

Assessment of stresses in the cervical spine caused by posture and position of the head.

Surg Technol Int. 2014 Nov;25:277-9.

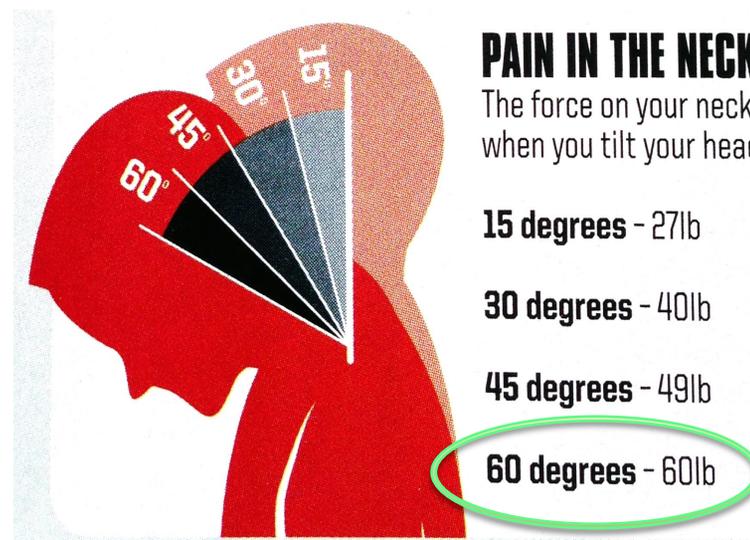
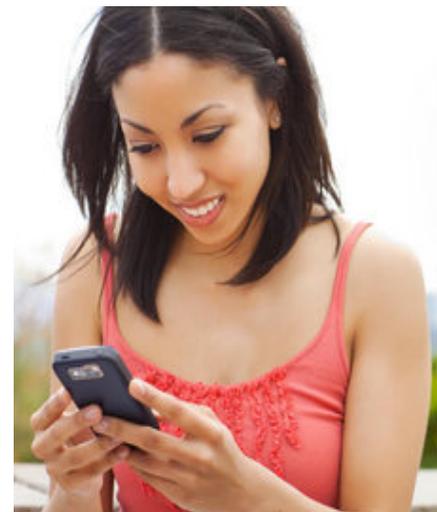
Hansraj KK1.

Abstract

Preamble. Billions of people are using cell phone devices on the planet, essentially in poor posture. The purpose of this study is to assess the forces incrementally seen by the cervical spine as the head is tilted forward, into worsening posture. This data is also necessary for cervical spine surgeons to understand in the reconstruction of the neck.

Conclusions:

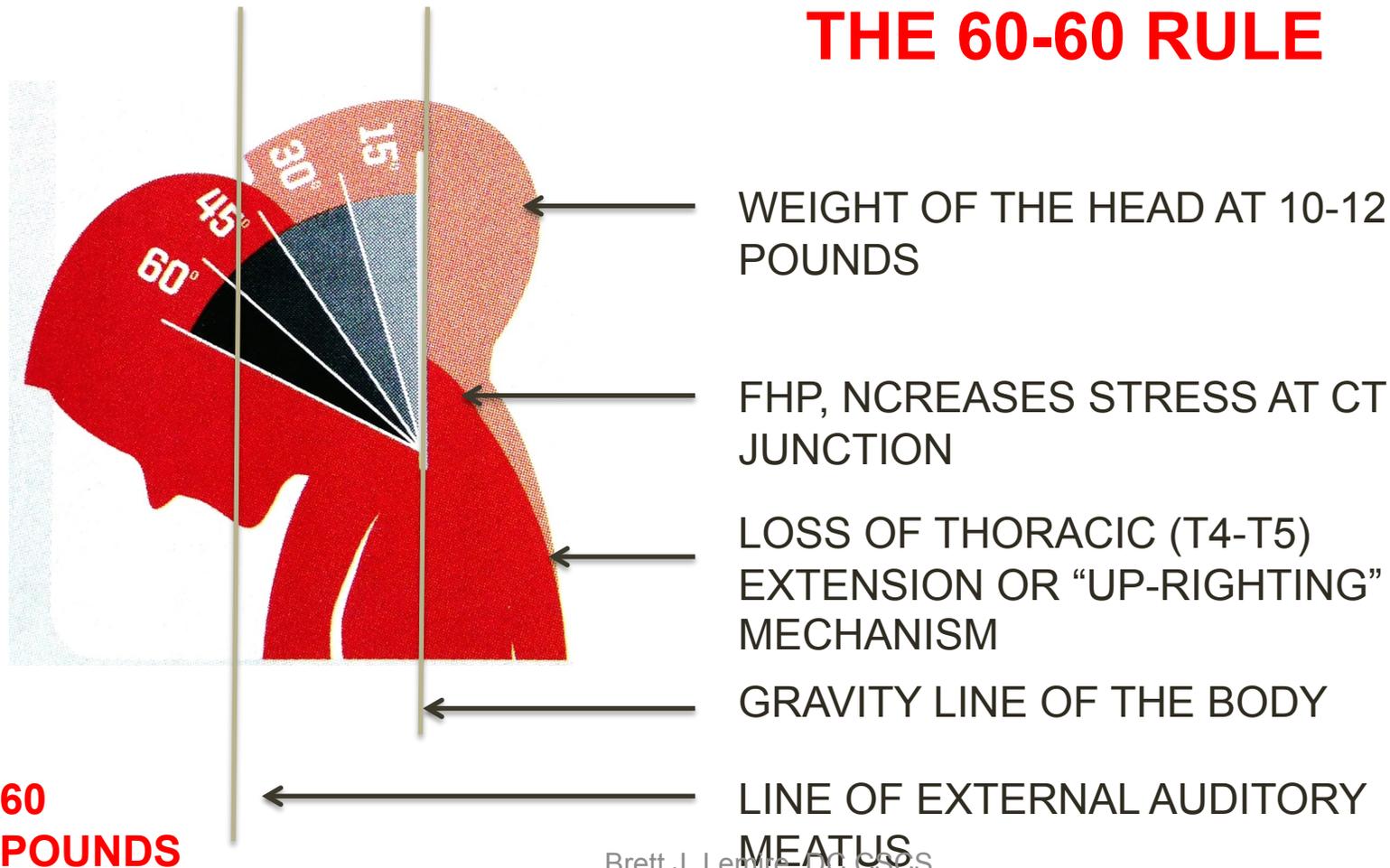
In his study, Hansraj calculated how stressful varying degrees of curvature would be on a person's spine. At zero degrees of forward tilt, the resting pressure is equal to the weight of the person's head: roughly 10 to 12 pounds. **But for each 15 degrees of tilt, the pressure increases. At 15 degrees, a person feels 27 pounds of pressure; at 30 degrees, it ups to 40 pounds; at 45 degrees, 49 pounds; and at 60 degrees, a person should feel roughly 60 pounds of force on the spine.**



FORWARD HEAD POSTURE - FUN+KIN

Clinical Pearl – Be able to identify the posture, explain the loads on the spine & have some CES for the patient in your treatment plan!

THE 60-60 RULE



Brett J. Lemire, DC CES



TEACHING AWARENESS

A NASA life scientist's plan for living health, youth, and energy through natural everyday movement ... without going to the gym

Sitting Kills

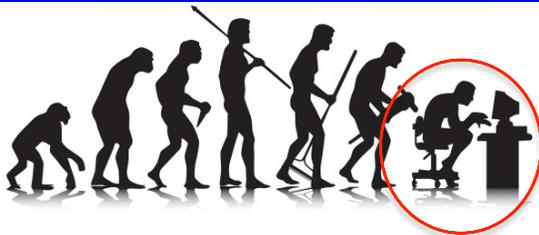


Moving Heals

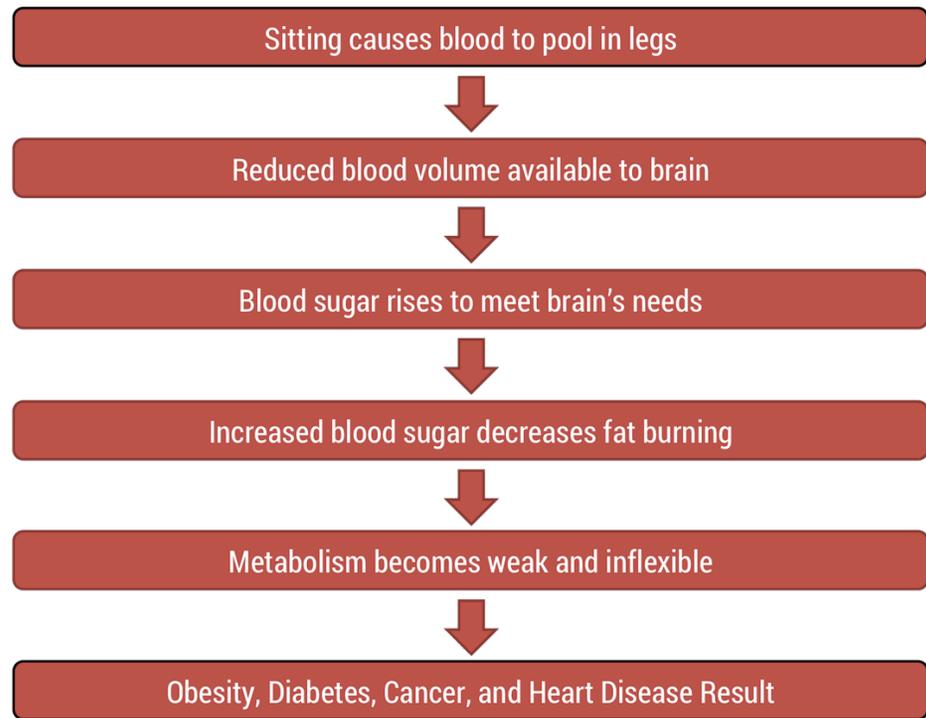
How Simple Everyday Movement Will Prevent Pain, Illness, and Early Death — and Exercise Alone Won't

JOAN VERNIKOS, Ph.D.

