

Chiropractic Management of Spine Injuries in Sports

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Muscle Strains and Ligament Sprains

Muscle strains and Ligament sprains are the most common injuries that cause back pain in the young athlete. They can be caused by athletic overuse, improper body mechanics and technique, lack of proper conditioning, insufficient stretching, as well as trauma. The athlete will complain of back pain with activity and will feel relief with rest.

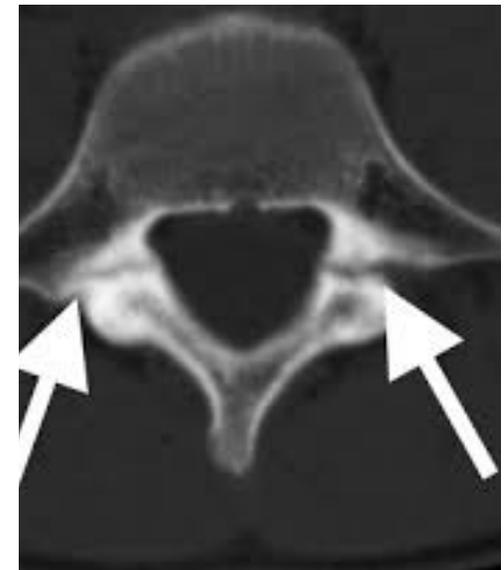
Most common treatments

....for injury not necessarily function

- Rest, Ice, heat
- Motion
- NSAIDs
- Pain medication (sparingly)

Accompanied conditions

- Pars fractures
- Spondylolysis
- Spondylolisthesis
- Stress fractures
- Functional consideration:
Reflex inhibition



Article Information

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This article is part of the following special collection(s): [Literature and Narrative Reviews](#), [Lumbar & Thoracic Spine](#), [Sports and Spine](#)

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114 articles were reviewed for reporting of Pars Interarticulars diagnosis.

cricket (31.97%)
baseball/softball (26.91%)
rugby (22.22%)
weightlifting (19.49%)
sailing (17.18%)
table tennis (15.63%)
wrestling (14.74%)

Only 5 studies reported the management instituted for their participants, and these were all case reports. Of 74 players with spondylolysis in these studies:

70 (94.59%) underwent conservative treatment

4 (5.41%) underwent surgical treatment

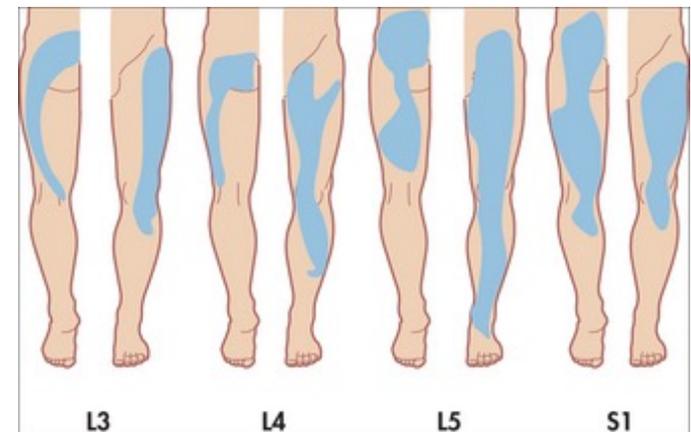
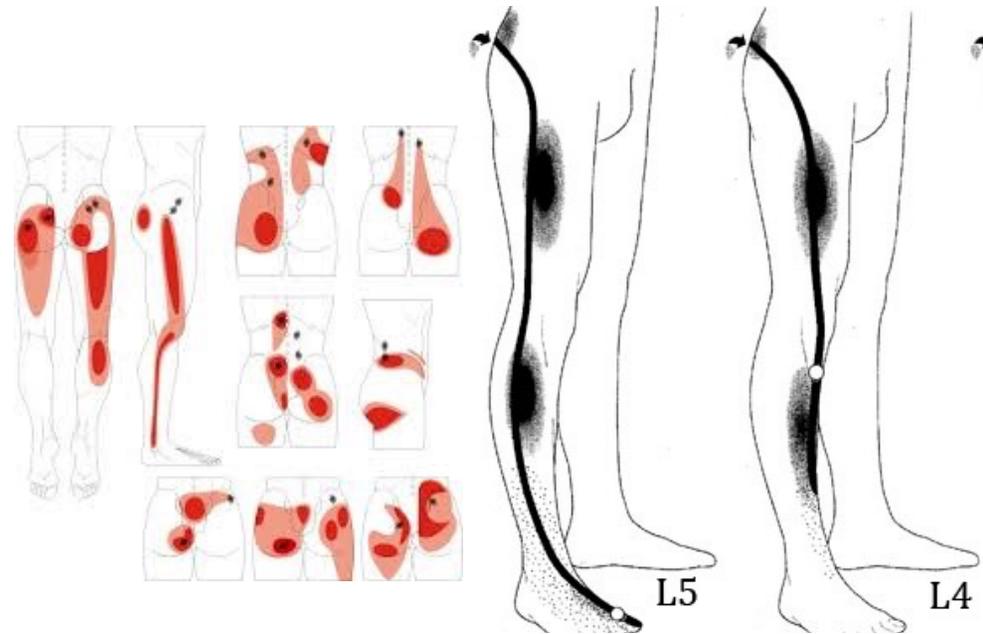
61 (82.43%) returned to their previous level of play

