity of the head more above the shoulders. The chiropractor's job is to rehabilitate the soft tissues to permit the more aware patient to do a better job of maintaining healthy postural balance. In other words, the chiropractor gives the patient the anatomical freedom to do a better job, but it is up to the patient to take advantage of this postural freedom.

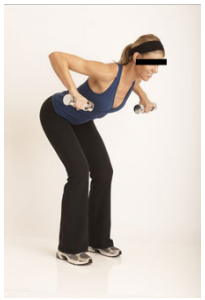

Figure 6. Rowing exercise

Quasimodo and Segmentalism

Figure 7. Multifactorial approach

It is impossible to resist the temptation to sermonize a bit prior to exiting this article. Although it would not be hard to convince oneself that there are segmental misalignments and fixations in a hyperkyphotic upper dorsal spine, perhaps several, there would be little practical value in seeing the patient through this type of segmental lens. When Quasimodo comes in subluxated, his "spinous left T2" and "right lateral flexion restriction T3" are quite beside the point. Hyperkyphosis is a regional problem, and regional problems need regional solutions. Quasimodo's listing would be "hunchback, apex T2-3," and an obvious corrective procedure would be a vectored thwack on the back, using either a prone or supine setup. Or, maybe even a standing thwack, like that used by D.D. Palmer on Harvey Lillard in 18953.

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Identifying the frequency of perinatal sacroiliac hypermobility indicators in a chiropractic clinic.

John Edwards, DC, Jeanne Ohm, DC, Charles Blum, DC, Allison Union BS

Introduction:

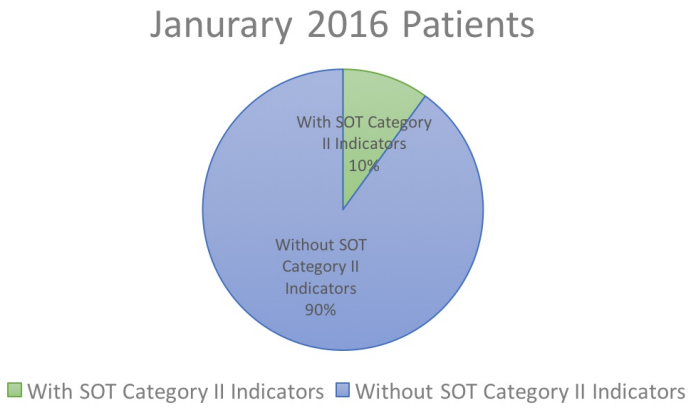
Increased psoas-tension (PT) changes biomechanics during pregnancy, and several sources suggest a correlation between PT in non-pregnant adults and persistent, subacute sacroiliac joint hypermobility (SIJH). The relationship between stabilizing relaxin-induced perinatal SIJH (P-SIJH) and preventing PT remains under-investigated. There are various types of chiropractic assessment and treatment methodologies for assessing SIJ pain though many presume the SIJ's motion is restricted and don't have therapeutic options for SIJH. Sacro Occipital Technique (SOT) has specific methods of assessing and treating SIJH and may be an important part of manual manipulative strategies for treating pregnant patients with P-SIJH pain/dysfunction. SOT's screening protocol for addressing SIJH/pain related to hypermobility may complement other chiropractic interventions or perinatal manipulative therapies for SIJ pain/dysfunction since treatment for P-SIJH would differ from care for restricted SIJ motion or dysfunctional static positioning.

Purpose/Aim:

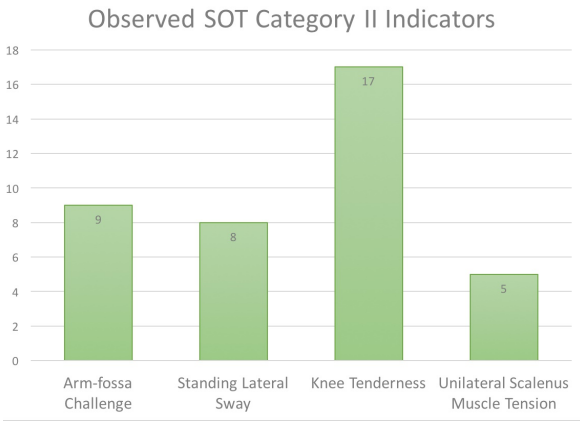
This office specializes in perinatal and pediatric patient care and sought to investigate the presence of P-SIJH in patients presenting with LBP/SIJ pain. Therefore we examined the frequency of four-SOT indicators in a cohort of perinatal chiropractic patients under chiropractic manipulative care for P-SIJH.

Materials and Methods:

IRB approval was granted for a retrospective review of 170 visits (January 2016) that identified 17-perinatal patients presenting with LBP/SIJ pain who also met the criteria for potential P-SIJH identified by SOT. These four indicators are the arm fossa test, standing sway test, unilateral scalenus muscle tension, and medial/lateral knee pain. One SOT assessment, the arm fossa test[1], was found to have some degree of reliability for assessing SIJH in both acute and subacute patients.



Results:



At least one indicator of P-SIJH was observed in all 17-assessments. Failing an arm fossa test challenge [9-patients], standing lateral sway [8-patients], and unilateral scalenus muscle tension [5-patients] were present in concert with medial/lateral tibial plateau tenderness that resolved upon SIJ stabilization (supine pelvic wedge/block placement to reduce pelvic torsion)[17-patients] 75% of the time. Two indicators were detected more frequently than three or four.

Conclusion:

SOT identified potential P-SIJH in 10% of the cohort under chiropractic perinatal care. Therefore further study of uncorrected P-SIJH/PT relationships in pregnancy may warrant further investigation. The need for practitioners to be aware of P-SIJH in pregnancy may be important since therapeutic options for SIJ pain/dysfunction vary greatly if the goal is to increase motion to modify juxtaposition versus stabilizing to support better juxtaposition of the SIJ. Also being aware of P-SIJH may help explain SIJ pain/dysfunction in perinatal patients who may have gone undiagnosed before.

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The management and care of three elderly patients with neck pain: A case series

Harvey Getzoff, DC

Introduction:

The intent of this paper is to study the methods used to evaluate and adjust three older patients experiencing neck pain and upper extremity pain with severe restriction of cervical motion. All three patients presented with similar findings along with similar histories and profiles. They were 70 years old or older at the time of their initial visit. They had neck pain and upper back pain along with unilateral radicular pain to an upper extremity. They all have significant limitations with cervical ranges of motion (ROM) in the sitting position. All three had used various medications both prescribed and not prescribed to manage their pain. None of the three patients reported any trauma to their neck.

All three patients improved symptomatically, with fewer pains in the neck along with less radicular pain. All three patients had improvement of their cervical ranges of motion but notable limitations were still present. All three were cooperative with specific homecare instructions and needed exercises. All three patients were evaluated and adjusted with Sacro Occipital Technique (SOT) category methods. SOT is a systems method of Chiropractic utilizing the functional components of three-body systems[1], described as Category I, II, and II. Two of the cases studied in this paper were category three and one was a category two. Inclusive in both category adjustments were the cervical stair step and figure 8 adjustments. "Cervical spine related problems and findings do not dictate the SOT category. Each of the three SOT categories is defined by SOT indicators but each category allows for cervical analysis adjustment and assessment within its framework[2]. The SOT method of Chiropractic was founded and developed by M.B. DeJarnette DC.