former Director of NASA's Life Sciences Division



EXACTLY HOW SITTING KILLS PEOPLE



Brett J. Lemire, DC CSCS



TEACHING AWARENESS

Sitting Hurts

2X Greater Risk Of Diabetes

90% Greater Risk Of Cardiovascular Disease

49% Greater Risk Of All-Cause Mortality

Sources:
Katmarzyk BMJ Open, 2012
Wilmot, Diabetologia, 2012

CHIROPRACTIC NEUROSCIENCE CURRENT RESEARCH





SPINAL ADJUSTIVE CARE – **SAFETY PIN-CYCLE**



Brain→Body

**ARE YOU
CONNECTED?**

Ask your chiropractor

appointments@chiro.org.uk • www.chiro.org.uk

THE SAFETY PIN CYCLE

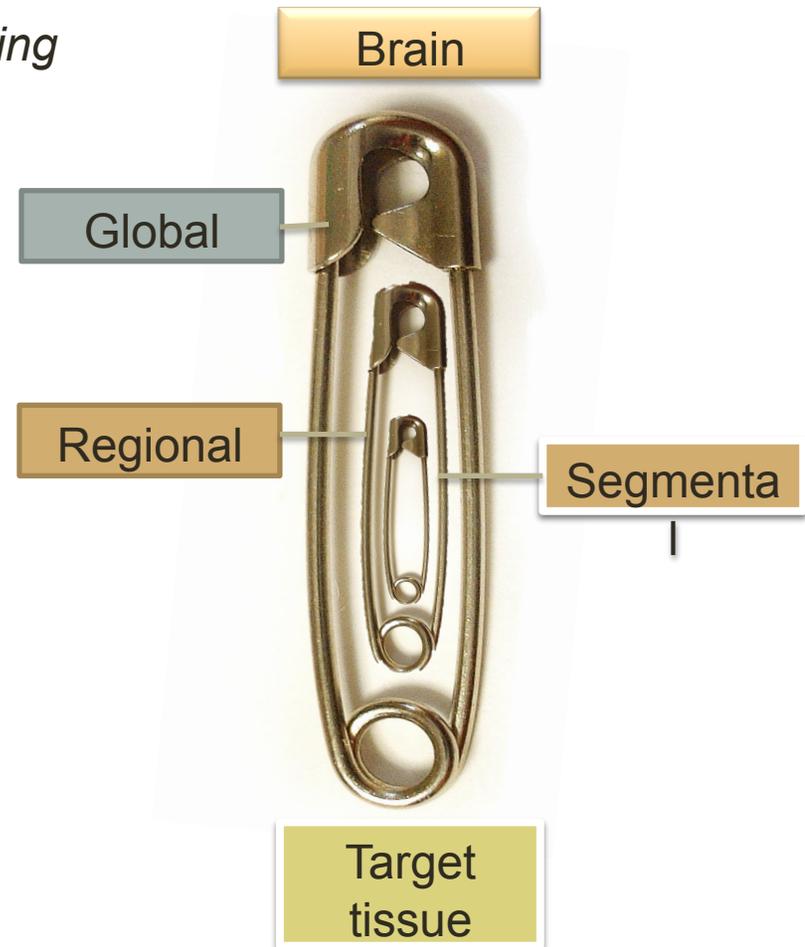
Life begins in the
Brain and is sent to
the body via the
Nerves, the Body sends
messages back to the
Brain, a free flow of
this communication is
required for Normal
Coordination & Health.

THE NORMAL COMPLETE CYCLE

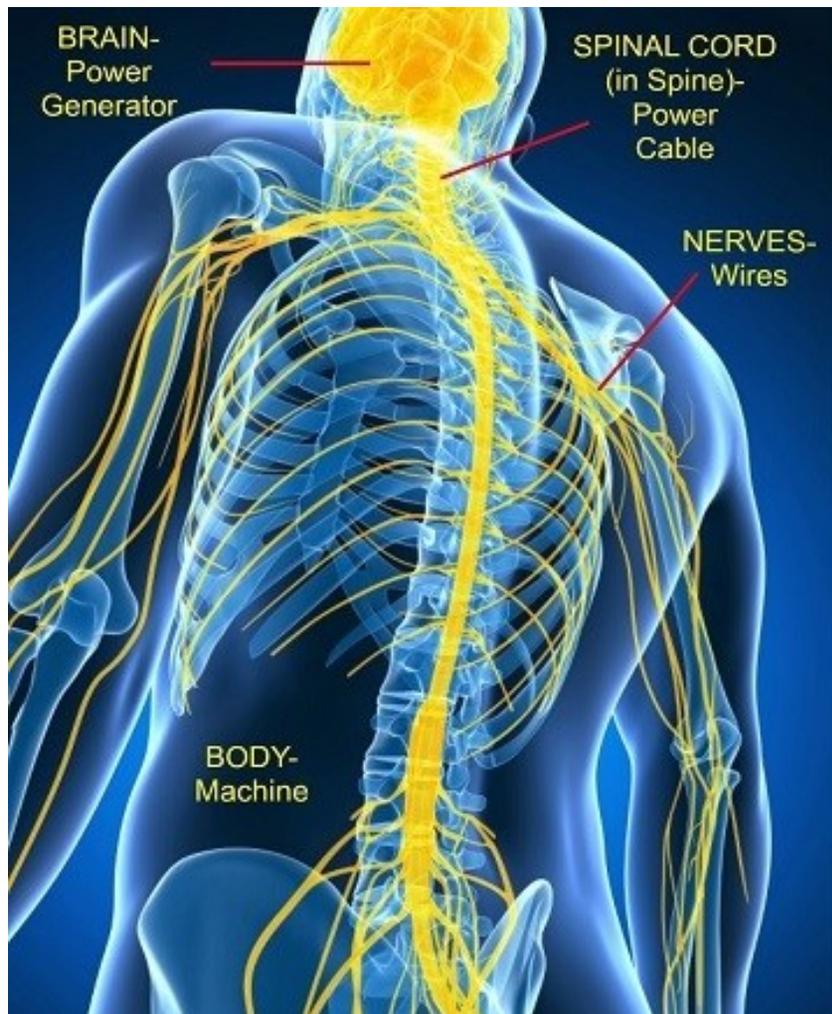


SPINAL ADJUSTIVE CARE - 3-LEVELS OF THE SAFETY PIN- CYCLE

*“Is our program of chiropractic care closing
the Safety-Pin Cycle on all 3 levels?”*



SIMPLE MESSAGE



Malfunction in the Power Generator, Cable or Wires, will lead to malfunction in the Machine.

The same goes for your BODY.

Take care of your Nervous System and Spine.

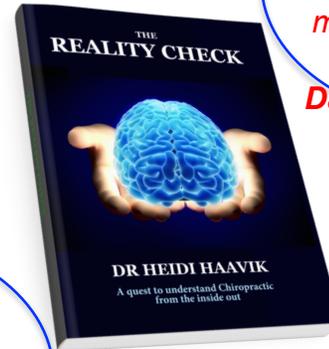
Chiropractic specializes in maintaining the Nervous System & Spine.



THE BOOK– REALITY CHECK



Heidi Haavik, DC
PhD



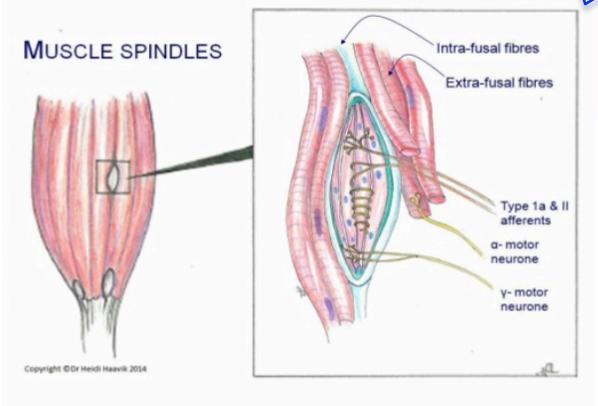
According to Dr. H. –
Spinal adjustments are felt by paraspinal muscles, and are fed to the brain.
Data for Sensori-motor integration

According to Dr. H. –
“muscle spindles function as your brains eyes within a muscle”
Proprioception

A subluxation is.....
“a central segmental motor control problem”

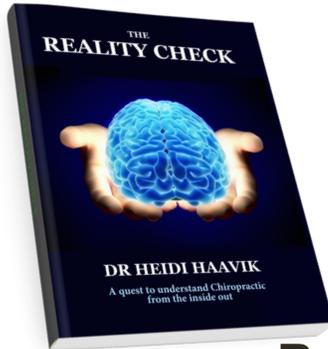
Which means that the *central nervous system* is not
controlling the movement pattern of the spinal segment as it should, which alters the stretching of the paraspinal muscles which changes the input to the
brain which impacts how it processes other
information

Brett J. Lemire, DC CSCS





REALITY CHECK



Pg. 17

Brain fills in the gaps and/or alters your reality based on past expectations, surrounding information and intentions.

READ

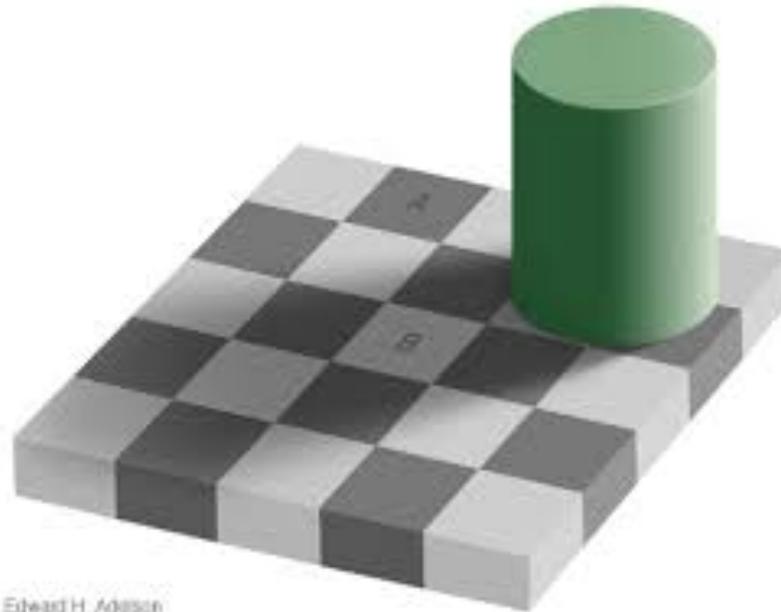
“Ceoinsdr the anmzaig pweor of the hmuan biran. It dseno’t metatr in waht oredr the lrttees in a wrod are, the olny tihng taht is iproamtnt is the frsit and lsat ltetres are in the rghit pclae. The rset can be a tatol mses and you can sitll raed it wuhotit a plboerm.



Heidi Haavik, DC
PhD



THE DIFFERENCE BETWEEN SQUARE A & B

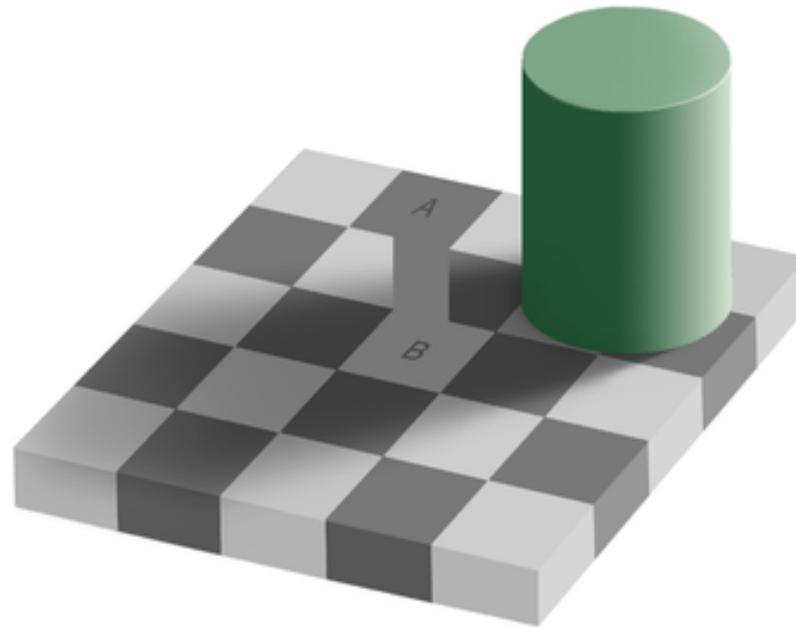


Edward H. Adelson

WHICH SQUARE IS DARKER?