6 (8.11%) retired

Disposition of the final 7 was not reported.

Accompanied conditions

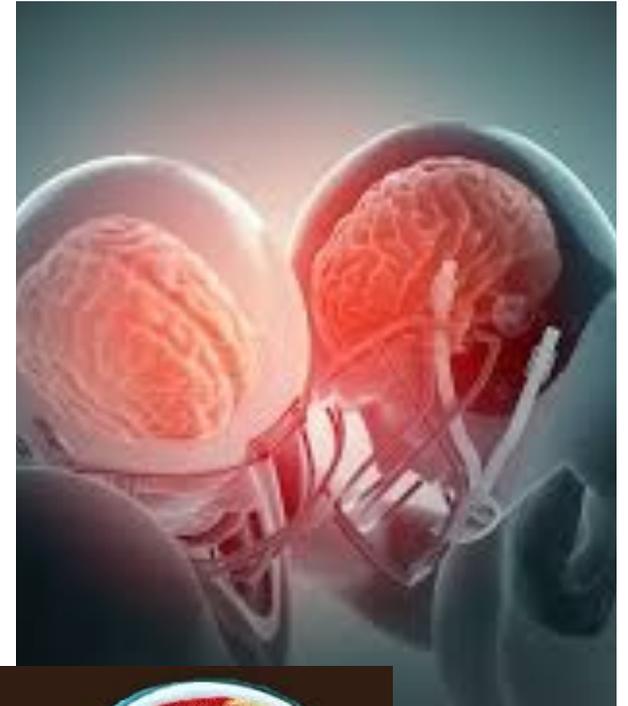
- Disc herniations: local, referred pains.
- Radiating with nerves root insult and inflammation. Motor, reflex and sensory changes with compression.
- Facet mediated pain.
- Functional consideration: Myofascial referred pains. Pseudo sciatica.



Patients may present with a specific spinal condition but the entire body was subjected to trauma. Dysfunction of one part can affect function of the whole.

Accompanied conditions

- CONCUSSION
- Fatigue
- Comprehension
- Coordination
- Functional consideration:
reduced response to
command



Review Article

Kinetic Chain Rehabilitation: A Theoretical Framework

Aaron Sciascia and Robin Cromwell

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Correspondence should be addressed to Aaron Sciascia, ascia@lexclin.com Received 15 September 2011; Accepted 7 March 2012

Academic Editor: Gu'ıl Baltacı

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• What phase is your patient?

- **Acute: Protection, diagnosis, symptom relief, healing.**

- CHIROPRACTIC TECHNIQUES

- **Recovery: Muscle re-education, soft tissue mobility.**

- CHIROPRACTIC TECHNIQUES

- **Functional: Strengthening, coordination, integrative movements.**

- CHIROPRACTIC TECHNIQUES

The stabilizing system of the spine. Part I. Function, dysfunction, adaptation, and enhancement.

Panjabi MM1.

