Asia-Pacific Chiropractic Journal

CLINICALEXPOSITION

The Gluteus Maximus Manual Muscle Test in Chiropractic clinical practice:

A critical review of reliability, validity, clinical utility, and its importance as a core Chiropractic examination competency

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Abstract: The gluteus maximus is the largest muscle of the human beings we serve as Chiropractor. It is distinctive muscle in terms of size, anatomy and function compared to apes and other non-human primates. The gluteus maximus is one of the principal muscles responsible for controlling the human trunk and lower limb during powerful locomotion. In essence, unless Chiropractors correct this muscle's functional capacity, our patients will fail to recover from walking impairments and low back pain. The gluteus maximus is the principal extensor of the hip and an important contributor to pelvic and lower-limb function.

Despite its biomechanical importance, standardised manual muscle testing (MMT) of the gluteus maximus is not consistently emphasised as a core examination procedure in chiropractic education. The available literature provides a meaningful evidentiary foundation for standardised gluteus maximus and hip-extensor MMT. Studies have demonstrated clinically meaningful inter-examiner agreement, while controlled investigations have shown that manual grades of hip-extensor strength correspond with objectively measured torque. A 2025 systematic review specifically examining MMT in Applied Kinesiology identified standard MMT, without additional non-musculoskeletal challenge procedures, as potentially useful and reported moderate-to-very-strong reliability for several muscles, including the gluteus maximus.

This paper argues that standardised gluteus maximus MMT should be considered a fundamental Chiropractic examination competency, not because MMT replaces dynamometry, electromyography, imaging, or neurological examination, but because it provides a rapid, inexpensive, repeatable bedside assessment of hip-extensor performance. Proper testing requires appropriate patient positioning, pelvic stabilisation, consistent examiner contact, consistent resistance, and careful interpretation. A weak result should be interpreted as a finding of impaired force production or motor performance, not, by itself, proof of a specific pathology.

Indexing Terms: gluteus maximus; manual muscle testing; chiropractic; Applied Kinesiology; reliability; validity; hip extension; pelvic stability; low back pain; neuromusculoskeletal examination



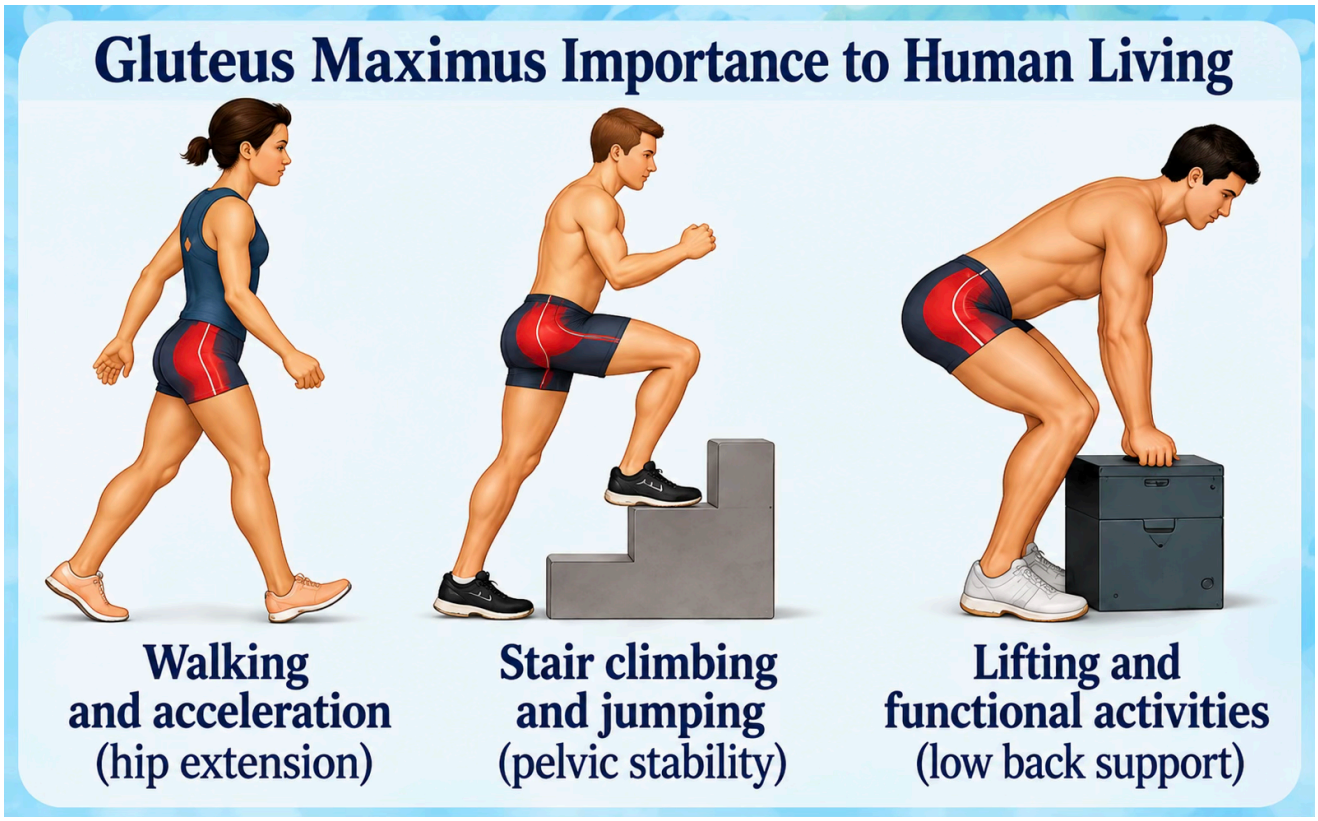
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Introduction

The gluteus maximus occupies a uniquely important position in the ensemble of human movement. It is the largest of the gluteal muscles and a major hip extensor, contributing to propulsion, stair climbing, rising from a seated position, running, jumping, lifting, and control of the pelvis and trunk.

Consequently, assessment of gluteus maximus performance has implications extending beyond the hip itself.

Figure 1: The basic rationale for the manual muscle test -- for life and movement



For Chiropractors this is particularly relevant because common clinical presentations involve the interaction of the lumbar spine, pelvis, sacroiliac region, hip, and lower extremity. A clinician examining these regions needs methods capable of identifying meaningful functional impairments rather than relying exclusively on structural imaging or symptom location. Manual muscle testing offers one such method.

> The scientifically useful question is not simply whether 'muscle testing works', but whether a specific, standardised gluteus maximus MMT provides reproducible and clinically meaningful information about hip-extensor performance. The literature reviewed here indicates that it can.

The Gluteus Maximus as a target of Chiropractic examination

The gluteus maximus produces powerful hip extension and contributes to control of the pelvis and lower extremity. During functional activities, hip-extensor performance is especially important when the body must generate propulsion or control the trunk over the lower extremities.

A 2024 systematic review of hip biomechanics in people with low back pain reported differences in hip muscle performance and identified reduced hip-extensor and abductor strength in affected populations across several forms of assessment. (Perry, 2004) These findings support the clinical relevance of assessing hip-extensor function as one component of a broader lumbopelvic examination.