It is my hope that this paper can be helpful for Chiropractors adjusting patients with not only similar history and profiles but also anyone presenting with similar findings.

SOT Evaluation and Cervical ROM:

All three patients were evaluated in the standing, prone and supine position utilizing the SOT indicator system in conjunction with specific cervical ranges of motion done in the sitting position. DeJarnette stated that "there are many neurological and orthopedic test that have value in making a detailed study of the cervical spine and you should be familiar with all of them" [2]. The standards used to evaluate cervical ranges of motion are as follows: Up to 90° for flexion, up to 70° for extension, up to 45° for lateral flexion and up to 90° for rotation[3]. All cervical ranges of motion were measured by the use of a flexometer[4].

SOT Cervical Adjusting:

The primary SOT method of cervical adjusting is the stair step and figure 8 procedures. Dr. DeJarnette comments that the "figure 8 and stair step combine analysis and correction" [5]. Stair

step and figure 8 adjustments are utilized in all three SOT categories. In performing the stair step the doctor is seated at the head of the table with the patient in the supine position and places a hand to each side of the patient's skull. The patients chin and forehead must be kept level as the doctor puts inferior pressure through the cervical spine toward the feet going a little higher at each step[5]. "The level where the head resists elevation is considered the level of subluxation and the area where the figure 8 is to be concentrated. Holding in this area you execute a side bending and a rotational motion to comply with the movement involved in making a figure 8. Inferior pressure is maintained throughout to continually engage the motor units" [5]. DeJarnette felt that "the figure 8 is the ideal cervical technique as it involves no violent motions or thrusting forces rather a gentle controlled motion to reset the processes of the loosened cervical motor units by aligning the facet planes" [2,6,7].

SOT Cranial Evaluation and Adjusting:

Evaluation of the cranium is based on multiple indicators that center on a specific principle that the malar bone is central to the function of the cranium and dependent upon the growth and development of the midface malar (zygoma) and maxillary bones.. The malar bone is relevant to the sinuses, the orbit of the eye and the nasal passages. It joins the face to the cranium. It forms sutures with the temporal, maxillary, frontal and sphenoid bones. The malar evolves from membranous tissues; therefore it can adapt and respond to sensory organ development, respiratory function and the dental occlusion. [9] It is the most externally paired bone, at the temporal and the most internally paired bone at the sphenoid. Its suture with the maxillae is broad and serrated allowing for expansion and contraction.[10]

To test for cranial range of motion apply an index finger contact in the patient's mouth, outside the maxillary arch in the area of the back molars on the maxillary/malar suture. This suture is on the same vertical plane as the midline of the eye. The opposite hand contacts the frontal bone with your thumb on one side and your fingers on the opposite side stabilizing the frontal bone. Make firm contact with your index finger on the maxillary/malar suture and guide in both the superior and anterior direction while at the same time lifting the frontal superior and away, medial, from the greater wing of the sphenoid on the same side. **The resistance is the indicator, the guidance is the adjustment**. The side of the cranium where the malar is most resistant is the primary site of cranial adjusting. Often the side of the head tilt, recognized on the plumb line, is the side of the malar finding. The ideal position of the head is one in which the eyes are level with the horizon.[11] Abnormal postural position of the head can facilitate ocular compensation through the sternocleidomastoid and upper trapezius muscles as well as the vestibular system.[12]

Homecare instruction:

All patients with cervical findings are advised of the following: Maintain eyes level (on the horizon) especially when watching television, working on a computer or utilizing hand held devices. When sleeping on your back don't use a pillow but use a rolled up towel under the neck with the chin and the forehead level with each other. When lying on your side the head should be level. We also advise not to stretch or twist the head and neck. The only exercise advised is to

slowly turn the head to the side most resistant in rotation, when testing cervical ranges of motion, while looking behind you and to not allow the opposite shoulder to come forward.

Case History #1:

A 70-year-old male was first seen at this office on February 19, 2019. He presented with neck pain throughout his neck with numbness in all five fingers of his left hand, especially when in bed at night. The onset of the pain has been gradual over the last two years. Of significance in his history was a surgical intervention for a left ear neuroma in 1986. As a result of the surgery he could no longer hear out of his left ear. When standing on a SOT plumb line his left ear was lower than the right ear while his spine was tilted to the right. A lateral view on the plumb line revealed a forward head posture (the midpoint of the ear is anterior to the midpoint of the humoral head). DeJarnette contended, "that cranial sutural dysfunction altering head posture can be reflected throughout the entire postural system" [2,6]. Sitting cervical ranges of motion revealed the following: there were marked limitations in cervical extension 5°, right rotation 30°, left rotation 45° and he was unable to laterally flex his head to the left.

Cranial ranges of motion revealed sutural restrictions primarily in the right maxillary/malar suture and the right frontal/sphenoid suture. All SOT indicators identified a primary category three. "Category three addresses subluxations of the lumbar spine in combination with related disc tissue problems and compensatory reactions in the pelvis and cervical spine"[13]. As of July 1, 2019 at his 10th adjustment at our office this patient is experiencing a marked improvement. There is less pain and numbness with greater range of motion: Right rotation is 60° while left rotation is 80°. Extension is still limited at 10° and left lateral flexion has a slight improvement at 10°. He appears to be compliant with both his instructions and his turning exercise. He understands the need to continually manage his needs in order to have a continued successful outcome.

Case History #2:

A 72-year-old female was first seen at this office on March 7 2019. She presented with the following neck pain throughout her neck with a specific sharp pain in the left upper back especially when trying to turn her head to the right. She further stated that the pain was prolonged but had worsened in the last three months. When standing in the SOT plumb line her head position was fixed to the right (right ear lower than the left ear) while her spine was curved to the left. Sitting cervical ROM revealed a significant limitation of right rotation of 10°, accompanied by an increase of neck and left upper back pain. Forward flexion was limited to 5° as was left lateral flexion.

Cranial ROM revealed sutural restriction primarily in the right maxillary/malar suture and the right frontal /sphenoidal suture. The SOT indicators identified a primary category two. "Category two addresses the ability of the weight bearing structural system of the body, inclusive of the head righting reflexes, to fully communicate through the nervous system so that maximum weight bearing function can occur within the demands of a gravitational environment"[13]. As of

April 29th 2019, at her 7th adjustment at our office she was experiencing substantial improvement. There was less pain in both her neck and in her upper back with greater ROM. Most importantly she could now rotate her neck to the right 70°. She has been compliant with both her rotational exercise and cervical instructions.