THE DIFFERENCE BETWEEN SQUARE A & B



THINK AGAIN



2017 RESEARCH



*brain
sciences*

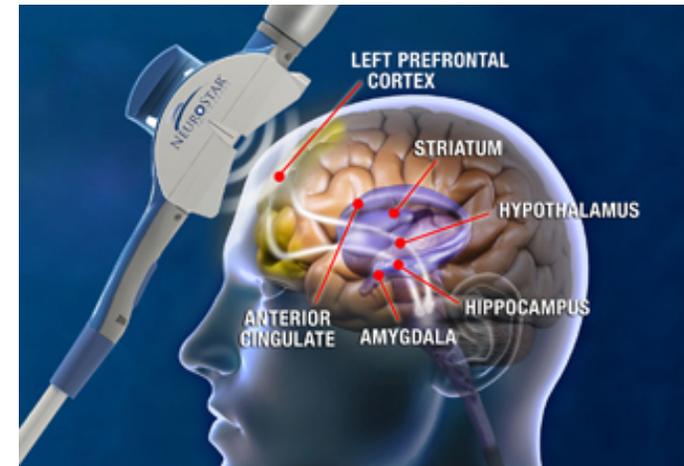
Brain Sci. 2017, 7(1), 2; Impact of Spinal Manipulation on Cortical Drive to Upper and Lower Limb Muscles

H Haavik, I Khan Niazi, M Jochumsen, D Sherwin, S Flavel, KTürker

“We used transcranial magnetic brain stimulation and tested the muscle responses with increasing brain stimulations,” says lead author Heidi Haavik (PhD, DC).

“We also tested spinal cord excitability to the same muscles using a method called F waves.

One other thing we measured in this study was a type of brain measure that we know is 100% happening in the brain (and not the spinal cord) called a Movement Related Cortical Potential (MRCP).”



Transcranial Magnetic Stimulation

TMS & rTMS:
Single pulses or repetitive weak pulses are used to observe which functions are disrupted or facilitated on certain locations of the cortex.





Brain Sci. 2017, 7(1), 2; Impact of Spinal Manipulation on Cortical Drive to Upper and Lower Limb Muscles

H Haavik, I Khan Niazi, M Jochumsen, D Sherwin, S Flavel, KTürker

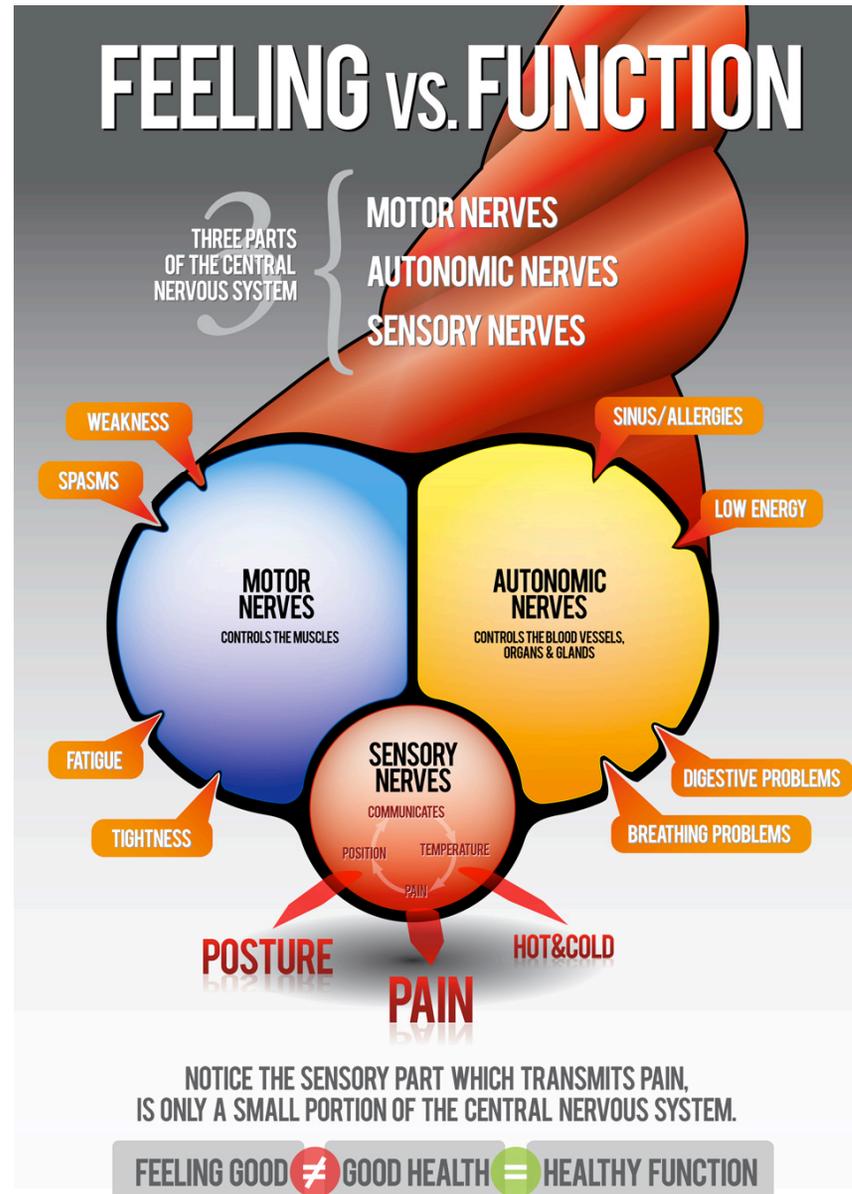
THE SCOOP!

The results of their study showed large changes in the maximum output of the muscle after an adjustment session when they stimulated over the brain, with no changes in the spinal cord measure and significant changes in the MRCP brain measure.

These results are consistent with previous findings that have suggested increases in strength following chiropractic adjustments were due to descending cortical drive from the brain and that the strength changes could not be explained by possible changes at the level of the spinal cord.



Q: Is there still too much emphasis on treatment for pain (sensory), and not enough on motor and autonomic function!



A: According to Dr. Haavik, we may not be treating the patient long enough to affect (+) changes in the brain!

NERVE TENSION CAN EXIST WITHOUT PAIN.*

*HAUSE M. PAIN AND THE NERVE ROOT. SPINE. 1993; 18(14):2053.

Brett J. Lemire, DC CSCS

©2019 Migr & Amieco Consulting

Research Article

Manipulation of Dysfunctional Spinal Joints Affects Sensorimotor Integration in the Prefrontal Cortex: A Brain Source Localization Study

Dina Lelic,¹ Imran Khan Niazi,^{2,3,4} Kelly Holt,² Mads Jochumsen,³ Kim Dremstrup,³
Paul Yelder,⁵ Bernadette Murphy,⁵ Asbjørn Mohr Drewes,^{1,3} and Heidi Haavik^{2,5}

Conclusion. A single session of spinal manipulation of dysfunctional segments in subclinical pain patients alters somatosensory processing at the cortical level, particularly within the prefrontal cortex.

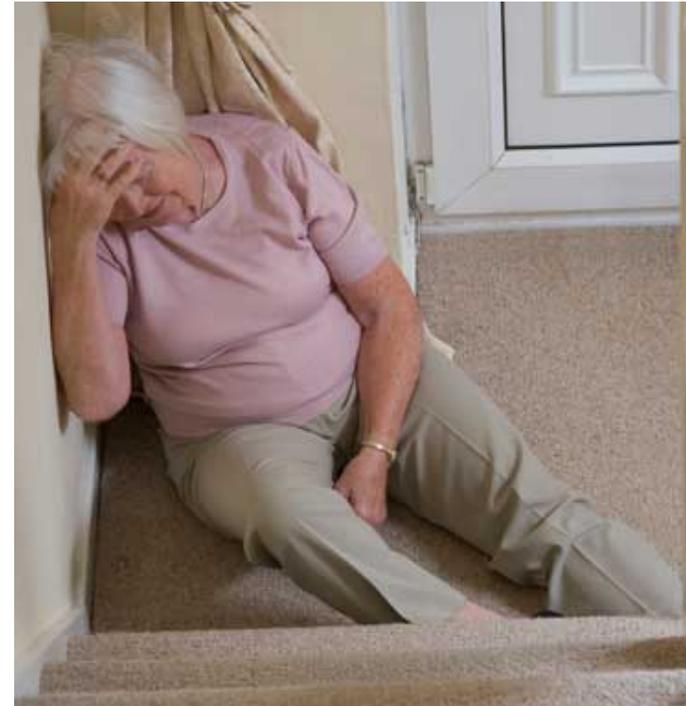


Brett J. Lemire, DC CSCS



Effectiveness of Chiropractic Care to Improve Sensorimotor Function Associated With Falls Risk in Older People: A Randomized Controlled Trial.

- **OBJECTIVE** - This study assessed whether 12 weeks of chiropractic care was effective in improving sensorimotor function associated with fall risk, compared with no intervention, in community-dwelling older adults living in Auckland, New Zealand.
- **METHODS** - Sixty (60) community-dwelling adults older than 65 years were enrolled in the study.
- Outcome measures were assessed at baseline, 4 weeks, and 12 weeks and included proprioception (ankle joint position sense), postural stability (static posturography), sensorimotor function (choice stepping reaction time), multisensory integration (sound-induced flash illusion), and health-related quality of life (SF-36).
- **CONCLUSION** - *Sensorimotor function and multisensory integration associated with fall risk and the physical component of quality of life improved in older adults receiving chiropractic care compared with control.*

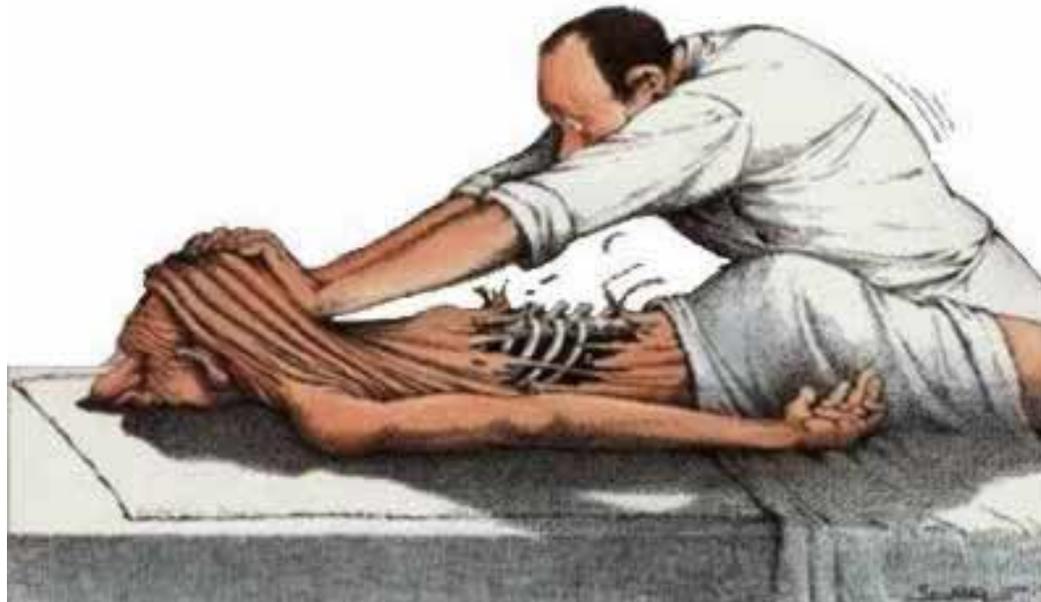


Holt K, Haavik H, Lee A, Murphy B, Elley CR; J Manipulative Physiol Ther. 2016 May;39(4):267-78. Epub 2016 Apr 2.