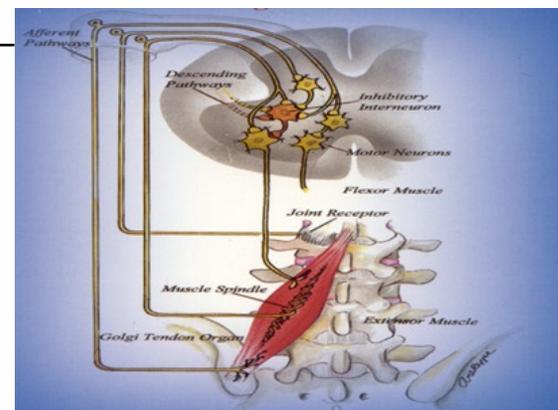
Author information

Abstract

Presented here is the conceptual basis for the assertion that the spinal stabilizing system consists of three subsystems. The vertebrae, discs, and ligaments constitute the passive subsystem. All muscles and tendons surrounding the spinal column that can apply forces to the spinal column constitute the active subsystem. The nerves and central nervous system comprise the neural subsystem, which determines the requirements for spinal stability by monitoring the various transducer signals, and directs the active subsystem to provide the needed stability. A dysfunction of a component of any one of the subsystems may lead to one or more of the following three possibilities: (a) an immediate response from other subsystems to successfully compensate, (b) a long-term adaptation response of one or more subsystems, and (c) an injury to one or more components of any subsystem. It is conceptualized that the first response results in normal function, the second results in normal function but with an altered spinal stabilizing system, and the third leads to overall system dysfunction, producing, for example, low back pain. In situations where additional loads or complex postures are anticipated, the neural control unit may alter the muscle recruitment strategy, with the temporary goal of enhancing the spine stability beyond the normal requirements.

• SUBSYSTEMS FOR SPINAL STABILITY

- Surgeons — — Passive: disc and ligaments
- PT — — Active: muscles and tendons
- Chiro — — Neural: determines requirements for stability by monitoring various transducers signals and directs the active subsystem to successfully compensate.
- GOAL: restore and integrate basic sensory, motor and reflex function.



Chiropractor: Bio IT Hacker

- Injury leading to corrupted programming
- Aberrant input = Aberrant output
- Local and global affect of injury (micro and macro)
- Neurovascular decongestion
- Sensorimotor re-education
- Perpetuation
- Observation