Case History #3:

A 72-year-old male was first seen at this office on February 19, 2019. He presented with the following neck pain primarily on the right side with tingling in the entire right arm. The patient also stated that he was experiencing pain in the upper back. The initial onset was years previous with sharper pains within the last month. When he was standing on the SOT plumb line his head was fixed to the left with the left ear lower than the right ear. Sitting cervical ROM revealed the following: there was a marked limitation of cervical right rotation at 10° which elicited neck pain. His left lateral flexion also had extreme limitation at 10°. His forward flexion was limited to 30°.

Cranial ranges of motion revealed sutural restrictions primarily in the left maxillary/malar suture and the left frontal/sphenoidal suture. SOT indicators identified a primary category three. "Category three addresses subluxations of the lumbar spine in combination with related disc tissue problems and compensatory reactions in the pelvis and cervical spine"[13]. As of August 6, 2019 at his tenth adjustment in our office the patient is experiencing significant improvement. There was no pain reported in the neck or in his right arm. His cervical right rotation ROM was 70° with no pain reported. Left lateral flexion improved but still showed limitations at 20°. He is compliant with both his cervical instruction and cervical turning exercise. He recognizes the need to continually manage his needs in order to have a successful outcome.

Discussion:

A systematic literature review[14] was performed evaluating spinal manipulative therapy's (SMT) effect on spinal ranges of motion. "In five of the nine studies on cervical ROM a positive effect was reported, whereas the remaining four studies did not show improvement[14]." None of the studies reviewed utilized the cervical stairstep technique and generally focused on high velocity low amplitude (HVLA) type adjustments, which may be problematic in the geriatric population. Oliveira-Campelo et al, found that manual (ischemic compression, passive stretching, and muscle energy) techniques applied to the upper trapezius muscle all seemed to improve the cervical range of motion and pressure pain sensitivity, however only the ischemic compression seemed to persist after one week[15].

With the geriatric population factors associated with arthritic changes and osteoporosis often make HVLA cervical adjusting a cautionary obstacle. The cervical stair step procedure does not offer the high velocity or strong forces used in a HVLA cervical adjustment and in this case series demonstrated successful outcomes. While the cervical myofascia and joint range of motion is an important consideration in the geriatric population, particularly driving a car[16], some literature is finding that a lack of flexibility is also associated with underlying arterial stiffening[17].

Conclusion:

As stated in the introduction the intent of this paper is to study the methods used by an SOT chiropractor to successfully manage the care of three older patients with neck pain. Discussion of SOT procedures in this paper was limited to just those methods most related to the patients' primary needs.

When managing the care of all patients there must be an understanding by the patient as to their limits and for them to continual manage their needs. At the same time there must be an understanding by the practitioner of those limits and to engage their patients in their own care. In these three patients involvement in their care was important for a successful outcome.

Calliet felt that "irritated tissues must be ascertained as removable, reducible and irreversible"[18]. The problems as presented by the patients in this study, based on their histories, findings and profiles, were considered to be reducible but certainly not removable. Improvement of cervical ROM along with the three patients reporting significantly less pain with no need for medication were credible indicators of a successful outcome.

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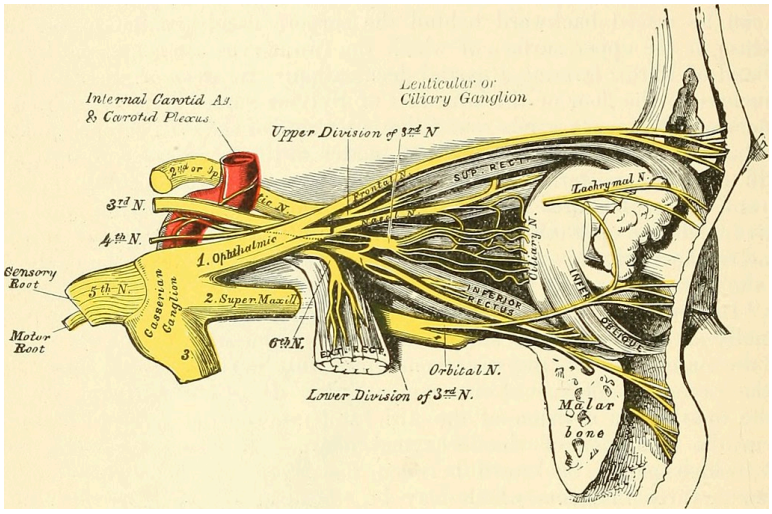
SOT cranial therapy with light therapy for the treatment of trochlear nerve palsy and right eye concomitant deviation

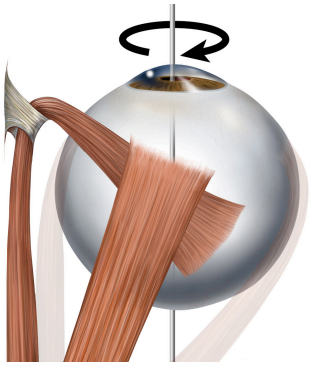
Rachel Hamel, DC, Charles Blum, DC

Introduction:

The trochlear nerve is the fourth cranial nerve that innervates the superior oblique muscle of the eye. "Because of the muscle's placement at the posterior portion of the eye, the muscle elevates the posterior of the eye, causing the front of the eye to become depressed. The muscle also causes abduction of the eye moving the pupil away from the nose, and intorsion rotating the eye such that the top of the eye moves toward the nose. Acquired weakness of this muscle usually leads to complaints of binocular vertical or oblique diplopia, sometimes with a torsional component."[1]



In adult and pediatric patients, trochlear nerve palsy is less common than abducens (sixth cranial nerve) or oculomotor (third cranial never) palsies. Richards et al, found that of 4,373 acquired cases of extraocular muscle palsy in adults, there were only 657 cases of isolated fourth nerve disease.[2] One study by Dosunmu et al determined that the most common cause of fourth nerve palsy was presumed congenital, followed by hypertension, and trauma.[3] An earlier study found that "head trauma as the principal cause, with surgical injury, inflammation, and brain tumors seen occasionally."[4]



The diagnosis of unilateral trochlear nerve palsy (superior oblique muscle) is based on acute onset vertical deviation which increases in contralateral side gaze, down gaze and ipsilateral head-tilt together with excyclodeviation (the outward rotation of the eyeball) which also increases in both down gaze and ipsilateral head-tilt.[5] Both vertical deviation and excyclodeviation decrease in contralateral head-tilt.[5] To detect excyclotropia (lateral eyeball rotation) one must ask the patient whether there is a tilted double image in down gaze.[5] "Bilateral trochlear nerve palsy causes a change of vertical deviation between right and left gaze and between head-tilt to the right and to the left shoulder."[5]

A 55-year-old male patient presented to this office for care with significant vision dysfunctions (e.g., inverting numbers, reading from the wrong line, and constant squinting). These deficiencies caused a great deal of stress trying to see when reading and in activities of daily living. The patient reported a 48 year history of left eye dominance, inability to accurately see information, inversion of numbers and reading from the wrong line, inability to see all colors, sense of imbalance, decreased mood, eye strain, neck and bilateral shoulder tension and an inability to find what he's looking for. History revealed several head traumas due to car accidents, falling out of a car when he was 11 years old, and possible physical abuse from being thrown as a small child.