Standardised, reliable and validated Gluteus Maximus manual muscle testing:

The Chiropractic profile

The traditional prone gluteus maximus test is performed with the patient prone and the knee flexed approximately 90°. The examiner stabilises the pelvis while the patient attempts hip extension against downward resistance applied to the posterior distal thigh. (Conroy et al, 2022; Schmitt, Cuthbert, 2008)

- Patient position: prone.
- Knee: flexed approximately 90 degrees.
- Pelvis: stabilised to minimise lumbar extension and pelvic rotation.
- Action: patient actively extends the hip.
- Resistance: examiner applies downward resistance toward the table against the posterior distal thigh.
- Observation: assess the patient's ability to maintain hip extension against the applied resistance.
- Comparison: where appropriate, compare right and left sides and document the grade or qualitative response.
- Repeat testing: use the same position, contact point, resistance direction, stabilisation, and examiner mechanics during reassessment.

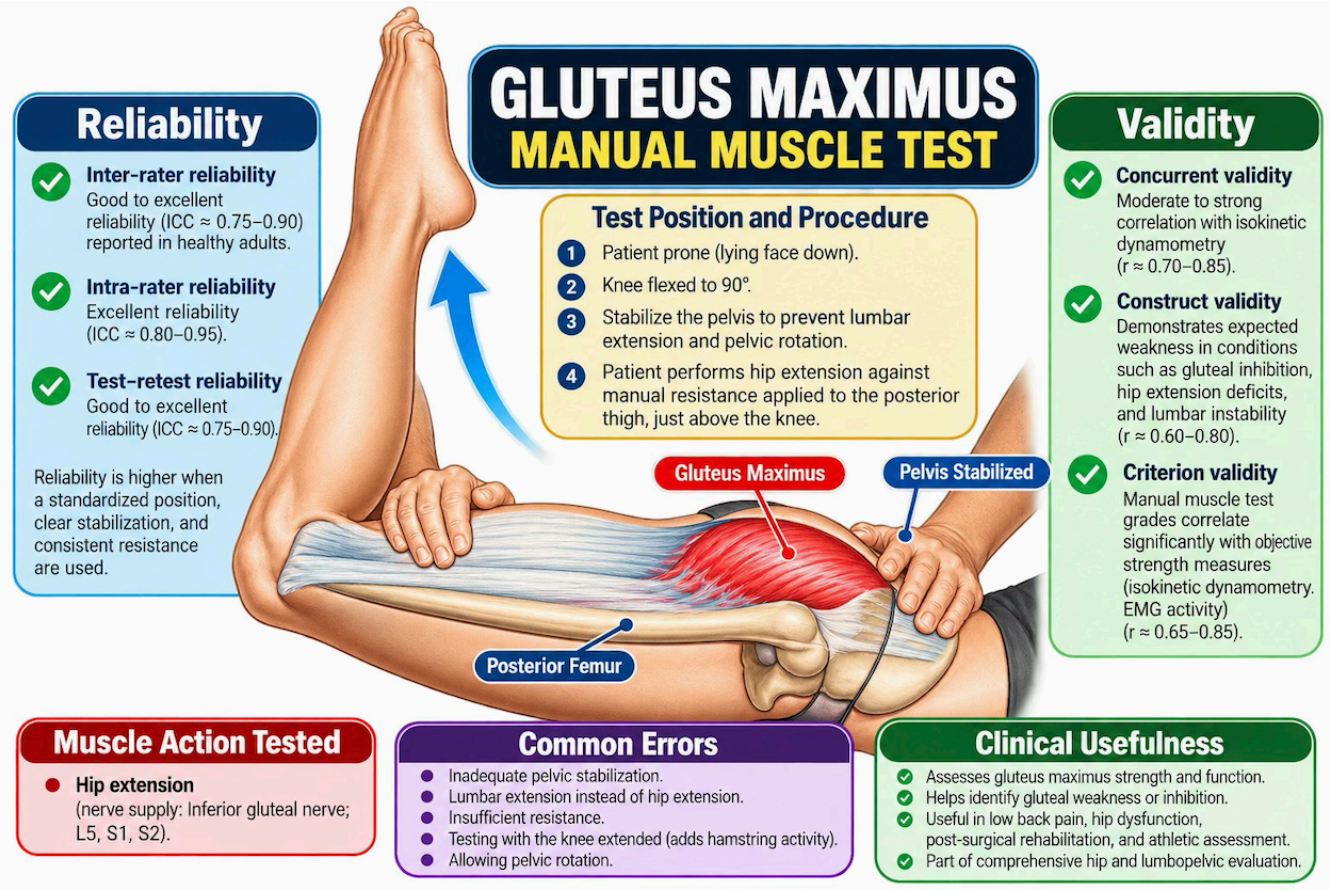
Gluteus maximus (after Walther, with permission, 2000)

Origin: posterior gluteal line of ilium, tendon of sacrospinalis, dorsal surface of sacrum and coccyx, and sacrotuberus ligament.

Insertion: gluteal tuberosity of femur and iliotibial tract of fascia lata.

Action: extends hip, assists in externally rotating the thigh.

Figure 2:Detailed illustration of the standardised prone gluteus maximus MMT, emphasising patient position, pelvic stabilisation, resistance direction, and common errors.



Test: The supine patient flexes the knee and extends the hip. The knee flexion is necessary to help take the hamstrings out of the test. The examiner directs pressure on the distal one-third of the femur in a direction of hip flexion. Observe for adequate pelvic fixation to the trunk by the trunk extensors and oblique abdominal musculature.

Nerve supply: inferior gluteal, L4, 5, Sl, 2.

Neurolymphatic:

Anterior: anterolateral thigh.

Posterior: between posterior superior iliac spine and L5 spinous.

Neurovascular: on the lambdoidal suture midway between lambda and asterion.

Nutrition: vitamin E, male or female endocrine concentrates or nucleoprotein extracts.

Meridian association: circulation sex.

Organ/gland association: reproductive organs or glands.

Body Language of Inhibition:

Testing position: Much information is gained as the patient goes into the testing position. IN\n the presence of inhibition, she may attempt to rotate the pelvis around the vertical axis, lifting it from the table on the side of the test to aid in lifting the thigh from the table. Another indication of inhibition or malfunction is a change of knee flexion by

the patient. Even though the tester may have placed the knee in proper flexion, the patient may attempt to extend it to recruit synergistic action in the hamstrings. Inhibition may be evident by an inability to reach or maintain the testing position in the first place.

During test: Continues improper effort, such as that used in an attempt to hold the resting position, will be observed. The patient will attempt to straighten the leg from the flexed position, and to rotate the pelvis.

Movement aberrations: Difficulty in arising from a chair, or in arising from the standing hip flexion position (Adams orthopaedic test).

Postural imbalance: Anterior rotation of the pelvis, or the patient carries the weight of the trunk posteriorly on a posteriorly rotated pelvis in an attempt to compensate for the weakness. In either the standing or the prone position, an inhibited gluteus maximus may be observed by the atonic appearance of the muscle. In the prone position, there is a lack of firmness and roundness of the gluteus maximus. In the standing position, the gluteus maximus appears to sag.