Neural responses to the mechanical parameters of a high-velocity, low-amplitude spinal manipulation:
THE EFFECT OF PRELOAD PARAMETERS:

- CONCLUSION -Because preload parameters in this animal model were shown to affect neural responses to an HVLA-SM, ***preload characteristics should be taken into consideration when judging this intervention's therapeutic benefit in both clinical efficacy studies and in clinical practice.***
- Reed WR, Long CR, Kawchuk GN, Pickar JG; J Manipulative Physiol Ther 2014 Feb; 37(2):68-78.



Spine J. 2002 Sep-Oct;2(5):357-71.

Neurophysiological effects of spinal manipulation.

Pickar JG1.



RESULTS:

Biomechanical changes caused by spinal manipulation are thought to have physiological consequences by means of their effects on the inflow of sensory information to the central nervous system. Muscle spindle afferents and Golgi tendon organ afferents are stimulated by spinal manipulation. Mechanical and chemical changes in the intervertebral foramen caused by a herniated intervertebral disc can affect the dorsal roots and dorsal root ganglia.

Spinal manipulation is also thought to affect reflex neural outputs to both muscle and visceral organs. Substantial evidence demonstrates that spinal manipulation evokes paraspinal muscle reflexes and alters motoneuron excitability. The effects of spinal manipulation on these somatosomatic reflexes may be quite complex, producing excitatory and inhibitory effects. Whereas substantial information also shows that sensory input, especially noxious input, from paraspinal tissues can reflexively elicit sympathetic nerve activity, knowledge about spinal manipulation's effects on these reflexes and on end-organ function is more limited.

CONCLUSIONS:

A theoretical framework exists from which hypotheses about the neurophysiological effects of spinal manipulation can be developed. An experimental body of evidence exists indicating that spinal manipulation impacts primary afferent neurons from paraspinal tissues, the motor control system and pain processing..



MANUAL MUSCLE TESTS – ASSESSMENT OF MOTOR FUNCTION

Neurological evaluation of motor function..

+5 - full ROM, full strength

+4 - full ROM, less than normal strength

+3 - can raise extremity but not against
resistance

+2 - can move extremity but not lift it

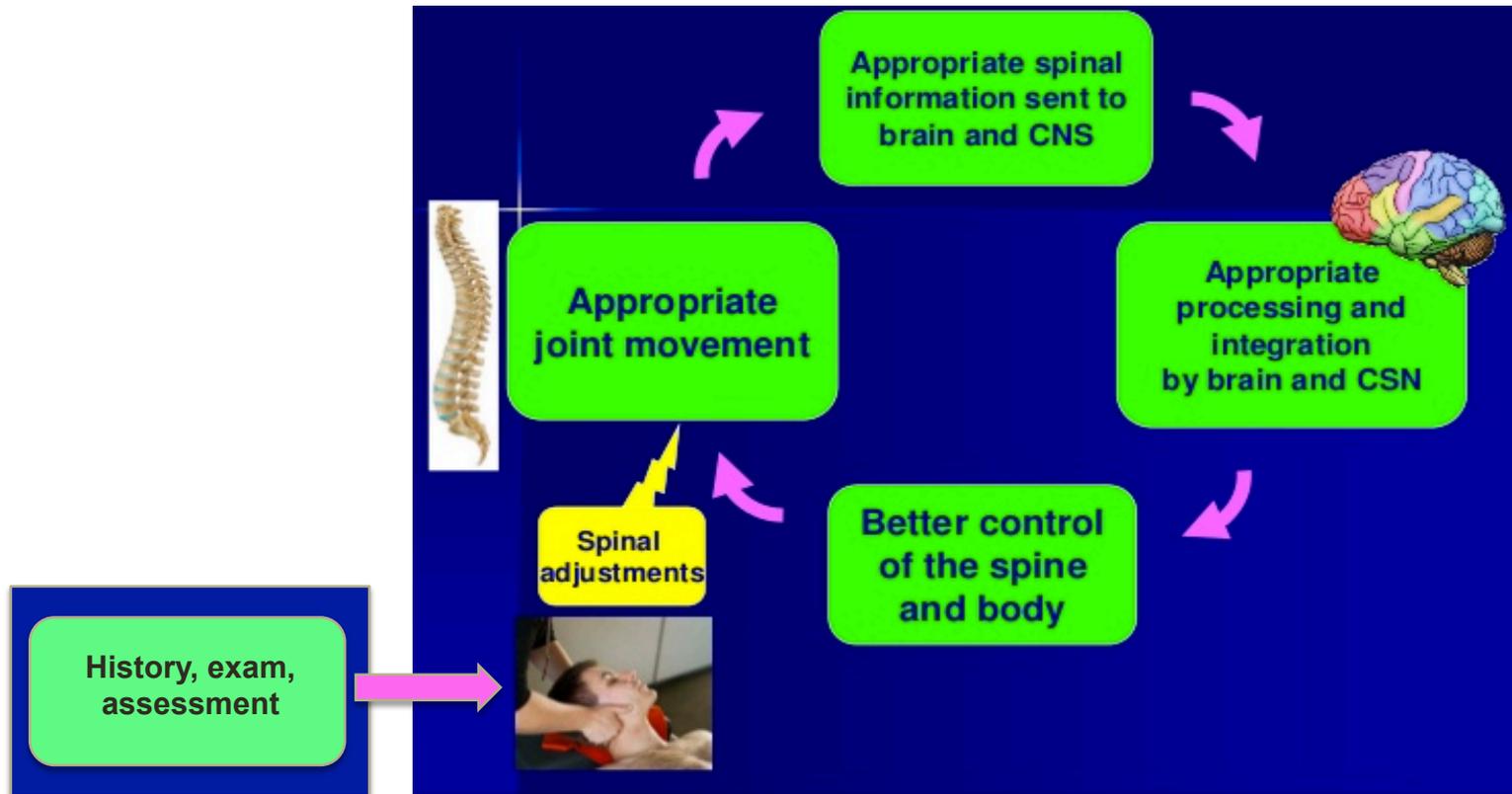
+1 - slight movement

0 - no movement





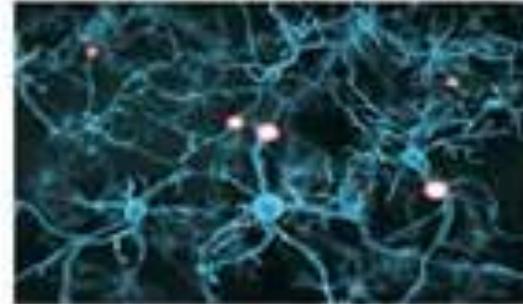
CHIROPRACTIC FIRST! REALITY CHECK





WHAT IS SENSORIMOTOR INTEGRATION?

H. HAVVIK



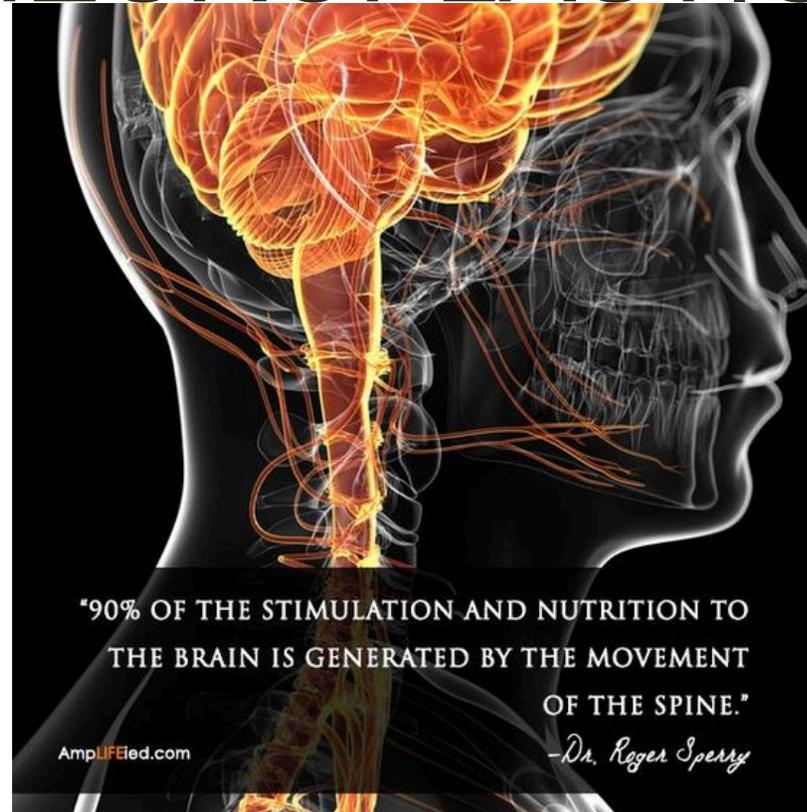
Your brain needs to integrate all sensory information to be able to adequately move your body. This is called sensorimotor integration. When your brain gets it right, it can carry out movements with pinpoint perfection

If your spine is not moving properly it makes it harder for your brain to accurately perceive what is going on in your body. This impacts how it can control your movements.

You may notice this as clumsiness. It can also lead to accidents and the development of painful conditions.