Methods and Intervention:

Examination revealed narrow dental arches with an anterior premature contact, poor TMJ translation on the right, and evidence of clenching/bruxism. Cranial nerve examination revealed weakness in cranial nerves 1, 2, 3, 4, 5(motor), 9, 10, 11, 12 on the right side. Palpatory pain was noted in the muscles of mastication and cranial assessment revealed left temporal bone and spheno-maxillary imbalance. A vision examination was also completed simultaneously and revealed right eye pointing upward about 10 prism diopters, with a concomitant deviation and cycle-rotary strabismus. Treatment consisted of six chiropractic treatments (over 5 months) incorporating sacro occipital technique (SOT) cranial[6], infrared[7,8] and red light[9] therapy and craniofacial adjustments[6].

Results:

Following care the patient reported significant reduction in all symptoms, was able to see clearly with both eyes, balance returned, increase work productivity, mood improvement and overall quality of life was greatly improved with less stress. Although vision therapy was recommended by the Ophthalmologist, the patient had not started vision therapy during this time, so post treatment vision scores were not documented. Additionally, the patient was responding excellent to minimal care, and didn't have the time for the vision therapy during our treatment window.

Discussion:

This patient's history relating childhood and automobile accident head trauma as a possible etiology of his trochlear nerve palsy is plausible based on the study by Dosunmu et al.[3] Also Jacobson et al, discussed "a patient who developed an isolated trochlear nerve palsy following minor head trauma. Investigation revealed an unsuspected tentorial vascular malformation that was compressing the trochlear nerve in its subarachnoid course."[10] They caution that "in the absence of other features (e.g., documentation of old head tilt, large vertical fusion amplitudes) that support decompensation of a congenital phoria, compressive lesions should be sought in cases of fourth cranial nerve palsies that follow minor head trauma."[10]

There is not much written about treatment of trochlear nerve palsies in the chiropractic literature, though one article by Blum[11] discusses the neuroanatomical pathways of this nerve, which emerges from the posterior aspect of the brainstem and while it is the smallest nerve innervating the eye muscles it also has a long pathway from the trochlear nucleus to the superior oblique muscle. Therefore with head trauma it is not unreasonable to presume this nerve might be affected. A search of the literature did find two studies that utilized sacro occipital technique cranial care for the successful treatment of head and brain trauma.[12,13]

As with any case study it is difficult to extrapolate the findings to the population at large due to lack of a control group, other similar subjects for comparison, and the inability to rule out placebo/ideomotor effects or regression to the mean. However the patient's clinical history and lack of response of other interventions suggest a relationship between the care he received at this office and his recovery. Caution and interdisciplinary cooperation must always be utilized in the treatment of any cranial nerve palsy since there may be many types of serious etiologies (e.g., infection, brain lesions, intracranial vascular events, etc.).

Conclusion:

A 55-year-old male patient presented to this office for care with significant vision dysfunctions of 48-year duration. He was treated with SOT cranial and craniofacial methodologies along with infrared and red light therapy. Following six office visits over a five-month period of time the patient reported that he was able to have normal vision for the first time since he was a child. Greater study is needed to identify if other patients presenting with vision problems and concurrent head traumas might benefit from SOT and cranial/craniofacial adjusting and infrared/red light therapeutic interventions.

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Sacro occipital technique (SOT) and dental treatment of sleep disordered breathing (SDB) in a child: A case report

Jason Scoppa, DC, David Buck, DDS

Introduction:

Sleep disordered breathing (SDB) in children is prevalent and a largely under-diagnosed condition. Obstructive sleep apnea syndrome (OSAS) is a type of SDB and in children is defined as a "disorder of breathing during sleep characterized by prolonged partial upper airway obstruction [hypopnea] and/or intermittent complete obstruction (obstructive apnea) that disrupts normal ventilation during sleep and normal sleep patterns."[1] SDB/OSAS negatively affects children in a number of ways, from cardiovascular, and metabolic consequences, which can include an inability to concentrate in school, poor academic performance, behavioral problems, to structural craniofacial and dental arch growth and development.[1] Similarly another study found that SDB/OSAS has different effects on the pediatric population than in adults "including deficits in cognition and neuropsychological functions, hyperactivity, ADHD, behavior problems, aggressive behavior, learning problems and nocturnal enuresis."[1] Due to lack of awareness healthcare providers often overlook this condition and its far-reaching affects. Generally when diagnosed, treatments are often one-dimensional, non-uniform, and are slow to respond to care.

Many factors might influence SDB/OSAS, including the following: adenotonsillar hypertrophy, [1] obesity,[1] tongue-base obstruction, [3] allergic/nonallergic rhinitis,[4] neuromotor abnormalities and instability of central ventilatory control,[5] and craniofacial compromised development. [6] Some high-risk considerations regarding pediatric SDB/OSAS include children born prematurely, and those with Down syndrome, craniofacial disorders, and neuromuscular disorders.[7]

There are various therapeutic approaches for the treatment of SBD/OSAS with the most common one being adenotonsillectomy surgery, [8] though these surgeries are not without their risks and complications. [9-11] Other options that also offer risks are tongue surgeries[12] as well as intranasal steroids and Montelukast for mild cases of SBD/OSAS, or continuous positive airway pressure (CPAP) for those with moderate to severe unresponsive cases. [8] The risks with CPAPs are the lack of compliance in the pediatric population. Less invasive options involve improving craniofacial growth and development with maxillary expanders[6,13,14] and oral myofunctional therapy.[15]

This is a case report about a four-year-old girl with signs and symptoms of sleep apnea, airway compromise, and disordered breathing, as well as, related dental malocclusion.
The patient had no significant physical complaints and had been treated by a sacro occipital technique [SOT][16] and SOT cranial[17] trained chiropractor since birth. However, the parents noticed that when she slept at night she would often snore, toss and turn, sleep with an open mouth posture, grind her teeth, and needed excessive amounts of sleep to feel rested. She was generally an even-tempered child but was having issues concentrating, and it was very difficult to wake her in the morning. She had a history of thumb sucking, but only when she was about to

fall asleep. This continued until parents worked with her to stop the habit around the age of 3½ years old.

Methods and Intervention:

Upon examination, she had a class III labial and lingual frenum but had no prior history of breast-feeding issues, speech issues, or any other signs that were apparent. However, given that the child has been treated with SOT chiropractic and cranial care since birth and was holding her adjustments while still having issues sleeping, she was referred to a dentist that specializes in the assessment and surgical intervention of labial and lingual frenums. This dentist confirmed the presence of the class III labial and lingual ties, and suggested surgery. Given her age it was necessary to use anesthesia and while anesthetized she was having visible difficulty breathing. The anesthesiologist said it was more than likely tonsillar hypertrophy and suggested seeing an ear nose and throat (ENT) medical specialist. The parents then took the child to an ENT, who eventually did remove the tonsils and adenoids.