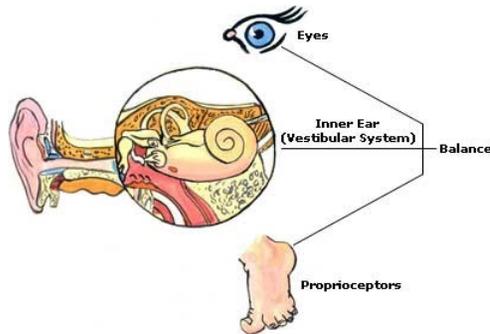
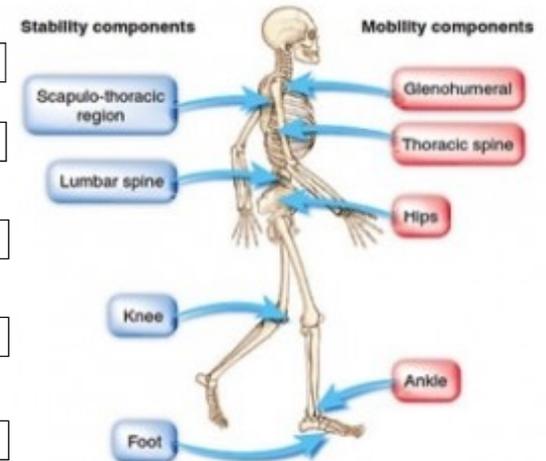
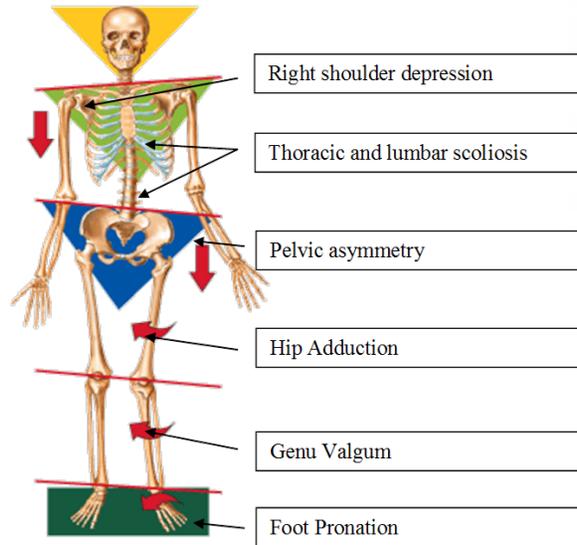
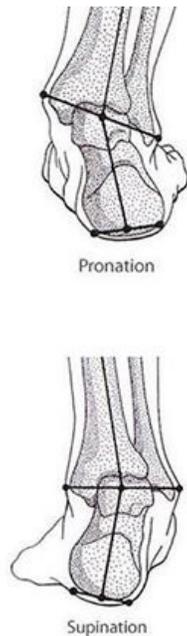
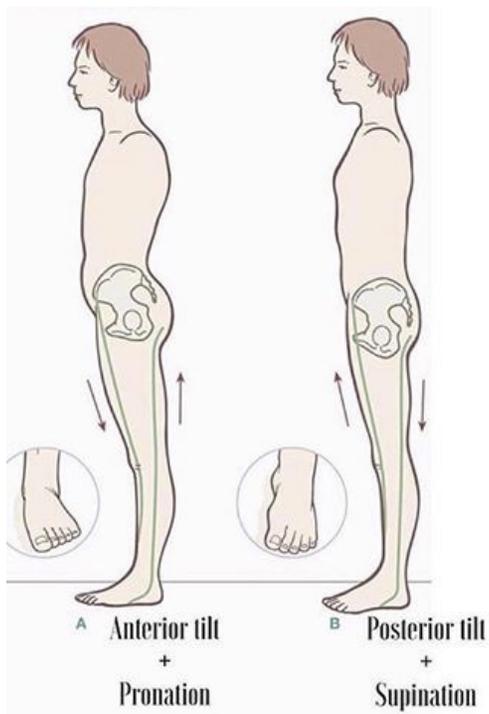


Functional Diagnosis: “somatic dysfunction”

Impaired or altered function of related components of the somatic (body framework) system: skeletal, arthroidal, and myofascial structures and related vascular, lymphatic and neural elements.”

Osteopathic Principles, 1981

Hidden functional pathology may have global affects hindering recovery or causing recurrent injuries



Controlling Posture and Vergence Eye Movements in Quiet Stance: Effects of Thin Plantar Inserts

A. Foisy, C. Gaertner, E. Matheron, Z. Kapoula Published: December 4, 2015, <https://doi.org/10.1371/journal.pone.0143693>

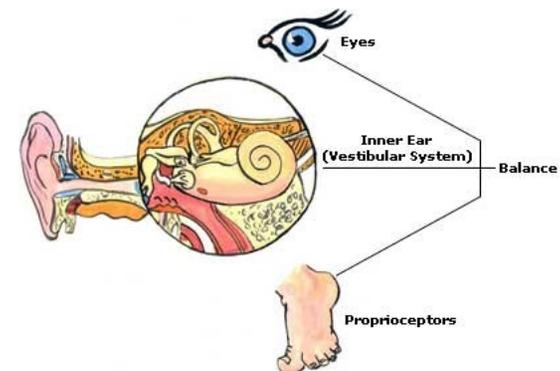
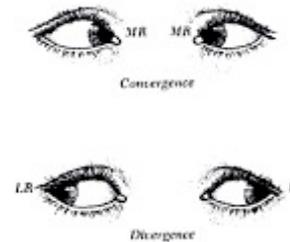


According to Roll and Roll [1, 2], some muscular groups have a synergic functioning:

The invertors muscles and the ipsilateral convergence muscles seem to work together, and conversely for the evertors and divergence muscles. As the stimulation of the medial part of the foot sole favors inversion, and eversion for the lateral part.

Balance: bottom up, head, position, eyes, ears. Visual, vestibular, somatosensory input. Conflict between two systems causes imbalance.

TERMINOLOGY: VERGENCE



How to diagnose cervicogenic dizziness

[Arch Physiother](#). 2017; 7: 12.