PAIN & NEUROPLASTICITY



www.youtube.com/watch?v=gwd-wLdlHjs



SEGMENTAL LEVEL

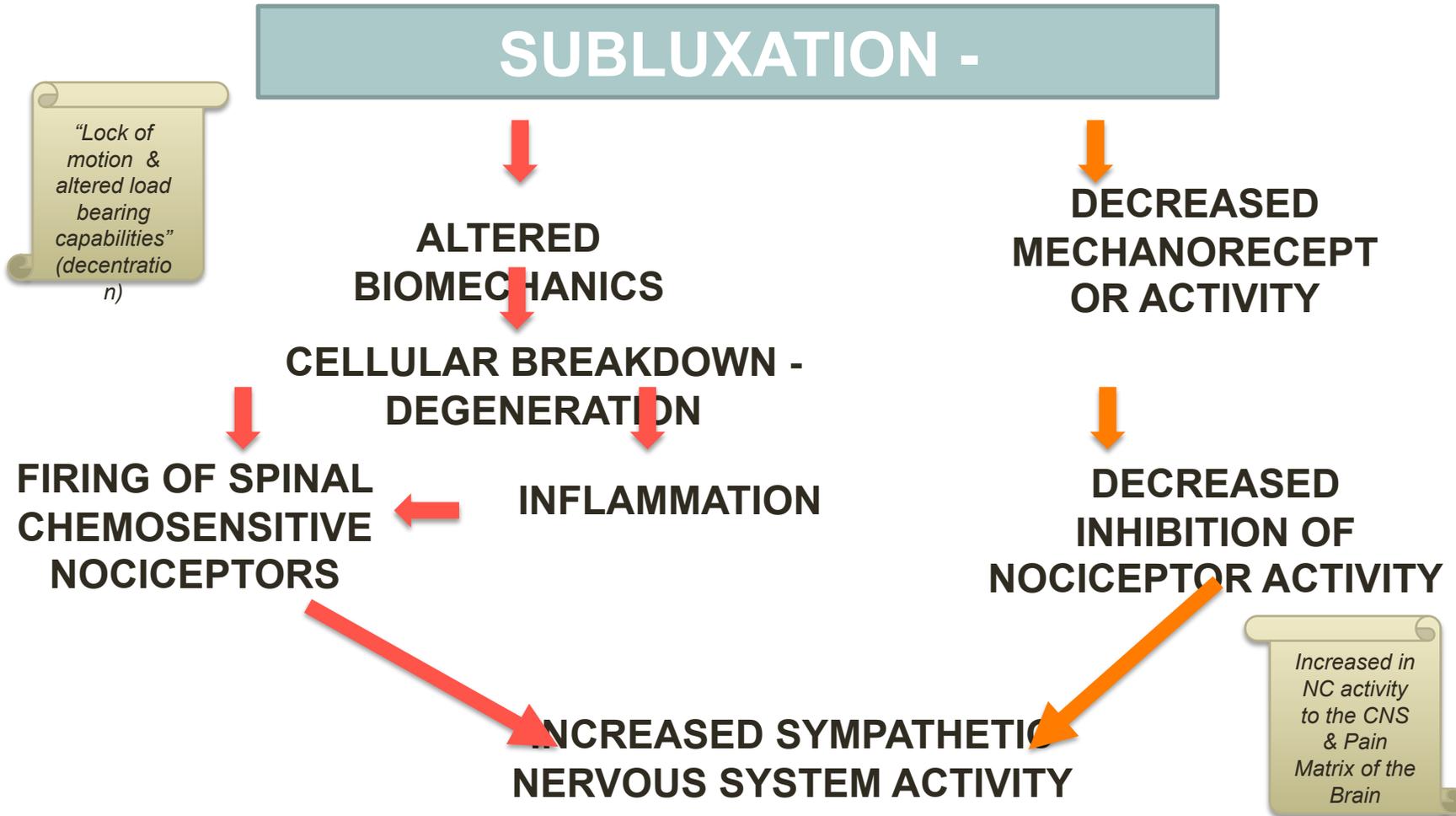
CHIROPRACTIC SPINAL ADJUSTIVE CARE

Assessment of subluxation at the segmental level

- Assessment of global posture
- Stationary palpation
- Motion palpation
- Observation of segment with functional movement patterns
- Assessment of diagnostic studies (x-ray, MRI, CT)



NEUROLOGICAL EFFECTS OF VERTEBRAL SUBLUXATION COMPLEX

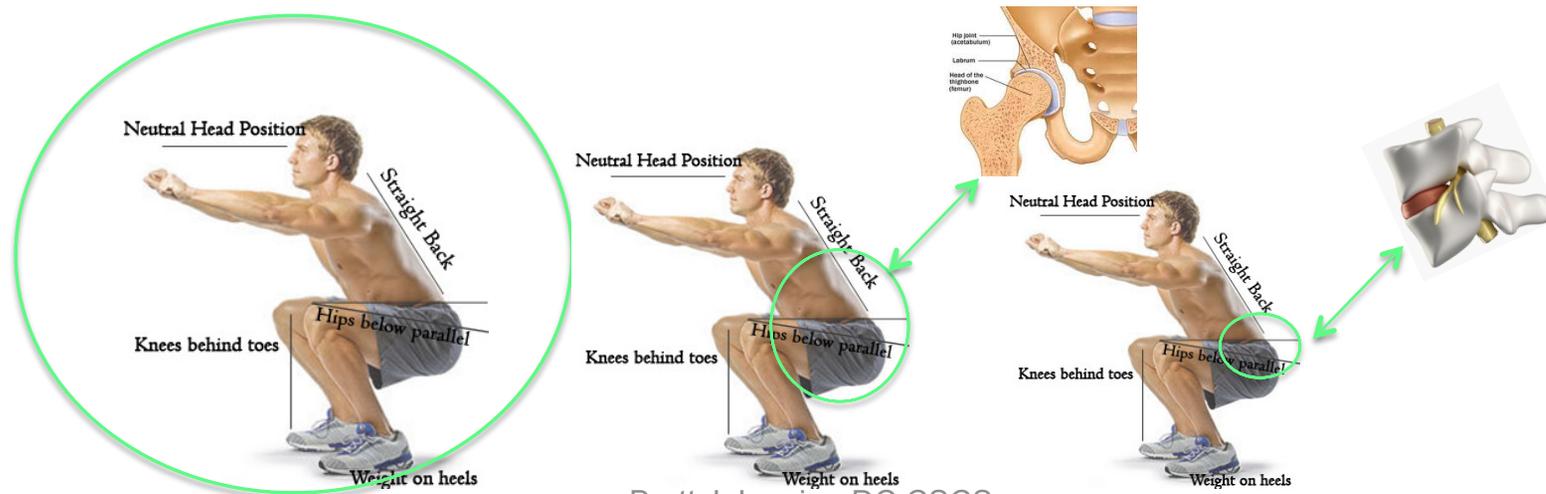




ASSESSMENT OF SUBLUXATION

Assess the patient or athlete on how well they body move at the global, regional and segmental levels

- Global – refers to the orientation of posture and quality of whole body movement (all the joints e.g. lunge, squat, walk, push, pull) / **Is the basic fundamental pattern present?**
- Regional – assess quality of posture or movement in a particular region (a series of joints, e.g. thoraco-pelvic “core-canister” lumbo-pelvo-femoral region) / **Can I appreciate the transfer of load though that region?**
- Segmental – assess position, quality of the mobility and stability at a particular segment (spinal or segmental joint level) / **Is the segment at risk handling the positional load?**



Brett J. Lemire, DC CSCS

WHICH CAME FIRST?

Vertebral subluxation along the axis of the spine or movement incompetency?



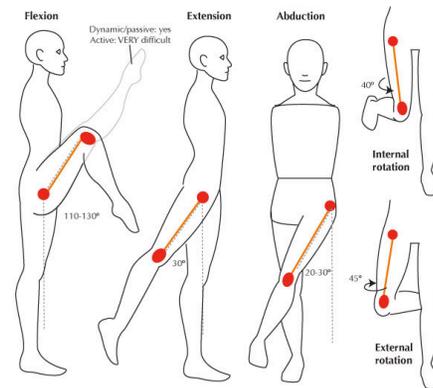


THE BODY IS BUILT ON REGIONAL INTER-DEPENDENCE?

A restricted hip will alter lumbar biomechanics & vice versa....

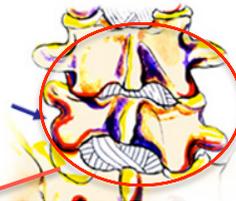
Ranges of motion (degrees)*

	Sidebending	Rotation	Flex	Ext
L1-2	5-6	1	8	5
L2-3	5-6	1	10	3
L3-4	5-6	1-2	12	1
L4-5	3-5	1-2	13	2
L5-S1	0-2	0-1	9	5

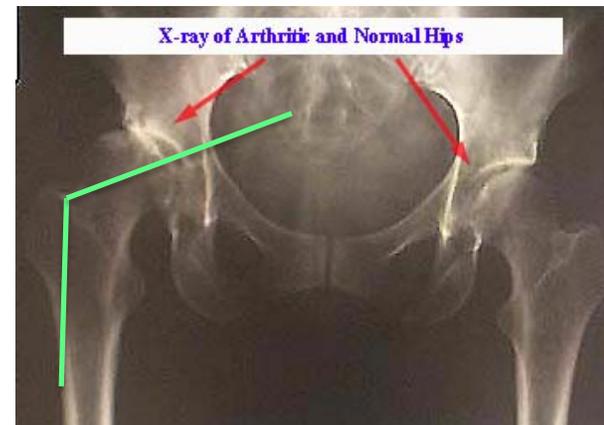


Pelvic shift

Subluxation



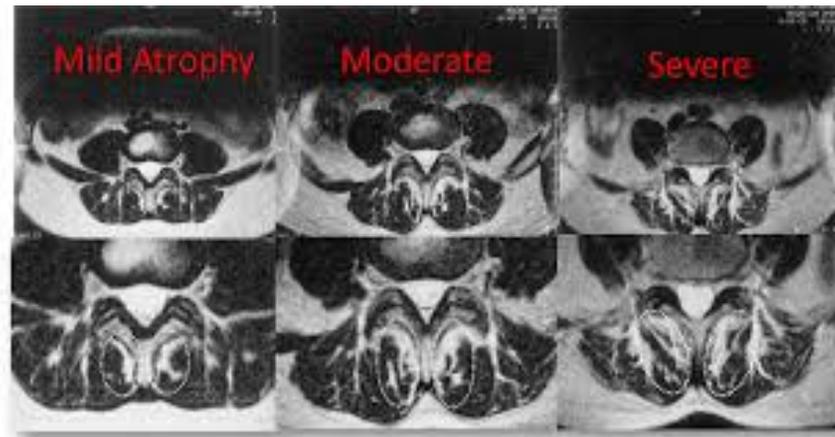
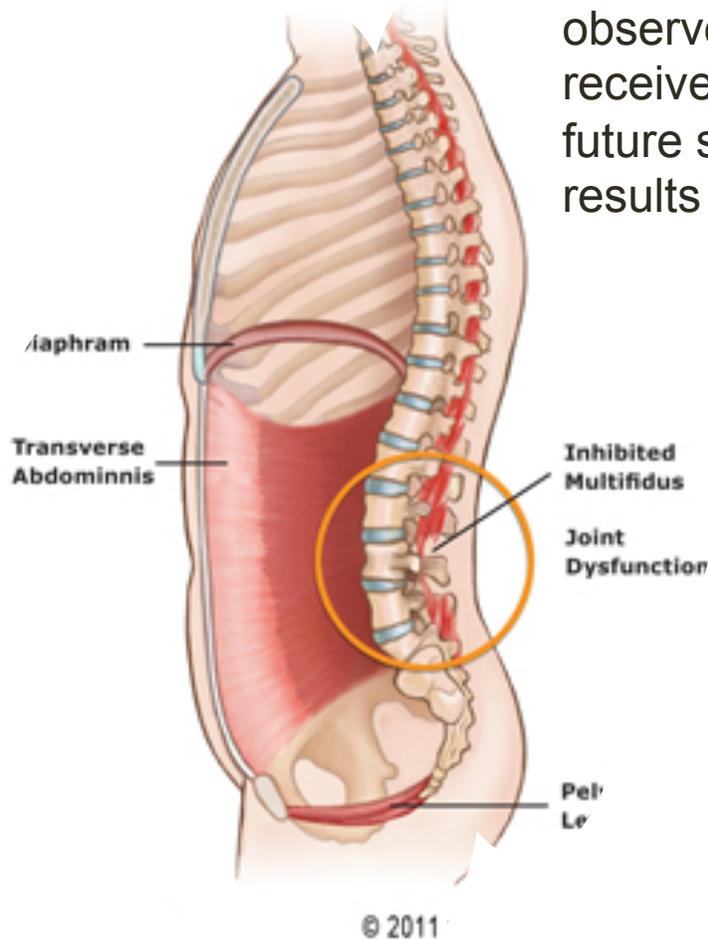
Hip restriction