Following the frenuloplasty and adenotonsillectomy surgery, the parents reported a 50% improvement in her sleep issues. However, she was still grinding her teeth loudly at night, still snoring occasionally, was still breathing with an open mouth posture, and still had a small anterior open bite (probably due to the thumb sucking). She was given a Myo Munchee[18] appliance (to help stimulate her craniofacial growth and development) and used it regularly for five minutes, twice a day, as well as when she slept. This created a near 100% reduction in her sleep issues, but because it can be problematic from a dental perspective to have a patient sleeping in an appliance, she was referred to a dentist specializes in craniofacial growth and disordered breathing for coordinated care and oversight.

Pre-Treatment Post-Treatment

The dental specialist in craniofacial growth and disordered breathing noted that she needed increased growth in her maxilla laterally and anteriorly along with retraining her tongue to maintain the proper resting (incisal papillae) position and swallowing posture. He recommended she continue with SOT cranial care, continue using the Myo Munchee for active rehab of her bite during the day, but also added the Myobrace J1[19,20] appliance to help correct improper tongue posture, open her airway at night, and bring her jaw into class I occlusal pattern. She was to wear the Myobrace J1 appliance for around an hour during the day, plus at night when she slept.

Results:

Within 5-months of care (6-chiropractic/2-dental office visits) the patient's sleep habits normalized, her anterior open bite improved, she had significant anterior and lateral growth in her maxilla, her posture was drastically improved, she had increased ability to concentrate, and she required less sleep to be fully rested.

Discussion:

There is not much research regarding interdisciplinary care that includes chiropractic cranial interventions in the treatment of children with SDB/OSAS. There are a few studies that discuss sacro-occipital technique (SOT) cranial therapies for the treatment of OSAS but these were with the adult population.[21-23] One study by Murphy and Vavrek discussed the inclusion of chiropractic cranial therapies in a multidisciplinary setting for the successful treatment of an infant with central sleep apnea.[24] Central sleep apnea occurs with a transient reduction by the ponto-medullary respiratory rhythm generator,[25] is a completely different entity than the more common obstructive sleep apnea or upper airway resistance syndromes.[26]

As with any case study it is difficult to extrapolate the findings to the population at large due to lack of a control group, other similar subjects for comparison, and the inability to rule out placebo/ideomotor effects or regression to the mean. However the patient's clinical history and lack of response of other interventions suggest a relationship between the care she received has some relationship to her recovery. With any intervention particularly in the pediatric population, weighing risks, benefits, and invasiveness of any therapeutic intervention is always an important consideration. It is possible that the subset of SDB/OSAS children with compromised craniofacial growth/development or disordered occlusion may respond well to the low-risk approach used with this case.

Conclusion:

This is a case report about a four-year-old girl with signs of sleep apnea, airway compromise, and disordered breathing, as well as related malocclusion patterns and maxillary underdevelopment. She had a successful outcome with co-treatment that included an SOT chiropractor and a cranial-facial growth specialist dentist, incorporating SOT cranial therapies, active rehab tools for her occlusion issues, and passive rehab tools such as a non-customized dental orthotic for craniofacial growth and development and myofunctional habit correction. Further research is needed to determine if SDB/OSAS children can be managed successfully utilizing a multi-pronged, team approach as was used with this patient.

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SOTO-USA Research Update

SOTO-USA is dedicated to bringing you the most updated and comprehensive research relating to Sacro Occipital Technique (SOT). Research is the future of chiropractic and SOT. Publishing this research sets the foundation for the future of SOT and protects its future worldwide. Understanding the published research allows us to grow, learn and modify our technique and diagnostic methods to fit our discoveries and stay current in the scientific community. The research department of SOTO-USA is goal oriented and focuses on action and results. **Please consider a tax-deductible donation to SOT research so SOTO-USA can help us further SOT's prominence in chiropractic healthcare**.

SOTO-USA is an organization dedicated to the advancement of SOT and the work of Major Bertrand DeJarnette, DO, DC. One of the many ways in which we at SOTO-USA contribute to the chiropractic profession is through the publishing of articles, newsletters, compendiums, and manuals relating to the art, science and philosophy of SOT (please visit our website for a complete listing of publications; www.SOTO-USA.org).

Association of Chiropractic Colleges – Research Agenda for Chiropractic (ACC RAC) Conferences

Papers Presented at the 2018 Conference and 2019 Conferences

The ACC RAC conference is one of the most prestigious chiropractic research conferences regularly attended by college presidents, research and technique chairs, and many other influential doctors and practitioners affecting the future of chiropractic and healthcare. Since SOTO-USA's inception in 1999 we have attended every conference and had a paper accepted at every ACC RAC conference possible. The 2017 marked the first year ever that the Biennial World Federation of Chiropractic Conference took place with the ACC RAC. It was a monumental event for sacro occipital technique, cranial, and chiropractic manipulative reflex technique research, since we had 22 papers presented.

This past year we had 14 SOT related papers and a workshop accepted for the 2018 ACC RAC Conference:

Bloink T, Blum CL. Chiropractic care for TMJ and extreme tongue fatigue: A case report. J Chiropr Edu. 2018;32(1):53.

Blum CL. The polyvagal theory: A rational for psychological and chiropractic interdisciplinary care. J Chiropr Edu. 2018;32(1):69.

Blum CL. Sacroiliac joint hypermobility syndrome and chiropractic: A preliminary survey. J Chiropr Edu. 2018;32(1):70.

Blum CL. A preliminary survey of chiropractic college use of table sanitizers in their clinic: Are there green alternatives? J Chiropr Edu. 2018;32(1):69.

Blum CL. Chiropractic care of a rock climber's shoulder with FHP (forward head posture): A case report. J Chiropr Edu. 2018;32(1):53.

Blum CL. Study on inducing fifth lumbar vertebra malposition by M. B. DeJarnette: Historical development of sacro occipital technique. J Chiropr Edu. 2018;32(1):69.

Blum CL, Benner CD. A survey of sacro occipital technique (SOT) practitioners: Pediatric patients and their presenting symptoms. J Chiropr Edu. 2018;32(1):69.

Edwards E, Ohm J, Blum CL, Union A. Identifying the frequency of perinatal sacroiliac hypermobility indicators in a chiropractic clinic. J Chiropr Edu. 2018;32(1):72.

Gleberzon B, Roecker C, Blum CL, Good C, Cooperstein R. Toward the Development of a Standardized Chiropractic Technique Program Workshop - Association of Chiropractic Colleges 25th Educational Conference and Research Agenda Conference. March 8-10, 2018.

Hamel R. SOT cranial therapy for the treatment of abnormal sensations of the tongue, tinnitus, TMD and neck pain. J Chiropr Edu. 2018;32(1):56.

Hamel R. SOT cranial therapy with an occlusal splint for the treatment of low back, leg and neuropathic pain: A chiropractic dental co-treatment case report. J Chiropr Edu. 2018;32(1):73.

Lane J, Union A, Edwards J. Chiropractic care of a pediatric patient with twin to twin transfusion syndrome. J Chiropr Edu. 2018;32(1):69.