Alternate Testing Methods: In the presence of a short rectus femoris, it is necessary to test the gluteus maximus with less knee flexion. The shortened rectus femoris is observed when the thigh cannot be raised from the table with knee flexion; it can raise adequately when less flexion is present. An improvement in the length of the rectus femoris can often be obtained by fascial release or percussion on the origin or insertion or myofascial trigger points of the muscle.

Note: The gluteus maximus is frequently tested in the weight-bearing position to evaluate for an upper cervical or foot dysfunction which appears to effect this muscle only when weight bearing. The test is generally accomplished against an upright hi-lo table, and it is done in a manner similar to the prone test. If a hi-lo table is not available, the test can be done stabilising against a wall; however, it is more difficult to obtain precise information.

Common spinal fixation complex associated with bilaterally inhibited gluteus maximus MMT

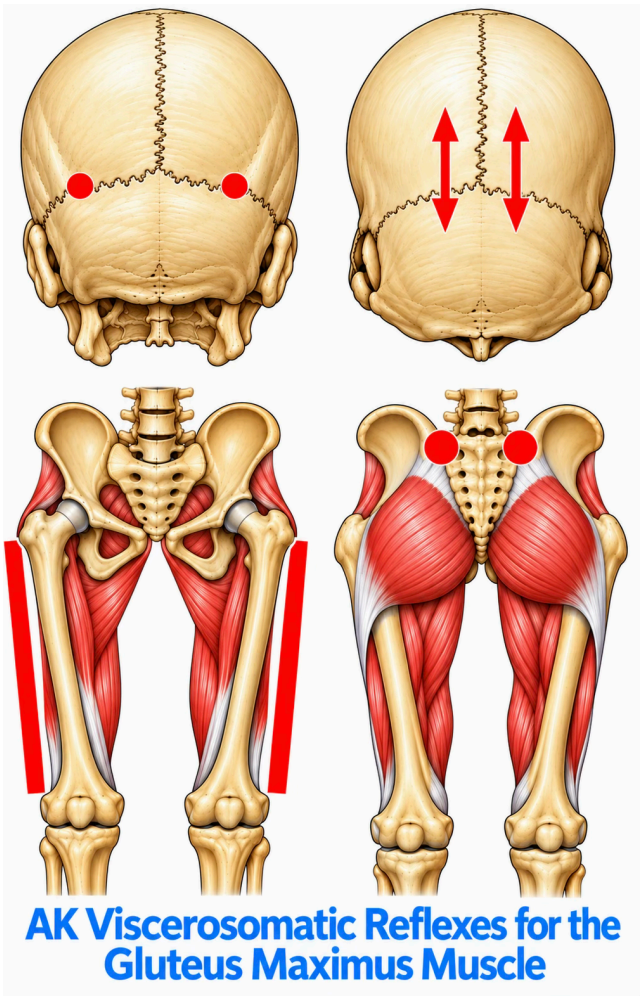
When a fixation complex is present in the spinal column, it has a specific bilateral muscle weakness in Applied Kinesiology. The bilateral weakness observed by Goodheart (Goodheart, 1973) reveals many vertebral fixations that would otherwise be overlooked.

Fixation levels associated with bilaterally inhibited gluteus maximus muscles are:

An upper cervical fixation: bilateral gluteus maximus muscles. This has been found repeatedly and for decades many tens of thousands of Chiropractors around the world since Goodheart first recognised the correlation.

Figures 3, 4: Upper cervical fixation correction for bilaterally inhibited gluteus maximus muscles - frequently found upon Chiropractic examination. The viscerosomatic reflexes for the gluteus maximus muscle in Applied Kinesiology Chiropractic [Walther, 2000, 1994]





The specific reflex-to-gluteus-maximus relationships have not been adequately tested with EMG, H-reflexes, TMS, dynamometry, autonomic measurements, sham controls, and blinded examiners. However, the widely reported in-office clinical trials by Chiropractors and other AK-users around the world have given considerable outcomes information on this subject.

Frank Chapman described tender reflex areas that he believed were associated with visceral and lymphatic dysfunction. Goodheart subsequently observed that stimulating particular Chapman reflexes appeared to change the result of specific muscle tests and incorporated this into AK as the neurolymphatic reflex system.

The proposed viscerosomatic pathway is approximately:

visceral/lymphatic disturbance
↓
somatic/autonomic afferent input
↓
spinal cord/brainstem integration
↓
alteration of α-motor-neuron excitability
↓
altered muscle recruitment
↓
MMT changes

> The important part is that the general neurophysiological architecture of these discoveries are neuro-physiologically plausible.

The importance of standardisation cannot be overstated. Manual muscle testing is affected by starting position, direction and timing of force, contact point, examiner mechanics, stabilisation, and other procedural variables. The objective is not merely to observe whether the leg moves backward, but to assess hip-extension force while minimising substitution by lumbar extension and pelvic rotation. (Schmitt, Cuthbert, 2008)

Reliability

Can different examiners obtain similar results?

Reliability is essential to any clinical examination. If one Chiropractor identifies a gluteus maximus as strong and another using the same procedure identifies it as weak, the test has limited value. Available evidence indicates that standardised gluteus maximus MMT can produce meaningful examiner agreement.

Pollard and colleagues examined inter-examiner reliability of lower-limb MMT while examiners were 'blinded', attempting to minimise visual, verbal, and nonverbal cues. For the gluteus maximus, the study reported approximately 75.6% agreement between examiners. The authors concluded that MMT demonstrated fair-to-substantial agreement across the muscles examined, while noting the need for further research regarding validity for specific clinical conditions.

Clinical meaning

The test is useful primarily as a low-cost clinical examination of hip-extensor performance, side-to-side differences, gross weakness, and change over time. With the addition of Applied Kinesiology diagnostic tests (challenge and therapy localisation), the operative factors contributing to the muscle inhibition found can be precisely and quickly diagnosed by the clinician. (Cuthbert and Walther, 2014)

Figure 5: Detailed illustration of the standardised standing gluteus maximus MMT, emphasising the multiplicity of functional assessment developed in Applied Kinesiology MMT assessment. This image emphasises the importance of gluteus maximus function in the evolution of homo sapiens sapiens. (Lieberman et al, 2006)