SEGMENTAL “MULTIDUS INJURY” – COMPROMISE OF THE DEEP SPINAL STABILIZERS

MRI Results - While this study is limited, there was an observed decrease in MF atrophy in patients who received SMT accompanied with low back exercises, and future studies would help demonstrate whether our results can be consistently reproduced.



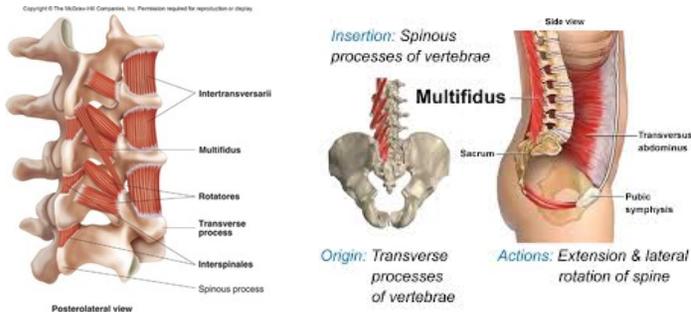
Long-Term Lumbar Multifidus Muscle Atrophy Changes Documented With Magnetic Resonance Imaging: A Case Series
[Mark Woodham,1 Andrew Woodham,2 Joseph G Skeate,3 and Michael Freeman4,*...J Radiol Case Rep.8\(5\); 2014 May](#)



REFLEX STABILIZATION OF THE SPINE WITH CHIROPRACTIC ADJUSTMENT

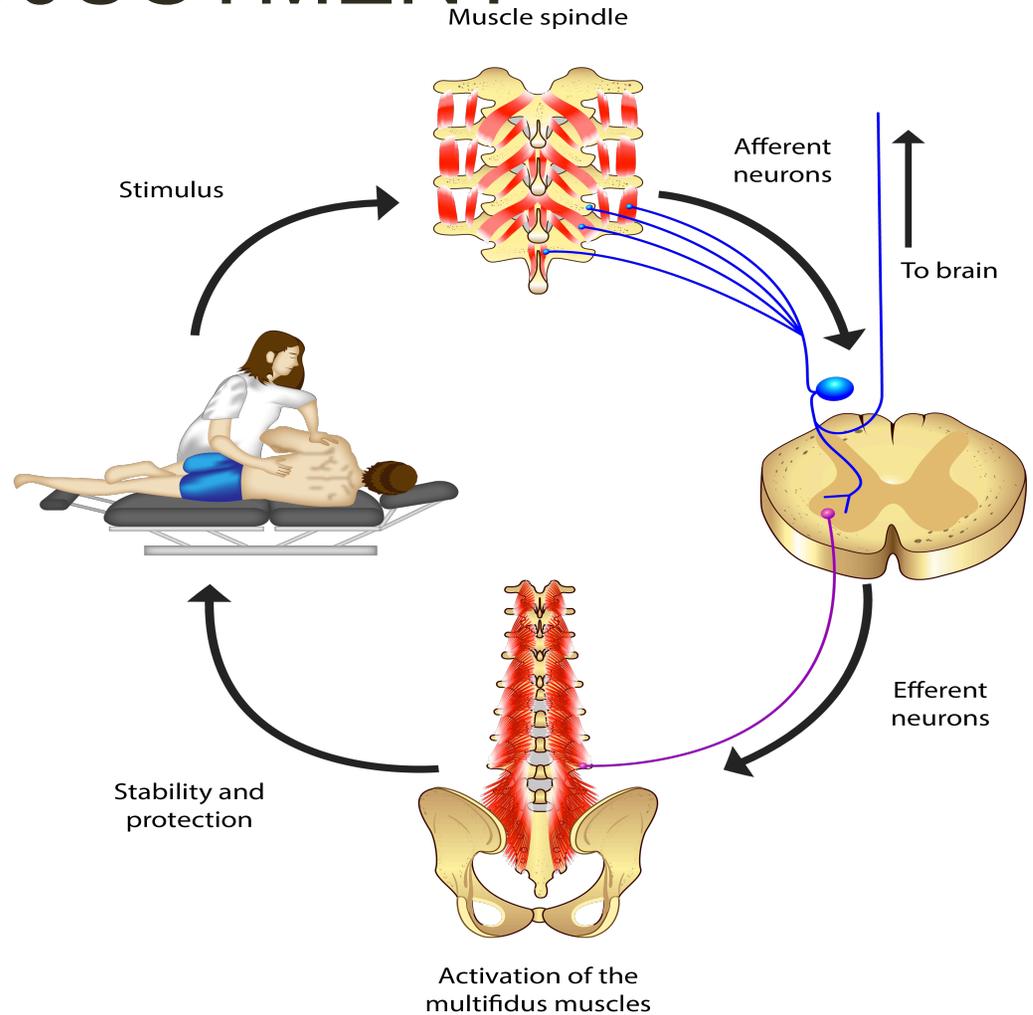
The integrated stabilizing system of the spine

- ❑ Short inter-segmental spinal muscles (multifidi)
- ❑ The deep neck flexors
- ❑ The diaphragm
- ❑ The abdominal wall
- ❑ The pelvic floor



ISSS muscles under ideal function (minus subluxation) activate automatically prior to purposeful movement to establish a stable base (i.e. a Kettle Bell Swing).

This occurs in a **“Reflexive” Feedforward Mechanism”**

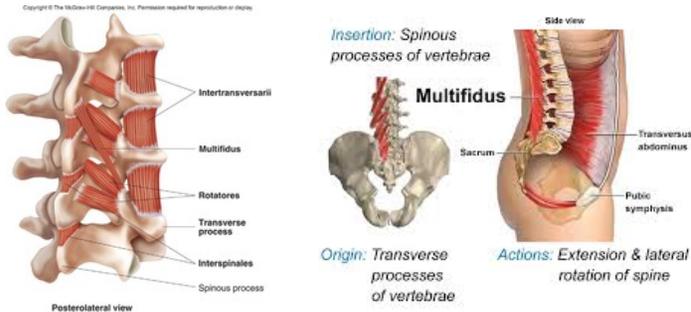




STABILIZATION OF THE SPINE DURING MOVEMENT & EXERCISE

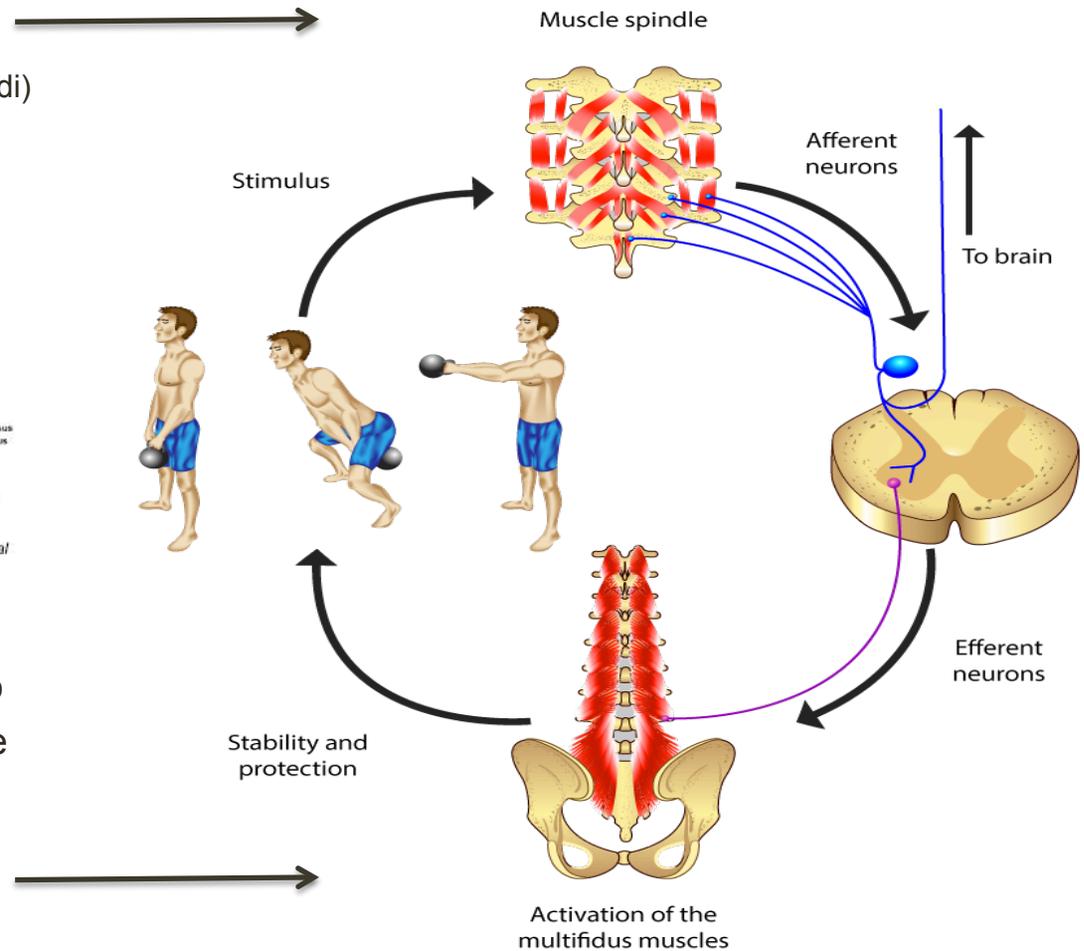
The integrated stabilizing system of the spine

- ❑ Short inter-segmental spinal muscles (multifidi)
- ❑ The deep neck flexors
- ❑ The diaphragm
- ❑ The abdominal wall
- ❑ The pelvic floor



ISSS muscles under ideal function (minus subluxation) activate automatically prior to purposeful movement to establish a stable base (i.e. a Kettle Bell Swing). This occurs in a **“Reflexive” Feedforward Mechanism”**

The Kettle Bell Swing



Brett J. Lemire, DC CSCS

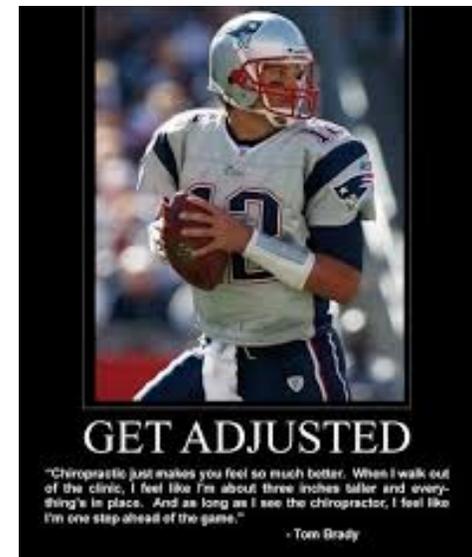
© William Morgan, 2014



Max Voluntary Muscle Contraction following Spinal Manipulation.