Mersky JA, Blum CL. Dizziness in a patient with airway compromise and TMD: A case report. . J Chiropr Edu. 2018;32(1):77.

Perry K. Unresponsiveness to sacro occipital technique (SOT) procedures suggested possible pathological contribution to patient presentation: A case report. J Chiropr Edu. 2018;32(1):63.

Serola R, Blum CL. Sacroiliac joint myoligamentous interrelationships: Implications of sacral nutation dysfunction on whole body kinematics. J Chiropr Edu. 2018;32(1):65.

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At this year's ACC RAC 2019 Conference we had twelve papers and one workshop accepted:

Thomas Bloink, DC, Charles Blum, DC. Mal de Debarquement Syndrome an atypical vertigo: A Case report [Platform]

Thomas Bloink, DC, Charles Blum, DC. Chiropractic care for a patient suffering a slip and fall and craniofacial trauma: A case report. [Platform]

Thomas Bloink, DC, Charles Blum, DC. Chiropractic care of professional hockey player suffering from multiple concussions: A case report [Poster]

Charles Blum, DC. A survey of chiropractic students or recent graduates on their experiences in chiropractic college adjusting lab or class [Poster]

Charles Blum, DC. Cranial therapeutic applications to facilitate dentofacial growth and development in a 50-year-old adult female A case report. [Poster]

Charles Blum, DC. A chiropractic and dental perspective the three faces of forward head posture: Differential diagnosis is the key for optimal outcomes [Platform]

William Boro, DC. Intervention affecting atrial fibrillation through chiropractic adjustment, sacro occipital technique's chiropractic manipulative reflex technique: a case report [Poster]

William Boro, DC. Intervention in gall bladder dysfunction through chiropractic adjustment and nutritional therapy: a case report. [Poster]

Richard Gerardo, DC, Charles Blum, DC. Interdisciplinary care of a 44-year-old male patient with obstructive sleep apnea (OSA) secondary to a class two division two malocclusion. [Platform]

Brian Gleberzon DC, Charles Blum DC, Christopher Good, DC, Robert Cooperstein, DC, Toward the Development of a Standardized Chiropractic Technique Program. [Workshop]

Rachel Hamel, DC. SOT cranial therapy for the treatment of pediatric torticollis: A chiropractic case report. [Platform]

Jeffrey Merksy, DC, Charles Blum, DC. Conservative chiropractic care for a post-traumatically induced C6/7 intraforaminal disc herniation in a 43-year-old female," was accepted as a platform. [Platform]

Keila Nichols, DC. Two sisters with plagiocephaly accompanied by torticollis - one treated with a cranial orthosis (helmet); the other with Sacro Occipital Technique (SOT) Cranial Therapy: a comparative case report. [Poster]

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At this year's 2019 World Congress on Low Back and Pelvic Pain in Antwerp, Belgium: October 28-31, 2019 we had seven papers accepted:

Charles Blum, DC. Leg length, pelvic disorders, postural imbalance, and stomatognathic relationships: A review

Thomas Bloink, DC, Charles Blum, DC. Chronic severe foot pain related to descending kinematic imbalance from the sacroiliac joint: A case report

Thomas Bloink, DC, Charles Blum, DC. Post-traumatic low back pain in a 40-year-old female with concomitant nonmusculoskeletal contribution: A case report

Robert Cooperstein, DC, MS, Charles Blum, DC, Elaine Cooperstein, DC, MS. Assessment of Consistency Between the Arm-Fossa Test and Gillet Test: A Pilot Study

John Edwards, DC, Jeanne Ohm, DC, Charles Blum, DC, Alison Union, BS. Identifying the frequency of perinatal sacroiliac hypermobility indicators in a chiropractic clinic

Rachel Hamel, DC. SOT cranial therapy with an occlusal splint for the treatment of low back, leg and neuropathic pain: A chiropractic dental co-treatment case report

Rick Serola, DC. The Central Role of the Sacroiliac Joint in Musculoskeletal Dysfunction

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At this year's 2019 World Federation of Chiropractic Congress in Berlin, Germany: March 20-23, 2019 we had five papers accepted:

Thomas Bloink, DC, Charles Blum, DC. Chiropractic care of professional hockey player suffering from multiple concussions: A case report

Thomas Bloink, DC, Charles Blum, DC. Mal de Debarquement Syndrome an atypical vertigo: A case report

William Boro, DC. Intervention in Atrial Fibrillation with Chiropractic Manipulation and Sacro Occipital Technique's Chiropractic Manipulative Reflex Technique (CMRT): A Case Report

William Boro, DC. Chiropractic Intervention in Gall Bladder Dysfunction: A Case Report

Robert Straub, DC. The posterior/inferior (PI) ilium and the short leg: A retrospective review (n=110) of records

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The Following was an SOT Related Presentation for the Australian Chiropractic Association (ACA) National Conference Research Symposium: October 20-21, 2018 - Hobart, Tasmania

Shaun Cashman, DC, Charles Blum, DC. Trapezius fibre muscle analysis: A preliminary inter/intra-examiner reliability study

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The **SOT Research Conference Proceedings** (Now fully indexed and searchable!)

All of the SOT Research Conferences have now been published in the Annals of Vertebral Subluxation Research and is available for searching through MANTIS (a major alternative healthcare search engine) and chiroindex.org (a major chiropractic search engine). All abstracts from the conferences will be published in the Quinquennial SOT Compendium of Peer Reviewed Research and full conference proceedings are offered free to every chiropractic college library nationally and internationally.

1st Annual Sacro Occipital Technique Research Conference Proceedings. Las Vegas, Nevada October 22, 2009. Annals of Vertebral Subluxation Research ~ Sept 29, 2011 ~ Pages 104-132.

2nd Annual Sacro Occipital Technique Research Conference Proceedings. New Orleans, Louisiana 2010. Annals of Vertebral Subluxation Research ~ October 17, 2011 ~ Pages 133-164.

3rd Annual Sacro Occipital Technique Research Conference Proceedings. Nashville, Tennessee May 19, 2011. Annals of Vertebral Subluxation Research ~ Nov 10, 2011 ~ Pages 165-182.

4th Annual Sacro Occipital Technique Research Conference Proceedings. Atlanta, GA May 3, 2012. Annals of Vertebral Subluxation Research ~ May 24, 2012 ~ Pages 41-59.

5th Annual Sacro Occipital Technique Research Conference Proceedings. Atlanta, GA May 2, 2013. Annals of Vertebral Subluxation Research ~ March 27, 2014~ Pages 22-48.

6th Annual Sacro Occipital Technique Research Conference Proceedings. Redondo Beach, CA May 15, 2014. Annals of Vertebral Subluxation Research ~ July 14, 2014 ~ Pages 129-144.

7th Annual Sacro Occipital Technique Research Conference, New Orleans, LA May 7, 2015. Annals of Vertebral Subluxation Research ~ June 8, 2015 ~ Pages 135-145.

8th Annual Sacro Occipital Technique Research Conference, New Orleans, LA May 7, 2015. Annals of Vertebral Subluxation Research ~ November 23, 2017 ~ Pages 254-274.