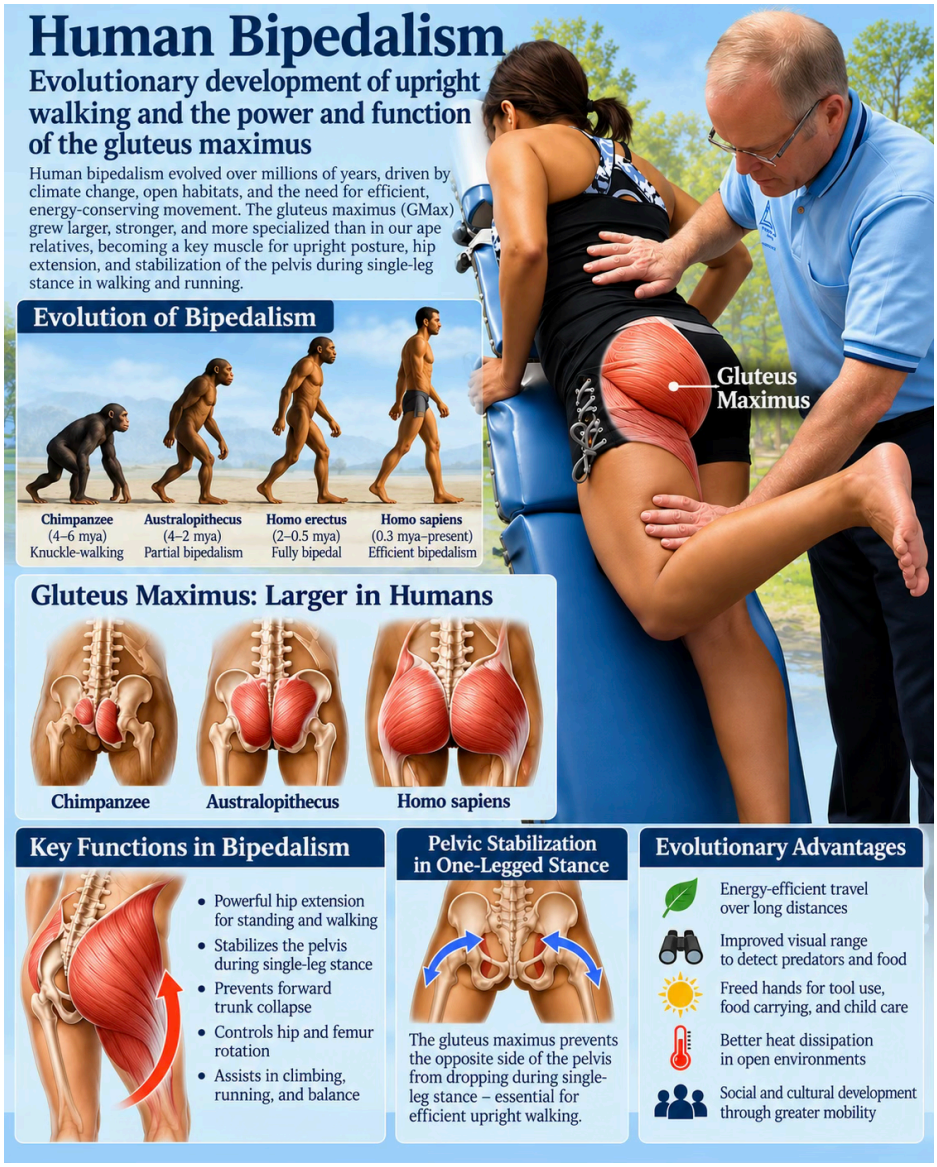
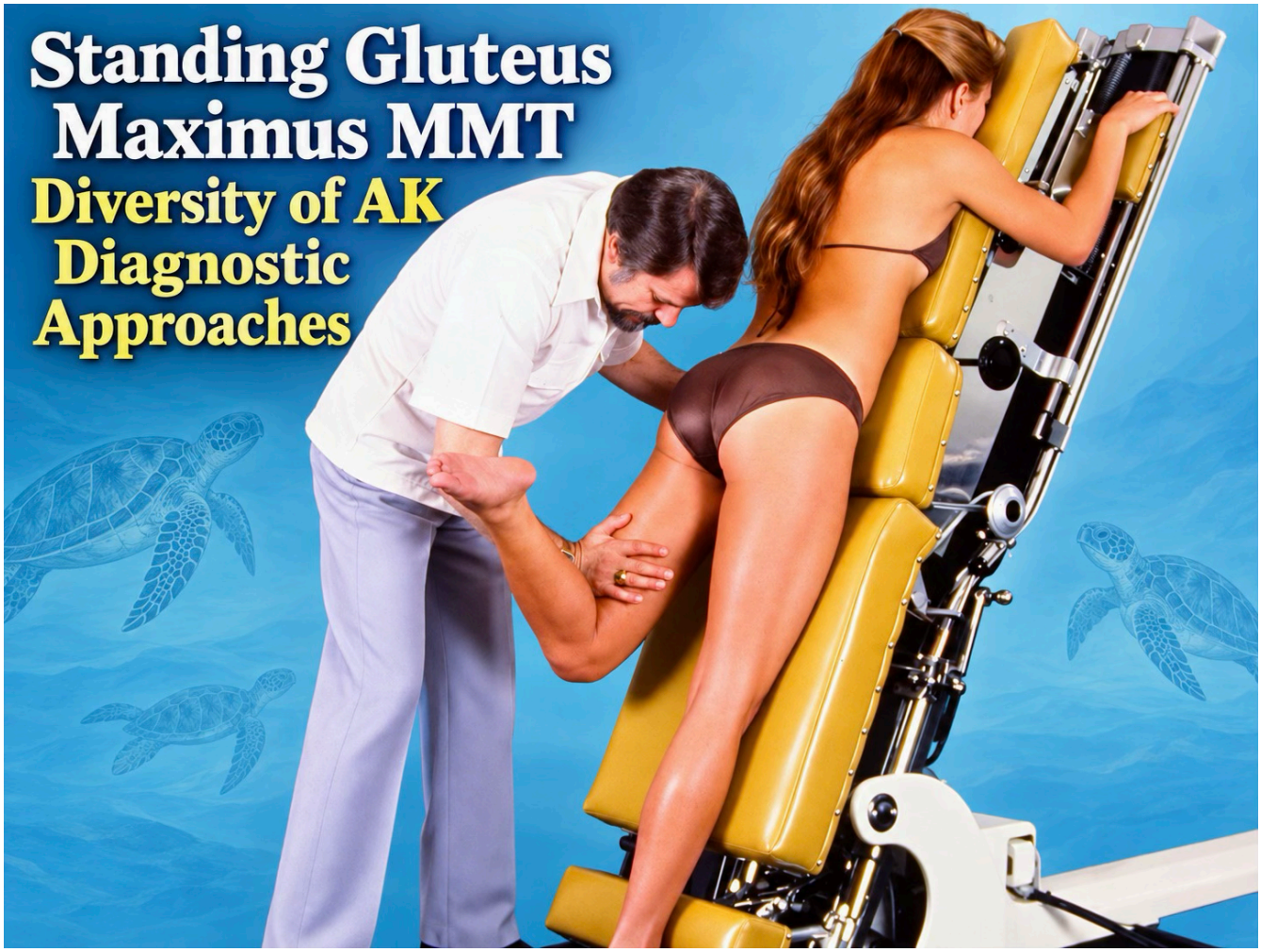


Figure 6: Standing gluteus maximus MMT illustration demonstrating an alternative clinical approach. This figure is presented as an illustrative variation; evidence for one testing configuration should not automatically be generalised to another.