Published online 2017 Sep 12. doi: [10.1186/s40945-017-0040-x](https://doi.org/10.1186/s40945-017-0040-x), [Frank M. Vickory](#), [Sarah E. Funderburg](#), [Rachel A. Cesario](#), and [Richard A. Clendaniel](#)

[Author information](#) [Article notes](#) [Copyright and License information](#) [Disclaimer](#)

[Vestibulospinal reactions in cervicogenic disequilibrium. Cervicogenic imbalance].

[Article in German]

[Hülse M](#)¹, [Hölzl M](#).

Author information 1Abteilung für Phoniatrie, Pädaudiologie und Neurootologie, Universitäts-HNO-Klinik Mannheim.

[HNO](#). 2000 Apr;48(4):295-301.

In 67 patients in which cervical imbalance was suspected the vestibulospinal reactions were monitored directly before and after manual therapy of the cervical spine.

The cranio-corpo-graphie (CCG) and the posturography were used to monitor the results.

A highly significant improvement of pathological vestibulospinal reactions was seen after chiropractic manipulation of the spine.

These results show that a functional disorder of the cervical vertebrae influences the vestibulospinal reactions.

The pathological deficit of the vestibulospinal reactions is not solely a phenomenon of peripheric labyrinth malfunction, failure in the brainstem or in the area of the cerebellum ("brain stem staggering"), but can also be viewed nearly regularly by cervical disturbance of the equilibrium.

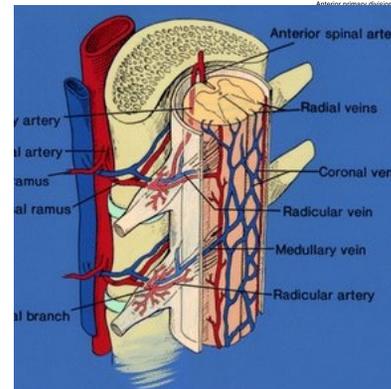
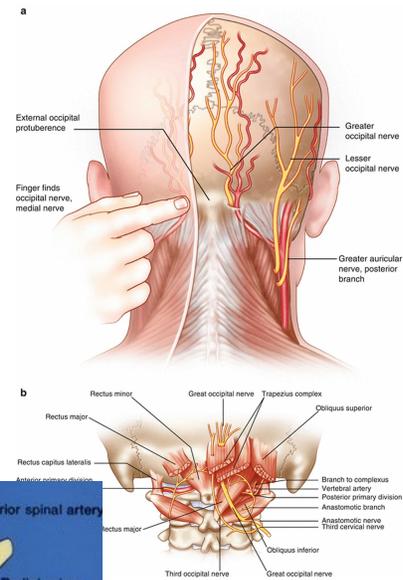
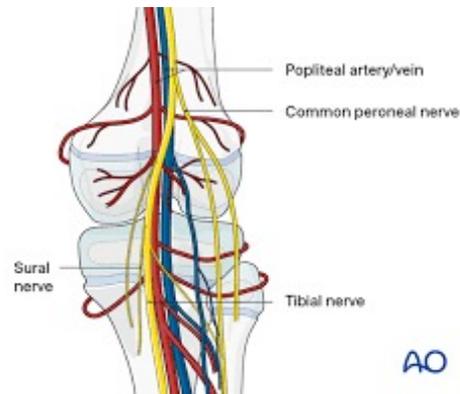
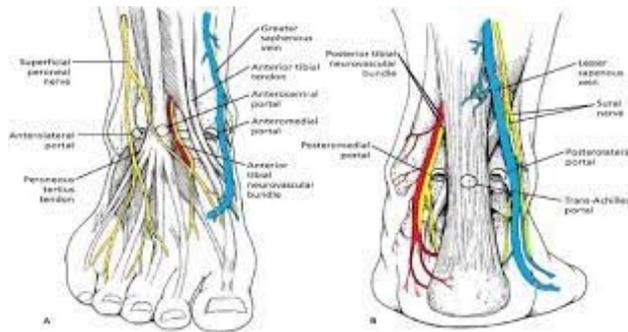
The results of the treatment can be observed within a few hours.