9th Annual Sacro Occipital Technique Research Conference, New Orleans, LA May 12-13, 2017. Annals of Vertebral Subluxation Research ~ November 23, 2017 ~ Pages 275-286.

10th Annual Sacro Occipital Technique Research Conference, Kauai, Hawaii, February 28 – March 2, 2018. Annals of Vertebral Subluxation Research. March 14, 2019 ~ Pages 29-33

11th Annual Sacro Occipital Technique Research Conference, Nassau, Bahamas February 27 – March 1, 2019. Annals of Vertebral Subluxation Research.

Many thanks go to the editors of the Annals of Vertebral Subluxation Research, Drs. Pamela Stone and Matthew McCoy. Their continued support of chiropractic clinical research and of SOT is greatly appreciated.

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At the inaugural 2009 Sacro Occipital Research Conference, Las Vegas, Nevada we had 28 abstracts accepted. At subsequent Sacro Occipital Research Conferences many of the submissions have led to paper submissions to various other research conferences and peer review journals. All SOT practitioners and allied healthcare partners are encouraged to be a part of our next research conference that will occur in 2020. Check the SOTO-USA website for the call for papers: www.SOTO-USA.org

Our ongoing commitment continues into the future with papers submitted to chiropractic and allied healthcare conferences and journals. One of the easiest ways research can be facilitated by a doctor in clinical practice is through the publishing of individual research papers and case histories. These lay the groundwork for future research directions and projects. If the need arises, we will be happy to assist the doctor in writing the paper or case history in order to get it submitted for publishing.

Please take a moment to review our landmark SOT and cranial research texts, which will eternally preserve SOT, related published research, which will have updated volumes every 5 years. These can all be purchased online at www.soto-usa.org or by calling (336) 793-6524.

1st Sacro Occipital Technique Research Conference Proceedings: 2009.

2nd Sacro Occipital Technique Research Conference Proceedings: 2010.

3rd Sacro Occipital Technique Research Conference Proceedings: 2011.

4th Sacro Occipital Technique Research Conference Proceedings: 2012.

5th Sacro Occipital Technique Research Conference Proceedings: 2013.

6th Sacro Occipital Technique Research Conference Proceedings: 2014.

7th Sacro Occipital Technique Research Conference Proceedings: 2015.

8th Sacro Occipital Technique Research Conference Proceedings: 2016.

9th Sacro Occipital Technique Research Conference Proceedings: 2017.

10th Sacro Occipital Technique Research Conference Proceedings: 2018.

11th Sacro Occipital Technique Research Conference Proceedings: 2019.

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Soon in Print - The Compendium of Sacro Occipital Technique: *Peer-Reviewed Literature 2005-2010.*

Soon in Print - The Making of a Chiropractor: The Biography of Major Bertrand DeJarnette by Ken Wheat

In Print:

The Compendium of Sacro Occipital Technique**: *Peer-Reviewed Literature 2000-2005.***

The Compendium of Sacro Occipital Technique**: *Peer-Reviewed Literature 1984-2000.***

The SOT Collection: *To the Year 2000.*

The SOT Collection: Supplement: *To the Year 2000.*

SACRO OCCIPITAL TECHNIQUE

Its Past, Present and Future

By Charles L. Blum, DC

Sacro Occipital Technique (SOT) is an assessment and treatment method of chiropractic developed by Major Bertrand DeJarnette, DO, DC in the late 1920s. Prior to beginning a career in chiropractic, a nineteen-year-old DeJarnette embarked on a career as an engineer within a group of elite engineering students hired by the Ford Foundry for research and development. One day not long after beginning his employment at the foundry, he was walking up the steps to his work when an explosion occured in the building. He was thrown nearly 30 feet and barely survived his injuries, everyone else was killed.

During that era in American history, anyone involved in an explosion was considered "bad luck" by potential employers and society at large. He felt despondent about his future engineering career, confused as to why he alone survived, and in excruciating pain due to the injuries he sustained. Contemplating suicide while standing on the highest bridge in town, he felt something touch him and tell him that he had important things yet to accomplish. At the time he was not an especially spiritual person, but he was shaken enough by the experience to get down to the bridge. He walked around aimlessly until he collapsed in front of a house, exhausted. In the morning the homeowner, who fortuitously happened to be an osteopath, discovered the young DeJarnette asleep on his front steps and offered to help him[1].

When the osteopath realized how injured DeJarnette was, he suggested that he attend an osteopathic college where he could learn and continue to receive care. After graduating with an osteopathic degree, he later attended chiropractic college. Upon graduating, he established his chiropractic practice in Nebraska City, Nebraska. He always felt there was a reason why he survived, and that he had a duty to make his life meaningful by improving the welfare of others[1,2].

DeJarnette had a photographic memory and could read a full page, rather than a single word, at a time. His abilities likely led to why he was able to write over 140 books and articles. For DeJarnette, research was an essential part of being a chiropractor, and essential to the future of the chiropractic profession. As early as July 1935, he was a featured speaker at the 40th Anniversary Convention 1895-1935 of the National Chiropractic Association, presenting clinical research. Always,

Photo: ***Major Bertrand DeJarnette, DO, DC***

research was his passion. 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[3]."

When Dr. DeJarnette began to study the treatments he rendered, he realized that if any meaningful information was to evolve from his experience, he would have to resolve it himself. He realized that explaining how his discoveries evolved was more difficult than the process of developing new diagnostic and therapeutic interventions[4].

"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[5]." "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[6]."

Three Novel Concepts[1,7]

DeJarnette utilized concepts of evaluating the body's presentation as a three dimensional holograph which is affected by a matrix of integrative activities. He investigated how sustained stressors to the body create distinct retained patterns of distortion in the neuromusculoskeletal system. He ultimately used his experiences to develop methods of categorizing three specific primary body distortion patterns.

1. He factored Osteopathic principlies relating to cerebrospinal fluid (CSF) circulation, dural membranous tensions, and cranial bone dynamics into chiropractic analysis and treatment.
2. He determined that there are two parts to the sacroiliac (SI) joint, a posterior weightbearing supportive hyaline structure and an anterior synovial membranous joint that allows for joint nutation.
3. From an engineering standpoint he realized that the majority of the weight or stress from structures above the SI joint rests upon the posterior SI joint, whereas inferior to the SI joint the stress is spread 50% to each hip joint.

DeJarnette's three novel concepts led to the development of three specific categories of analysis:

Category One: relates to the anterior synovial SI joint's nutation and its relationship to dural tension and CSF circulation.

Category Two: relates to the posterior SI weightbearing joint.

Category Three: relates to the body's adaptation to the inability to distribute weight through the posterior SI joint and its subsequent transmission (via iliolumbar ligaments and sacrospinalis muscles) to the lumbar discs and spine.

Integrating Viscerosomatics and Cranial Biodynamics into SOT

Utilizing the categories of analysis and treatment, DeJarnette found specific ways of incorporating treatment relating to viscerosomatic and somatovisceral reflexes, and specific organ manipulation into an indicator based system of care entitled Chiropractic Manipulative Reflex Technique (CMRT)[8].