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Reliability evidence for the gluteus maximus MMT

Question	Evidence	What it supports	Important limitation
Inter-rater reliability of standardised hip-extensor MMT:	Perry et al.: 82% agreement; identical grades in 27/31 limbs, remaining grades within one level.	Repeatable clinical finding when testing is standardized.	Study examined hip extensors. (Perry, 2004)
Validity against an objective strength reference:	Manual grades were associated with significant differences in isometric hip-extension torque.	MMT grades have meaningful correspondence with hip-extensor strength.	Torque was for hip extension as a functional muscle group. (Perry, 2004)
AK-style gluteus maximus reliability:	Pollard et al.: two examiners agreed on gluteus maximus strong/weak classification in 75.6% of observations while blinded to the MMT they were performing; kappa values across tested muscles ranged from fair to substantial.	AK-style non-instrumented testing can achieve meaningful examiner agreement.	Agreement was not perfect and the study did not establish diagnostic validity for the presence of low-back pain. (Pollard et al, 2011)
Current AK evidence synthesis:	2025 systematic review: 7 AK-MMT studies; non-challenge MMT showed variable reliability, with gluteus maximus identified among muscles that may have moderate-to-strong reliability.	Supports further clinical use/research of standardized non-challenge AK MMT.	Small evidence base; heterogeneous methods; some studies were low quality. (Soares et al, 2025)
Specificity of the gluteus-maximus test:	Standardized protocols flex the knee to 90° and control hip position to reduce hamstring substitution.	Improves the muscle-specificity of the test.	Hip extension remains a coordinated movement; substitution and pelvic/lumbar motion can alter the result. (Ryan, Bruno, 2024; Pizol et al., 2024)
Clinical usefulness:	MMT is inexpensive, rapid, portable, and can identify gross weakness and change over time; hip-extensor strength is relevant to gait and functional activities.	Useful where instrumentation is unavailable or when screening/clinical examination is the goal.	Powerful tool for measuring the muscle's contribution to proximal leg, hip, low back instability and pain.

Figure 7: Reliability and Validity of the Gluteus Maximus MMT



Validity

Does MMT correspond to actual hip-extensor force?

Reliability alone is insufficient: a test can be reproducible yet fail to measure the construct of interest. The validity question is whether manual grades correspond with objective measures of hip-extensor force.

Perry, Weiss, Burnfield, and Gronley investigated the hip-extensor MMT by comparing manual muscle grades with objectively measured isometric hip-extension torque. Interrater agreement was approximately 82%, and different MMT grades corresponded to significantly different levels

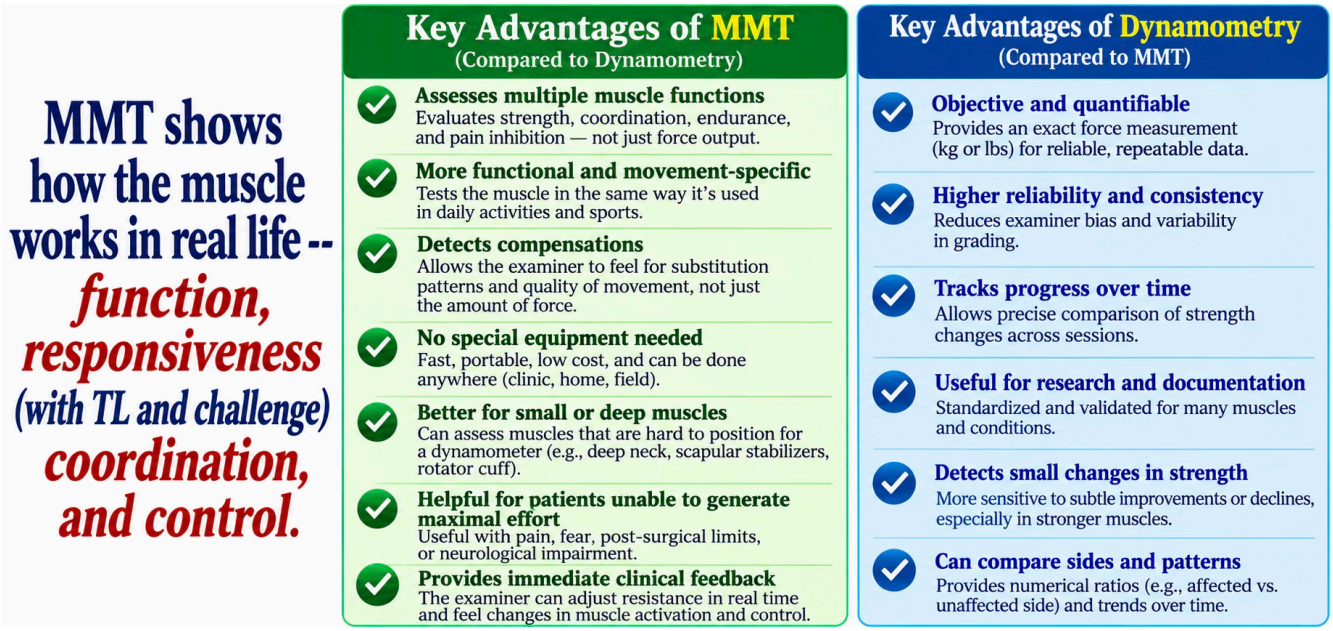
of measured torque. In the pathological group, mean torque was approximately 176 Nm for Grade 5, 103 Nm for Grade 4, 67 Nm for Grade 3, and 19 Nm for Grade 2.

These findings provide evidence of concurrent validity: manual grades were associated with objectively measured differences in hip-extensor force. The findings do not mean that a manual grade is interchangeable with a dynamometer measurement.

MMT is not a dynamometer, and that is no reason to abandon it

A dynamometer provides quantitative force or torque measurements, whereas MMT generally provides a categorical or semi-quantitative assessment of force production. A clinician therefore should not convert an MMT grade into an exact newton-meter value. Instead, MMT should be understood as a standardised clinical assessment of the patient's ability to generate and maintain force under defined conditions.