PMID: 10810676

[Indexed for MEDLINE]

THERE ARE VARIUS TECHNIQUES OF SPINAL MANIPULATION, NOT ALL ARE GRADE 5 MANIPULATIONS

Neurovascular Decongestion

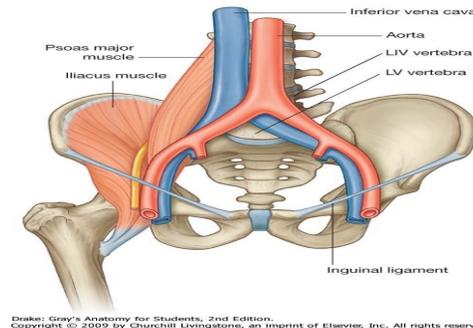
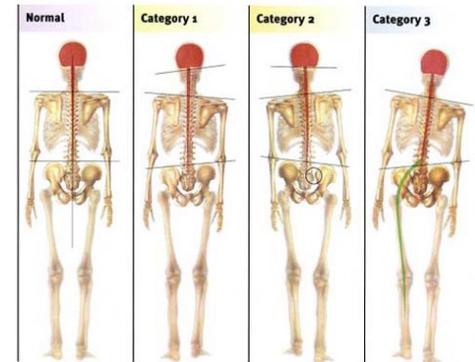


- Nutrient
- Eliminate waste
- Stimulus

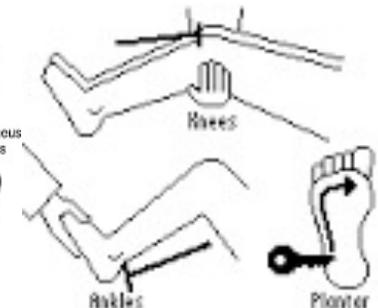
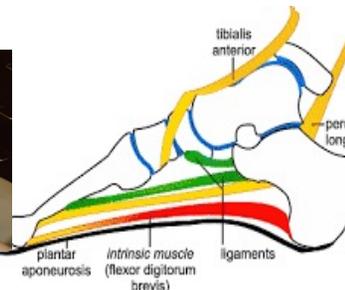
S.O.T. Blocking

Sensorimotor reintegration

- Passive body position
- Wedges used to align pelvis
- AP mobilization of pelvis
- Manually position longitudinal arch
- Medial to lateral knee mobilization
- Stimulate plantar and deep tendon reflexes
- Stimulate eye convergence and EOM.
- Mobilization of the shoulders and clavicles

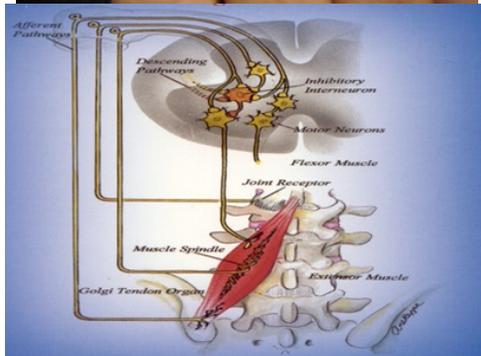
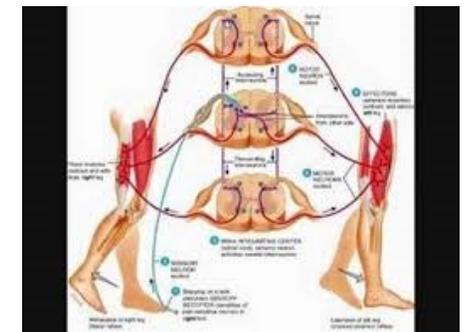
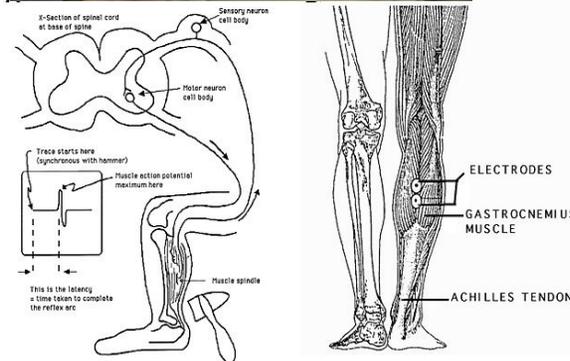


Drake: Gray's Anatomy for Students, 2nd Edition. Copyright © 2009 by Churchill Livingstone, an imprint of Elsevier, Inc. All rights reserved.