Incorporating cranial, meningeal, and CSF analysis and treatment[9] into a systematized methodology of care was also integrated into his category system. This allowed the doctor to use pre- and post-adjustment indicators to assess when and where care is needed and whether the care rendered was successful. His cranial system of analysis involved palpation for pain, functional assessments, and palpation of cranial compliance[9]. This allowed for a generalization of patient presentations into a system of analysis and care that followed a logical and reproducible progression[7].

With persistent extremity imbalance due to trauma, asymmetrical function, and various other possibilities, DeJarnette developed a system of extremity analysis and treatment relating to the feet, ankle, knees, and hips as well as from the scapula, shoulder, and elbow. Since imbalanced function can be specific to a joint or factors, distal or proximal, the whole kinematic chain of influence is considered with SOT extremity analysis and treatment[7].

Therefore while SOT is considered a chiropractic technique, it is more an inclusive paradigm of health that attempts to integrate whole body function, nonmusculoskeletal interrelationships, and preventative care.

Sacro Occipital Technique Organization (SOTO) – USA was formed in 1999 to disseminate the teachings of DeJarnette, and bring SOT into the evidence based chiropractic community. That involves responsibly performing research to support the findings of SOT doctors, being circumspect about our claims, and modifying SOT to fit the current research. SOTO-USA has been able to teach SOT according to DeJarnette's completed works, while bringing his work into 21st century language.

SOTO-USA focuses continuing its SOT certification program, with systematized syllabi, books, lesson plans, and certified instructors, along with written and practical SOT and cranial certification examinations. One aspect that SOTO-USA believes is important for the future of SOT is researching its clinical outcomes as well as its reliability and validity. Another crucial aspect for the future of SOT is interdisciplinary care.

Certification Program

In 2014-15 SOTO-USA is presenting SOT and Cranial Certification Programs at the University of Western States, Palmer College of Chiropractic Davenport, Palmer College

> DeJarnette analysis and techniques helped establish chiropractic as more than just a spinal based therapy but a wholistic method of spinal care incorporating cranial bone, viscera, meningeal, and extremity interrelationships.

of Chiropractic Florida, Southern California University of Health Sciences, and in Northern California. Our annual SOT and Cranial Certification examinations will be given this year at the SOTO-USA Clinical Symposium May 7-10, 2015 in New Orleans.

Research

SOTO-USA has a three-pronged focus with regard to research publication: (1) regularly presenting research at chiropractic (ACC/RAC[10], WFC[11], ECU[12], IRAPS[13] COCA[14], and ACH[15]) and interdisciplinary research conferences, (2) having annual SOT Research Conferences[16] (May 7, 2015 will be the 7th) that give doctors the ability to become familiar with submitting, preparing and presenting SOT related research in a professional and collegial manner, and (3) submitting research for publication in peer review journals.

Interdisciplinary Relationships

Pioneering dental/chiropractic co-treatment of temporomandibular joint disorders (TMDs), SOTO-USA is a member of the Alliance of TMD Organizations[17], a group of predominately dental based groups totaling 14,000 members that specialize in treatment of temporomandibular joint disorders. SOTO-USA has regularly been presenting research at the Interdisciplinary World Congress on Low Back and Pelvic Girdle Pain18, at the North American Brain Injury Conferences and John Hopkin's Integration of Complementary and Alternative Medicine into Clinical Practice Conference. Multiple papers have been presented at many chiropractic research conferences sharing how SOT care can integrate with various interdisciplinary fields such as dentistry, medicine (e.g., cardiology, neurology, gastrointestinal, gynecology, etc.), osteopathy, optometry, acupuncture, ayurveda, pediatrics, and pregnancy.

At this time, SOTO-USA is not just about furthering the work of DeJarnette, but about helping chiropractic and chiropractors move forward. This is accomplished by aiding doctors in clinical practice to share their findings in the research community, as well as sharing up to date findings from the research community with doctors in practice. Developing an understanding of chiropractic's role in nonmusculoskeletal therapies and how to integrate with allied healthcare providers, will ultimately offer patients improved therapeutic low risk options. Expanding chiropractic's role in healthcare delivery through education of our allied healthcare partners will also facilitate care of patients with secondary head, neck and back pain conditions associated with oncology, menstrual syndromes, pregnancy, brain trauma, TMD, and other conditions/syndromes.

SOT is an inclusive chiropractic paradigm of care that easily integrates various adjusting methods and methodologies. DeJarnette's life's work offers chiropractic an indicator based system of analysis and treatment to expand and enhance any chiropractors current practice. Please consider becoming a member of SOTO-USA, attending an SOT certification series or our annual symposium May 7-10, 2015, or simply becoming more familiar with SOT by visiting the SOTO-USA website at www.SOTO-USA.org.

Charles L. Blum, DC is in private practice Santa Monica, California, director of research for Sacro Occipital Technique Organization – USA, adjunct research faculty at Cleveland Chiropractic College and teaches the Sacro Occipital Technique (SOT) elective class at Palmer College of Chiropractic - West and Southern California University of Health Sciences.

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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.

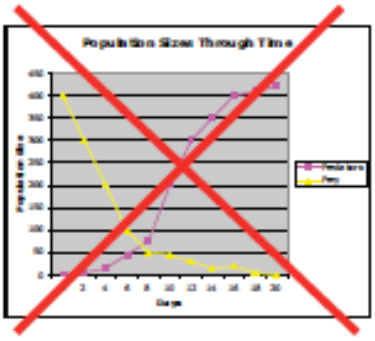
An effective poster will help you …
… engage colleagues in conversation.
… get your main points across to as many people as possible.

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, and 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!



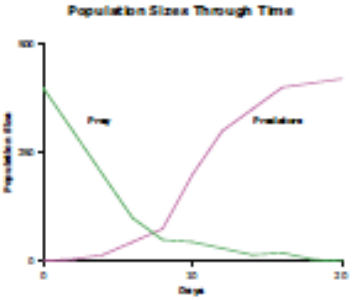
Desired message: Prey decreased as predators increased. Focus on relationships – exact values are usually not important.

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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To be Announced

Call for Scientific Submissions
Sacro Occipital Technique Organization - USA
13th SOT Research Conference

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 2020 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 October 31, 2020**

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 2019 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 October 31, 2020**

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 October 31, 2020**

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 October 31, 2020**

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 (e.g., staff) are not allowed to submit or query about submissions.

Important Information:

1. If the submission does not meet the submission requirements (e.g., 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 November 2019. 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 2015-2020. The paper will be published within the proceedings of the* SOT Research Conference 2020. 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 by **October 31, 2020** to:

SOT Peer Review Committee 2020
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 XIII
To be Announced

INSTRUCTIONS: This form must be completed, signed, and submitted by **October 31, 2020**
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 2015-2020*, 3) your accepted paper to be published in the Sacro Occipital Technique Research Conference Proceedings 2020 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 send to drcblum@aol.com by October 31, 2020.
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 Report 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.