- This study investigates whether spinal manipulation leads to neural plastic changes involving cortical drive and the H-reflex pathway
- **The improvements in MVC following spinal manipulation are likely attributed to increased descending drive and/or modulation in afferents.**
- **Spinal manipulation appears to prevent fatigue developed during maximal contractions.**
- **Spinal manipulation appears to alter the net excitability of the low-threshold motor units, increase cortical drive, and prevent fatigue.**
- **SMT → Getting to the brain!**

Niazi IK1, Türker KS, Flavel S, Kinget M, Duehr J, Haavik H.; Exp Brain Res. 2015 Apr;233(4):1165-73. doi: 10.1007/s00221-014-4193-5. Epub 2015 Jan 13.



J Manipulative Physiol Ther. 2006 Mar-Apr;29(3):196-202.

The effect of sacroiliac joint manipulation on feed-forward activation times of the deep abdominal musculature.

Marshall P. Murphy B.

JOURNAL OF
MANIPULATIVE
AND
PHYSIOLOGICAL
THERAPEUTICS



METHODS:

Ninety young males were assessed for the FFA of their deep abdominal muscles in relation to rapid upper limb movements. Those who met the criteria for delayed FFA (failure of deep abdominal activation within 50 milliseconds of deltoid activation) were then reassessed 6 months later. These subjects then underwent sacroiliac joint manipulation on the side demonstrating decreased joint movement during hip flexion and lateral flexion. Feed-forward activation times were then reassessed after joint manipulation.

RESULTS:

Seventeen (18.9%) of 90 subjects met the criteria of impaired FFA. Thirteen of 17 were available to be re-measured at 6-month follow-up. The intra-class correlation coefficient for FFA at this time was greater than 0.70 for all movement directions. There was a significant improvement (38.4%) in FFA times for this group when re-measured immediately after the sacroiliac joint manipulation.

CONCLUSIONS:

Delayed FFA is a highly reproducible measure at long-term follow-up. ***This technique appears to be a sensitive marker of the neural effects of sacroiliac joint manipulation.*** Future prospective studies are needed to determine if delayed FFA times are a marker for those at risk for developing back pain.

Brett J. Lemire, DC CSCS

HOW DOES SPINAL ADJUSTMENTS AFFECT ATAXIA?

The word 'ataxia' is derived from Greek meaning 'disorderly' (Bastian 1997). In the literature, most common definition of ataxia is "the in-coordination of movements" (Bastian 1997, Mariotti et al. 2005).

- **Ataxia is commonly known as “in-coordination of movements”. Insufficient postural control and in-coordination of multi-joint movements without muscle weakness are most observable features of ataxia.**
- **Coordination between various sensory and motor systems results in a normal gait pattern.**
- **The vestibular, visual and somatosensory systems interact in flexible manner for a particular posture depending on the environment and desired movements.**
- **The proprioceptive senses convey the information related to the body position and movements to the brain via the proprioceptors located in the joints, muscles, ligaments and tendons.**
- **These inputs, along with information from the visual system, are transmitted to the central nervous system.**
- **The central nervous system generates the motor output in accordance to the sensory input received.**
- **The presence of IN-COORDINATION & BALANCE DYSFUNCTIONS in movements without muscle weakness is a more precise definition of ATAXIA.**

Ataxia: Physical Therapy and Rehabilitation Applications for Ataxic Patients

Manual therapy followed by specific active exercises versus a placebo followed by specific active exercises on the improvement of functional disability in patients with chronic non specific low back pain: a randomized controlled trial

Background

Recent clinical recommendations still propose active exercises (AE) for CNSLBP. However, acceptance of exercises by patients may be limited by pain-related manifestations. **Current evidences suggest that manual therapy (MT) induces an immediate analgesic effect through neurophysiologic mechanisms at peripheral, spinal and cortical levels.** The aim of this pilot study was first, to assess whether MT has an immediate analgesic effect, and second, to compare the lasting effect on functional disability of MT plus AE to sham therapy (ST) plus AE.

Results

MT intervention induced a better immediate analgesic effect that was independent from the therapeutic session (VAS mean difference between interventions: -0.8; 95% CI: -1.2 to -0.3).

Conclusions

This study confirmed the immediate analgesic effect of MT over ST. Followed by specific active exercises, it reduces significantly functional disability and tends to induce a larger decrease in pain intensity, compared to a control group. These results confirm the clinical relevance of MT as an appropriate treatment for CNSLBP. Its neurophysiologic mechanisms at cortical level should be investigated more thoroughly.

MT defined as:

•**High velocity, low amplitude dynamic thrust (manipulation)**, a rotational-lateral flexion thrust performed on a stiffed vertebral segment(s) with the patient side lying[23, 40].

Upper cervical and upper thoracic manipulation versus mobilization and exercise in patients with cervicogenic headache: a multi-center randomized clinical trial

BMC
Musculoskeletal
Disorders



Conclusions: Six to eight sessions of upper cervical and upper thoracic manipulation were shown to be more effective than mobilization and exercise in patients with CH, and the effects were maintained at 3 months.

James R. Dunning^{1,2,3*}, Raymond Butts⁴, Firas Mourad⁵, Ian Young⁶, Cesar Fernandez-de-las Peñas⁷, Marshall Hagins⁸, Thomas Stanislawski⁹, Jonathan Donley⁴, Dustin Buck¹⁰, Todd R. Hooks¹¹ and Joshua A. Cleland¹²

Brett J. Lemire, DC CSCS



***“ IF YOU WANT TO CHANGE THE FRUIT,
YOU HAVE TO CHANGE THE ROOTS.
IF YOU WANT TO CHANGE THE VISIBLE,
YOU HAVE TO CHANGE THE INVISIBLE FIRST. ”***



ASSESSMENT OF GLOBAL POSTURE & MOVEMENT

Brett J. Lemire, DC CSCS



USE OF ROMBERG'S TEST TO ASSESS

PROPRIOCEPTION
A positive Romberg test suggests that the ataxia is sensory in nature, that is, depending on loss of proprioception

Romberg's test, Romberg's sign, or the Romberg maneuver is a test used in an exam of neurological function for balance, and also as a test for drunken driving.

The exam is based on the premise that a person requires at least two of the three following senses to maintain balance while standing:

1. proprioception (the ability to know one's body position in space);
2. vestibular function (the ability to know one's head position in space)
3. vision (which can be used to monitor and adjust for changes in body position).

The Romberg test is a test of the body's sense of positioning (proprioception), which requires healthy functioning of the dorsal columns of the spinal cord.[1]

The Romberg test is used to investigate the cause of loss of motor coordination (ataxia). A positive Romberg test suggests that the ataxia is sensory in nature, that is, depending on loss of proprioception. If a patient is ataxic and Romberg's test is not positive, it suggests that ataxia is cerebellar in nature, that is, depending on localized cerebellar dysfunction instead.

Romberg and cerebellar function

Romberg's test is a test of proprioception receptors and pathways function. A positive Romberg's test which will show a wide base in patient with back pain have been shown to be 90 percent specific for lumbar spinal stenosis(1).

1. Katz JN, Harris MB (February 2008). "Clinical practice. Lumbar spinal stenosis". *N. Engl. J. Med.* **358** (8): 818–25.



FUKUDA STEP-TEST TO ASSESS PROPRIOCEPTION:

Background - Human beings rely on multiple systems to maintain their balance as they perform their activities of daily living. These systems may be undermined functionally by both disease and the normal aging process. Balance impairment is associated with increased fall risk.

Technique: March in place for 50 steps.
A rotation of >30 degrees to either side suggests asymmetrical labyrinthine function with the weaker side identified by the direction of rotation.



7 FUNCTIONAL MOVEMENT SCREENS (FMS)

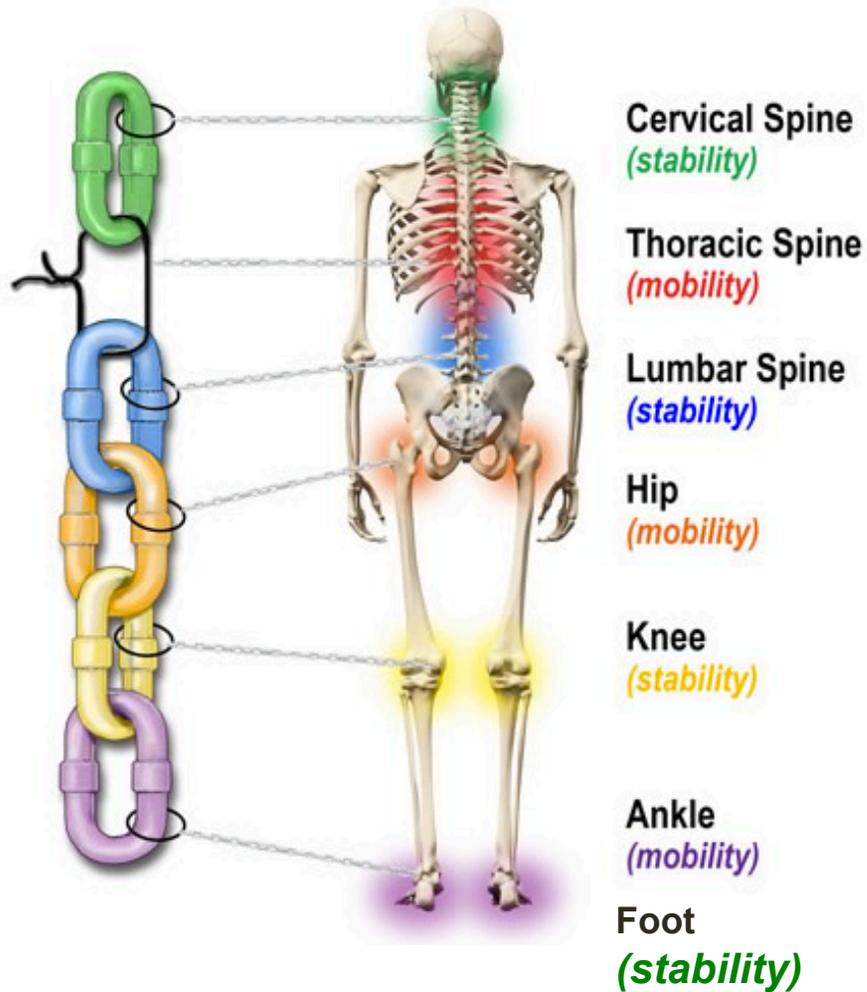
Score Rationale

- 0 Pain at any point throughout movement or in a clearing test (where applicable)
- 1 Unable to complete movement, or unable to assume position of movement
- 2 Requires compensatory movement to complete task
- 3 Completes task correctly without compensatory movement