Table 2: MMT vs. dynamometry

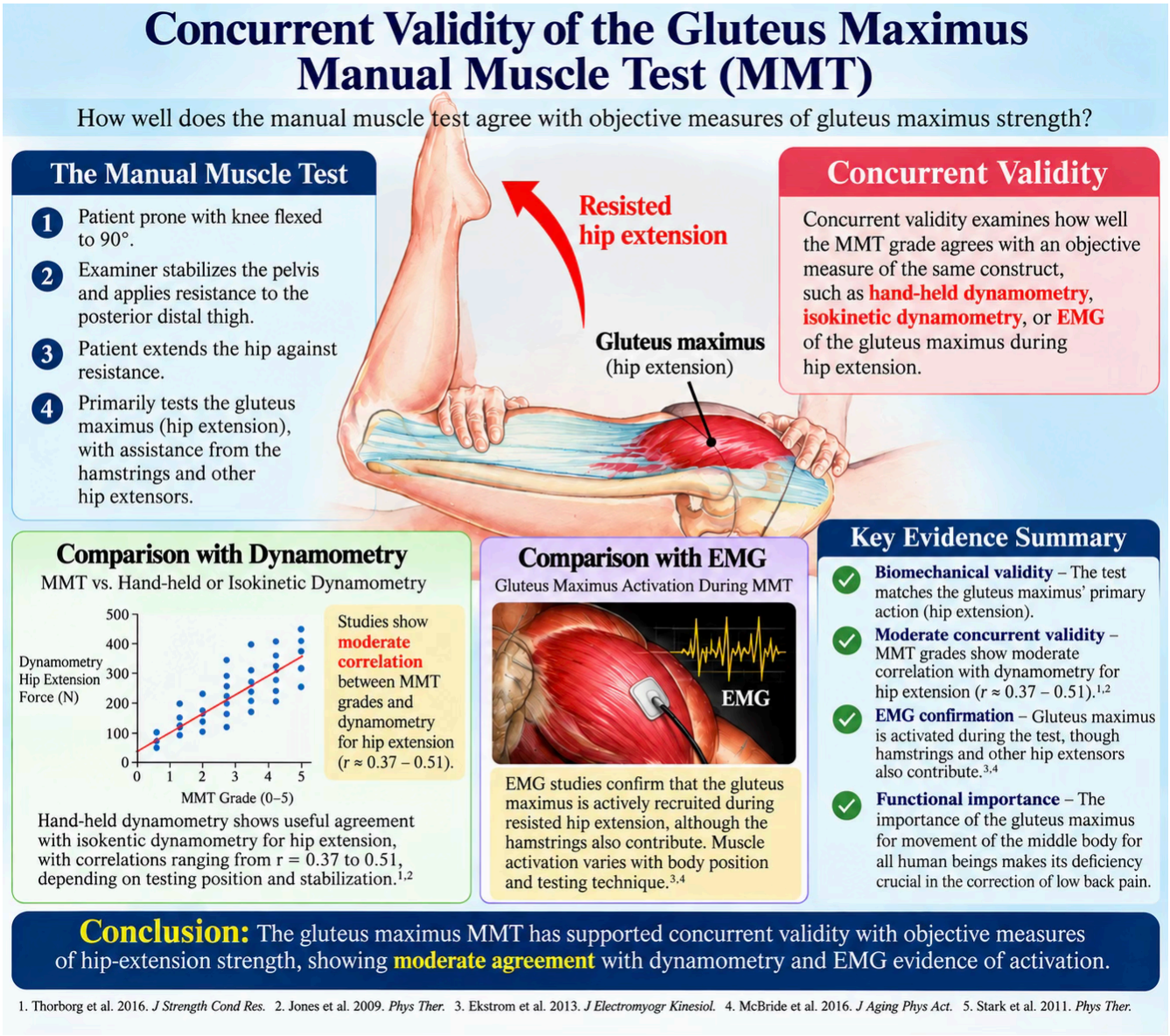


When precise force quantification is required, for research, high-level athletic testing, or detailed rehabilitation monitoring, hand-held or isokinetic dynamometry can add quantitative information. MMT and dynamometry are therefore best viewed as complementary tools.

Pelvic Stabilisation and the problem of substitution

One of the most important features of the gluteus maximus MMT is stabilisation of the pelvis. Without stabilisation, a patient may produce apparent hip extension partly through lumbar extension or pelvic rotation. The examiner must therefore control the pelvis sufficiently to make the test a meaningful assessment of hip-extensor performance.

Figure 8: Dynamometry vs MMT comparison of the Gluteus Maximus Muscle. Concurrent Validity of the Gluteus Maximus MMT



Clinical usefulness

Minimal equipment

A Chiropractor needs an examination table, appropriate patient positioning, knowledge of anatomy and biomechanics, and trained hands.

Rapid assessment

The test can be incorporated into a broader examination in a short period of time.

Repeatability

The procedure can be repeated before and after an intervention or during rehabilitation if the same testing conditions are maintained.

Side-to-side comparison

Comparing the right and left sides can identify clinically meaningful differences in force production.

Functional relevance

Hip extension is fundamental to walking, acceleration, stair climbing, rising from a chair, jumping, running, lifting, and trunk control.

Relationship to Low Back and Lumbopelvic disorders

Many papers throughout the history of modern Chiropractic have observed the correlation of gluteus maximus muscle dysfunction and chronic and acute low back pain. (Triano, Schultz, 1987; Suzuki, Endo, 1983; Alston et al., 1966; Thorstensson, Arvidson 1982) The gluteus maximus should not be regarded as an isolated hip muscle. Its activity occurs within a complex lumbopelvic system involving the lumbar spine, pelvis, hip, knees, hamstrings, abdominal musculature, and other hip musculature. Because of the integrative nature of AK assessment and treatment, its 'open-mindedness', many specific factors have been correlated to many sources of dysfunction in this muscle.

Current literature continues to investigate relationships between hip-extensor performance, gluteus maximus activation, and low back pain. A 2024 systematic review identified differences in hip muscle performance among people with low back pain, while a 2024 study using motion capture and electromyography investigated the clinical utility of prone hip extension testing for motor-control impairments associated with low back pain. (Ryan et al; Perry et al; Puzol et al, 2024) These studies support clinical investigation of hip muscle and its related joint function without establishing MMT as a stand-alone diagnosis of low back pain.

The neuromuscular significance of an inhibited gluteus maximus MMT

An 'inhibited' or weak' gluteus maximus MMT indicates difficulty generating or maintaining force under the conditions of the test. Possible contributors include pain inhibition, local injury, postoperative weakness, disuse, altered motor control, neurological impairment, reduced conditioning, hip pathology, lumbopelvic dysfunction, or other neuromusculoskeletal factors. These are encompassed in the AK model of the '5-factors of the IVF'. (Cuthbert & Goodheart, 2007)

Accordingly, a weak gluteus maximus MMT is a finding, not a diagnosis. The result should guide additional examination rather than replace it. What distinguishes AK is its emphasis upon proprioceptive responses of the muscle rather than the absolute strength of the muscle itself. It essentially sees muscle function as a transcript of the central integrative state of the anterior horn motoneurons, summing all excitatory and inhibitory inputs from the totality of the patient connected to the muscle. The appropriate sequences of testing, therapy localisation, and challenge, to correct the muscle inhibition found in the case of a gluteus maximus malfunction, to assess and to treat each tissue will become second nature for the experienced AK examiner.

> In other words, the locus of dysfunction ultimately rests with the complete nervous system. A procedure called therapy localisation, strictly diagnostic, seeks a change of muscle strength when the patient's hand is placed over an area of suspected involvement. Challenge defines a mechanism to test the body's ability to cope with external stimuli, again assessed by muscle testing.

Challenge is a diagnostic procedure unique to AK that is used to determine the body's ability to cope with external stimuli, which can be physical, chemical, or mental. Cranial challenge (for instance) has been described in the literature of this Journal previously. (Cuthbert) After an external stimulus is applied, muscle-testing procedures are done to determine a change in the muscle strength as a result of the stimulus. Through this approach, ineffective therapies that produced no improvements in muscle strength are rejected and only those that elicit a positive muscle response are used. This guides the treatment given to a patient.