Joint integration technique for reflex inhibition

Reflex Inhibition: mechanoreceptor sensory overload inhibits reflex responsiveness
Sensorimotor reintegration



Treatment Protocol

- Initial treatment schedule 2-3 visits / wk for 2 weeks.
- Home exercise to reinforce in office responses to Tx.
- Patient assessed each visit for pain and function.
- Techniques applied are specific to findings on each visit.
- GOAL: restore basic function for PT reinforcement
Strength, Endurance, Education, ROM (STEER).

Thank you!

J Spinal Disord. 1992 Dec;5(4):383-9; discussion 397.

The stabilizing system of the spine. Part I. Function, dysfunction, adaptation, and enhancement.

[Panjabi MM](#)1.

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An Exploration of Zink's Common Compensatory Pattern: Comparing Myofascial Restrictions to Segmental Spinal Somatic Dysfunctions: A Retrospective Study. Sanchez, Brohard and Thai. AAO Journal. Vol 28, Number 4. December 2018.

- Kinetic Chains: Sequenced physiological activations in the upper and lower extremity resulting in an integrated biomechanical task. (*coordinated movement*)
- Anatomy Trains: direct fascial connections between adjacent muscular structures taking part in the transfer of energy. (*strength and endurance*)

The stabilizing system of the spine. Part I. Function, dysfunction, adaptation, and enhancement.

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A dysfunction of a component of any one of the subsystems may lead to one or more of the following three possibilities:

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The third leads to overall system dysfunction, producing, for example, low back pain.

In situations where additional loads or complex postures are anticipated, the neural control unit may alter the muscle recruitment strategy, with the temporary goal of enhancing the spine stability beyond the normal requirements.

Core Stability

- Stabilizes axial skeleton allowing transfer of energy to distal body parts and minimizes joint load.
- Global core muscles: generate power/stability- gluteals, erector spinae, abdominal mm.
- Local core muscles: segmentally stabilize spine - multifidus, transverse abdominus.
- Supplementary core muscles: Quadratus lumborum, remaining abdominal, latissimus mm.

Novel Award 2000 Paper

www.elsevier.com/locate/clinbiomech

The effect of changes in foot sensation on plantar pressure and muscle activity

The central nervous system (CNS) relies on sensory input from muscle and cutaneous receptors in the lower extremities to generate

Matthew A. Nurse*, Benno M. Nigg

effective motor patterns for human posture and locomotion. Feedback originating from these receptors provides a constant source of information regarding

Human Performance Laboratory, Faculty of Kinesiology, University of Calgary, 2500 University Dr. NW, Calgary Alta., Canada

T2N 1N4

loading, joint kinematics, and pressure distribution on the plantar surface of the foot.

Received 1 November 2000; received in revised form 1 April 2001; accepted 1 July 2001

Recently, the effects of cutaneous input on human gait kinematics have received more attention. **Correlations have been made between the resultant changes in muscle activity and gait kinematics following cutaneous nerve stimulation [8].**

Location specific information from various cutaneous foot receptors also differentially affected muscle activity and gait kinematics [4]. However, the role of cutaneous afferent input is typically determined by increasing sensory signals with rapid stimulation of nerves that innervate different areas of the foot.

The purpose of this experiment was to examine whether changes in plantar pressure and muscle activation patterns could be induced by altering the sensory input to the foot. In general, it was found that the **loading underfoot shifted away from insensate areas towards areas of higher sensitivity during gait.**