Common errors in gluteus maximus MMT
(Schmitt, Cuthbert, 2008)

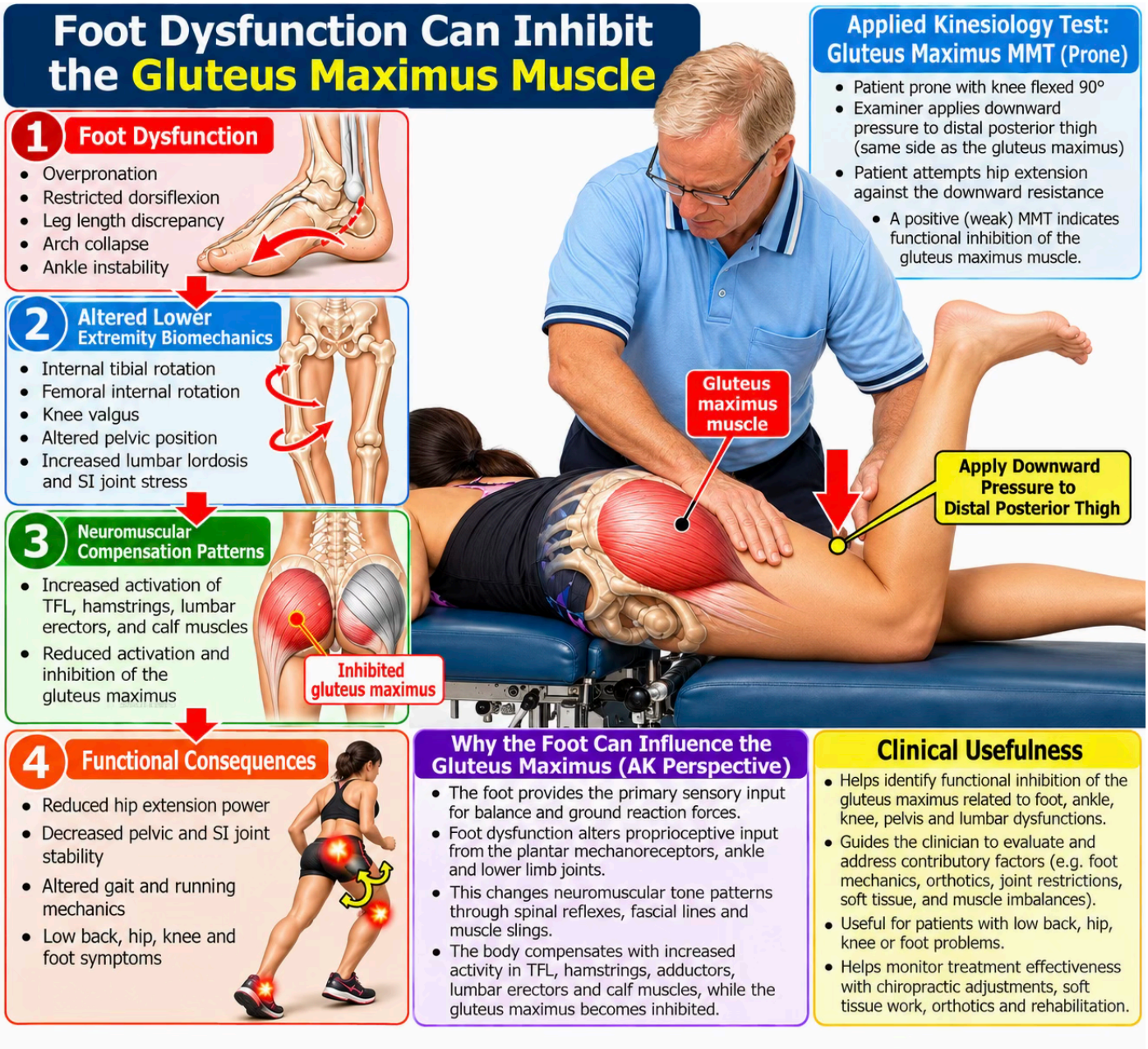
- Inadequate pelvic stabilisation, permitting lumbar extension or pelvic rotation.
- Testing with the knee extended, thereby changing the contribution of the hamstrings.
- Inconsistent resistance magnitude or speed.
- Changing the examiner's contact point and therefore changing the lever arm.
- Inconsistent examiner position or mechanics.
- Testing a general movement rather than a standardised muscle-specific procedure.
- Over-interpreting a weak result as proof of a particular spinal, visceral, nutritional, or systemic disorder.

Finding remote factors of dysfunction and interaction with the gluteus maximus MMT

For example, if foot dysfunction is causing disorganisation to the gluteus maximus muscles they will usually test weak with manual muscle testing when the patient is standing. The primary effect of foot dysfunction is evidenced by the muscles again testing weak immediately after the patient walks. Applied kinesiology techniques are seldom employed in isolation but as part of a process designed to restore maximal pain free movement of articulations, restoration of postural balance, systemic functionality and facilitation of the self-regulatory mechanisms of the body.

Figures 9, 10: Assessing foot subluxations in cases of gluteus maximus muscle inhibition: the obvious importance





The standing gluteus maximus MMT: An alternative clinical approach

The variations of patient positioning for this test shown for far emphasises the diversity of approaches used in Applied Kinesiology and Chiropractic clinical assessment. Such variations may be clinically interesting, but they should not automatically be assumed to possess the same reliability and validity evidence as the standardised prone hip-extension test (Figure 2).

This distinction is especially important in Chiropractic education. The evidence supports teaching a clearly defined, standardised procedure and then separately teaching clinicians how to critically evaluate variations. A test should not acquire the evidence base of another test merely because both are described as ‘gluteus maximus MMT’.

Foot function and its effect on remote structure and function is an excellent example of the body's integration, and how the entire body must be evaluated in order to find the basic underlying cause for many health problems. The major way the foot influences other areas is by way of the nervous system. Proprioceptors in the foot and ankle send organising impulses throughout the body. The role of these functional sensory receptors is to inform the central nervous system about ground reaction forces when the body stands and moves. The bottom of the low back is the feet, as many Chiropractors have declaimed.

Why this essential test belongs in Chiropractic education
(Ebrall, 2026)

A standardised gluteus maximus MMT integrates anatomy, biomechanics, neurological control, stabilisation, examination technique, and functional assessment. It provides a low-cost examination tool that can be incorporated into chiropractic education without requiring specialised equipment.

> The educational objective should not be to teach students that MMT can explain every clinical problem. It should be to teach students that muscle performance is a clinically measurable component of the neuromusculoskeletal system and that the quality of the measurement depends on standardised procedure and disciplined interpretation.

The case for making gluteus maximus MMT a universal Chiropractic skill

Several lines of evidence converge on the clinical usefulness of standardised gluteus maximus MMT. First, inter-examiner studies have demonstrated meaningful agreement. Second, controlled research has demonstrated correspondence between manual hip-extensor grades and objectively measured torque. Third, the 2025 systematic review of AK-MMT identified standard MMT, including gluteus maximus testing as having potentially useful reliability when performed without non-musculoskeletal challenge procedures. Fourth, hip-extensor function has clear relevance to walking, propulsion, lifting, stair climbing, athletic activity, and lumbopelvic function. Finally, the procedure is accessible in virtually every clinical setting and obviously responsive to chiropractic treatments.

For these reasons, standardised gluteus maximus MMT can reasonably be considered a core Chiropractic examination competency. The strongest educational argument is not that MMT replaces other forms of examination, but that every Chiropractor should be capable of performing a reliable, reproducible functional strength assessment with their own hands.

What Chiropractors should - and should not - claim

The MMT can:

- assess force-producing capacity under standardised conditions;

- identify reproducible weakness;
- compare sides;
- contribute to neuromusculoskeletal examination;
- contribute to functional assessment;
- provide a baseline for reassessment; and
- assist rehabilitation monitoring.

The MMT cannot, by itself:

- identify the exact anatomical cause of weakness;
- prove a particular spinal subluxation;
- establish a visceral disorder;
- replace neurological examination;
- replace quantitative dynamometry when precise force measurement is required, or;
- diagnose a complex disorder from a single muscle response.

Conclusion

The gluteus maximus manual muscle test deserves a prominent position in Chiropractic education and clinical practice. The evidence does not support treating MMT as an infallible diagnostic instrument, nor does it support treating every procedure historically described as Applied Kinesiology as equally validated. Contemporary research instead supports a careful distinction between standardised musculoskeletal MMT and procedures involving additional non-musculoskeletal challenges.

What the evidence does support is a practical and scientifically defensible role for standardised gluteus maximus MMT. It can be reproducible, clinically meaningful, inexpensive, rapid, and relevant to hip-extensor function. Inter-examiner studies have demonstrated meaningful agreement; controlled research has demonstrated correspondence between manual grades and objectively measured hip-extension torque; and contemporary systematic-review evidence identifies gluteus maximus among muscles for which standard MMT may demonstrate favourable reliability.

Every Chiropractic student should therefore graduate knowing how to perform this test on the largest muscle in the human body correctly, recognise substitution patterns, document the result, understand what it measures and does not measure, and integrate the finding with the remainder of the patient's neuromusculoskeletal examination.

That is not merely teaching 'muscle testing'. It is teaching competent functional neuromuscular examination.

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References

Cuthbert SC, Goodheart GJ Jr. On the reliability and validity of manual muscle testing: a literature review. Chiropr Osteopat. 2007;15:4. DOI 10.1186/1746-1340-15-4.

Schmitt WH Jr, Cuthbert SC. Common errors and clinical guidelines for manual muscle testing: "the arm test" and other inaccurate procedures. Chiropr Osteopat. 2008;16:16. DOI 10.1186/1746-1340-16-16.

Conroy et al. Kendall's Muscles: Testing and Function with Posture and Pain. Lippincott Williams & Wilkins; 2022.

Ebrall PS. Assessment of Muscle Change. In: Ebrall PS. The Chiropractic subluxation: A pragmatic conversation. XLibris. 2026. pp. 404-15.)

Lieberman et al. The human gluteus maximus and its role in running. J Exp Biol (2006) 209 (11): 2143-2155.

Pollard H, Calder D, Farrar L, Ford M, Melamet A, Cuthbert S. Inter examiner reliability of manual muscle testing of lower limb muscles without the ideomotor effect. Chiropr J Aust. 2011;41(1):23-30.

Perry J, Weiss WB, Burnfield JM, Gronley JK. The supine hip extensor manual muscle test: a reliability and validity study. Arch Phys Med Rehabil. 2004;85(8):1345-1350. DOI 10.1016/j.apmr.2003.09.019.

Soares JR, Stieven FF, Rocha CSDS, Miranda IF. Reliability of Manual Muscle Testing in Applied Kinesiology: A Systematic Review. J Manipulative Physiol Ther. 2025;48(6-9):862-870. DOI 10.1016/j.jmpt.2025.10.007.

Ryan N, Bruno P. The clinical utility of the prone hip extension test in the diagnosis of motor control impairments associated with low back pain: a cross-sectional study using motion capture and electromyography. Clin Biomech. 2024;118:106317.

Pizol GZ et al. Hip biomechanics in patients with low back pain, what do we know? A systematic review. BMC Musculoskelet Disord. 2024.

Perry J, Weiss WB, Burnfield JM, Gronley JK. The supine hip extensor manual muscle test: a reliability and validity study. Archives of Physical Medicine and Rehabilitation. 2004;85(8):1345–1350. DOI 10.1016/j.apmr.2003.09.019. PMID: 15295763.

Soares JR, Stieven FF, Rocha CSS, Miranda IF. Reliability of Manual Muscle Testing in Applied Kinesiology: A Systematic Review. Journal of Manipulative and Physiological Therapeutics. 2025;48(6–9):862–870. DOI 10.1016/j.jmpt.2025.10.007. PMID: 41236460.

Pollard H, Calder D, Farrar L, Ford M, Melamet A, Cuthbert S. Inter examiner reliability of manual muscle testing of lower limb muscles without the ideomotor effect. Chiropractic Journal of Australia. 2011;41(1):23–30.

Cuthbert SC, Goodheart GJ Jr. Common errors and clinical guidelines for manual muscle testing: 'the arm test' and other inaccurate procedures. Chiropractic & Manual Therapies. 2008;16:16. DOI 10.1186/1746-1340-16-16.

Avers D, Brown M. Daniels and Worthingham's Muscle Testing: Techniques of Manual Examination and Performance Testing. 10th ed. Elsevier; 2019.

Bohannon RW. Manual muscle testing: does it meet the standards of an adequate screening test? Clinical Rehabilitation. 2005. DOI 10.1191/0269215505cr873oa. PMID: 16180603.

Lyons K, Perry J, Gronley JK, Barnes L, Antonelli D. Timing and relative intensity of hip extensor and abductor muscle action during level and stair ambulation: an EMG study. Physical Therapy. 1983;63(10):1597–1605. PMID: 6622534.

Selkowitz DM, Beneck GJ, Powers CM. Which exercises target the gluteal muscles while minimizing activation of the tensor fascia lata? Electromyographic analysis of gluteus maximus, gluteus medius, and tensor fascia lata during rehabilitation exercises. Journal of Orthopaedic & Sports Physical Therapy. 2013.

Goodheart, G.J., Jr., "The fixation vertebral pattern," Chiro Econ, Vol 16, No 1 (Jul/Aug 1973).

Triano J, Schultz A: Correlation of objective measure of trunk motion and muscle function with low-back disability ratings. Spine 1987,12:561-5.

Alston W, Carlson KE, Feldman DJ, Grimm Z, Gerontinos E. A quantitative study of muscle factors in the chronic low back syndrome. J Am Geriatr Soc. 1966 Oct;14(10):1041-7.

Thorstensson A, Arvidson A. Trunk muscle strength and low back pain. Scand J Rehabil Med. 1982;14(2):69-75.

Suzuki N, Endo S. A quantitative study of trunk muscle strength and fatigability in the low-back-pain syndrome. Spine. 1983 Jan-Feb;8(1):69-74.

Kang SY, Jeon HS, Kwon O, Cynn HS, Choi B. Activation of the gluteus maximus and hamstring muscles during prone hip extension with knee flexion in three hip abduction positions. Manual Therapy. 2013;18(4):303–307. DOI 10.1016/j.math.2012.11.006. PMID: 23312068.

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