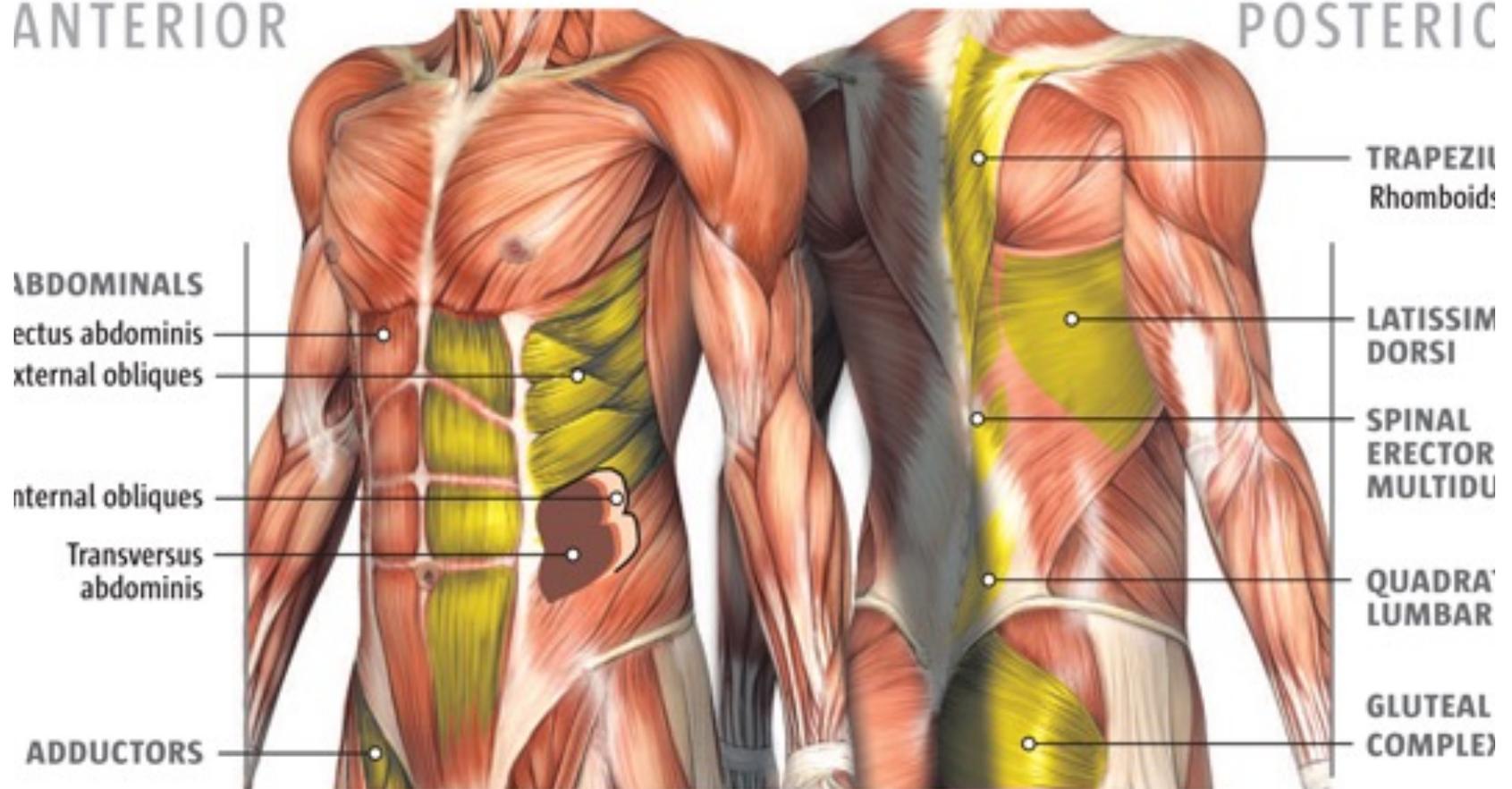
Core connections

Core refers to any muscle that attaches to the spinal column or the pelvis, which means that back pain can be from an imbalance or injury to any of these muscle groups.

 Muscles affected

ANTERIOR

POSTERIOR



Notes: "Core Advantage: Core Strength for Cycling's Winning Edge,"
from Danielson and Allison Westfahl; images from iStock.com

The Denver

Functional Assessment and Treatment Goals

- FUNCTIONAL ASSESSMENT
- Site of injury and dysfunction (stability)
- Orthopaedic and Neurological signs
- Associated systems requiring treatment to support normal function of the injured site.
- GOAL: Restoration of sensory, motor and reflex responses locally then reintegrated them globally.

Accompanied conditions

- Scheuermann's Kyphosis
- POSTURAL DISTORTIONS