THE “JOINT-BY-JOINT” APPROACH



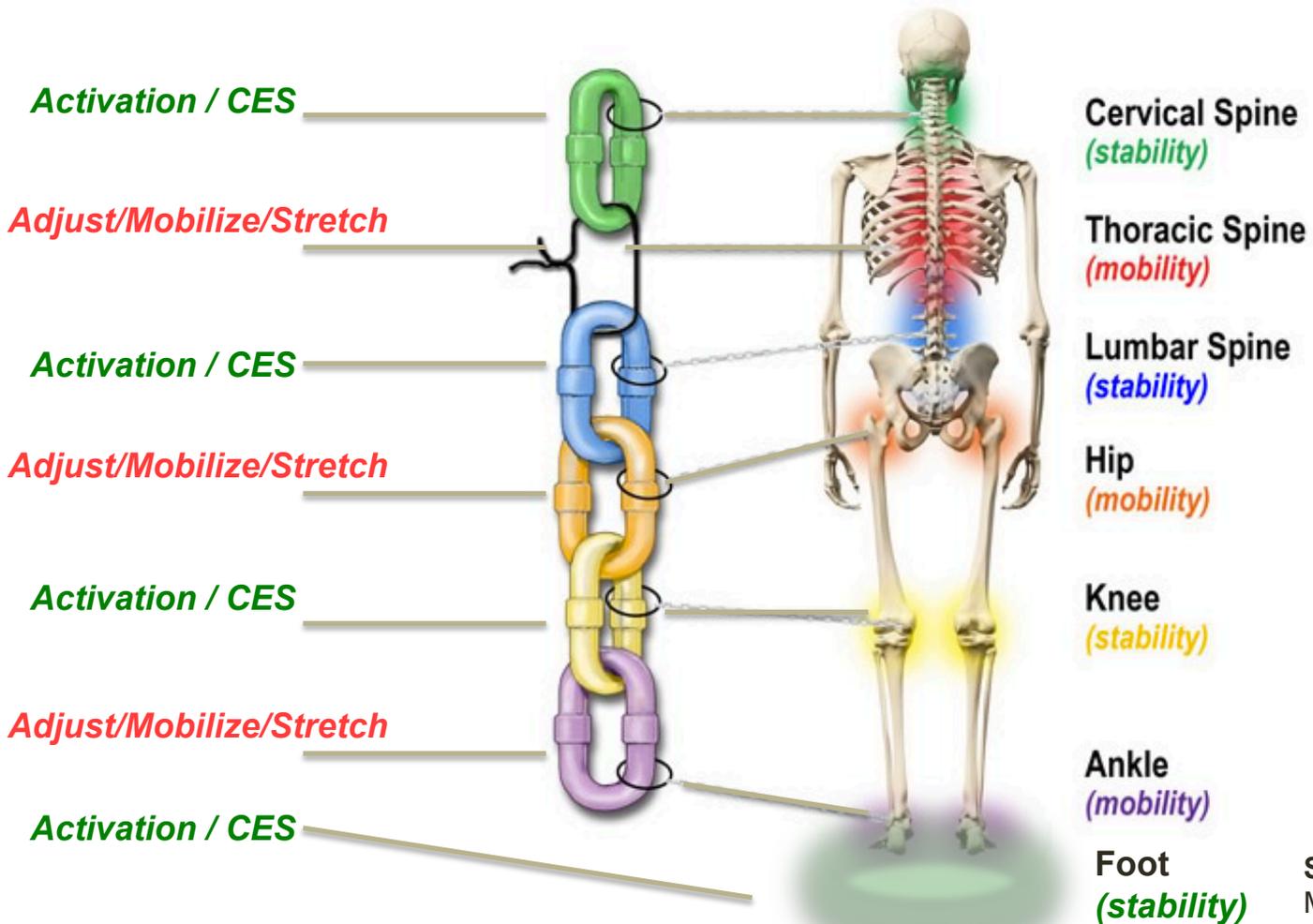
MOBILITY	STABILITY
Ankle joint	Foot stable
Hip joint	Knee joint
Thoracic spine	Lumbar spine
Gleno-humeral joint	Scapulo-thoracic jt.
C1/C2 region	Elbow joint

SOURCE:
Mike Boyle, ATC
Gray Cook, PT

Brett J. Lemire, DC CSCS



THE “JOINT-BY-JOINT” APPROACH



Brett J. Lemire, DC CSCS

SOURCE:
Mike Boyle, ATC
Gray Cook, PT



WHEN LOOKING AT MOVEMENT DYSFUNCTION – WE MUST RESPECT NEUROPLASTICITY

“As clinicians working with patients with musculoskeletal dysfunction conventionally evaluate **region-specific movement performance** prescribe motor control exercises without considering the potential for plasticity of the CNS.

(A segmental or regional approach)

In contrast, clinicians working with patients with neurological dysfunction commonly consider the effect of cortical dysfunction on patient performance as **"the brain is known"** to be the source of the problem.

(A more GLOBAL approach)

Source: SJ et al, Manual Therapy, 2014

ARE WE CONSISTENT ENOUGH WITH MOVEMENT THERAPY FOR OUR PATIENTS?

Kolar & McGill – “treatment for disc herniation can take-up to a year!”

Brett J. Lemire, DC CSCS



WHY EXAMINE BASIC MOVEMENT PATTERNS

Habitual movements are done repeatedly and unconsciously, they need to be monitored by DC.

- **Posture** – basis of all locomotor movements; all movements begin and end with posture; correlates with health and longevity.
- **Breathing pattern** – the average person breathes 14,000 to 21,000 times per day; linked to a wide variety of health complaints (mouth vs. nose breathing), para-sympathetic and sympathetic balance
- **CORE stability** – necessary for trunk stability through correct activation of the “canister” connection of the ribcage to the pelvis.
- **Squat** – average person will squat 30 times per day; getting out of bed, off a toilet, out of chair, picking things up etc.
- **Single leg stance** – the average person will take 5,000-10,000 steps in a day; 85% of the gait cycle requires single leg balance
- **Overhead reach** – is necessary for daily activities requiring use of the upper extremity during overhead activities.
- **Shoulder mobility** – is necessary for daily activities requiring use of the upper extremity during push and pull movements



OBESITY – CHANGES IN BODY COMPOSITION & ORIENTATION TO GRAVITY LINE



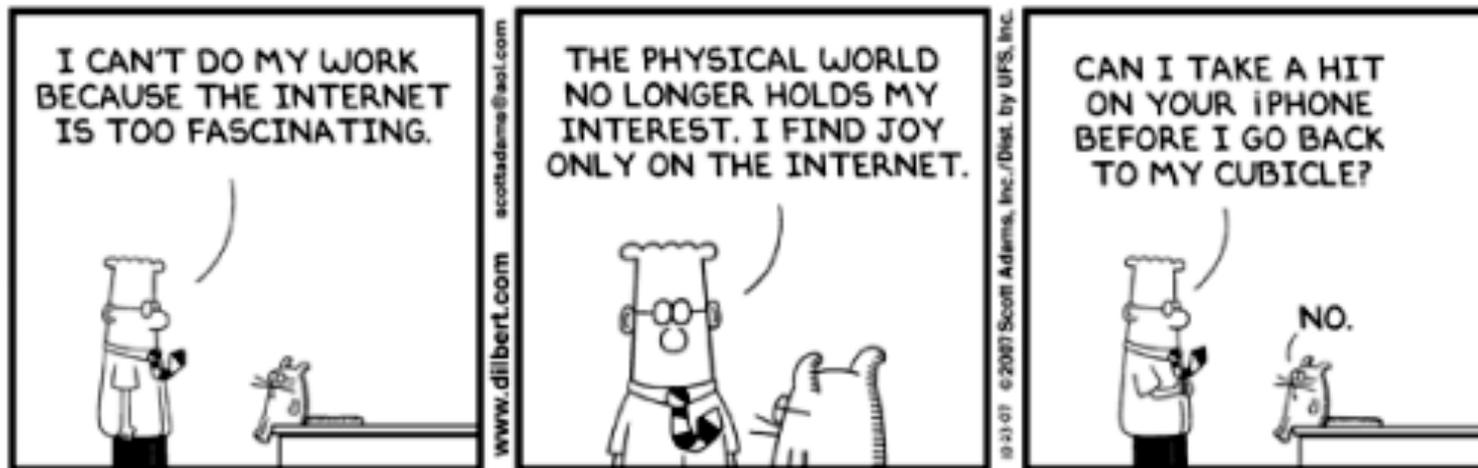
Gravity line

Progressive to complete compensatory change in posture and loss of optima load bearing throughout joint system!

Brett J. Lemire, DC CSCS

SECTION – TECHNOLOGY ADDICTION & CHRONIC MUSCULO-SKELETAL PAIN

Clinical – attempt to elicit how much time is spent on electronic devices.



Brett J. Lemire, DC CSCS

TECHNOLOGY ADDICTION & CHRONIC MUSCULO-SKELETAL PAIN

Sleep quality as a mediator between technology-related sleep quality, depression, and anxiety.

Cyberpsychol Behav Soc Netw 2013 Jan; 16(1):25-30.

Adams SK, Kisler TS

Abstract

This study examines (a) relations among technology use during sleep time, sleep quality, and depression/anxiety and (b) time awake due to technology use. Two hundred thirty-six college students completed self-report questionnaires and week-long sleep diaries. Results revealed that 47 percent of students reported night-time waking to answer text messages and 40 percent to answer phone calls. Regression analyses indicated that higher levels of technology use after the onset of sleep predicted poorer sleep quality, and poorer sleep quality predicted symptoms of depression/anxiety. Finally, sleep quality is a mediator between technology use after the onset of sleep and depression/anxiety. College students who have difficulty setting boundaries around technology use may be at increased risk for psychological health concerns.



CHIROPRACTIC

The Effect of Adding Forward Head Posture Corrective Exercises in the Management of Lumbosacral Radiculopathy: A J Manipulative Physiol Ther 2015 Feb 19.
Moustafa IMDiab AA - Randomized Controlled Study.

OBJECTIVE

The purpose of this study was to determine the immediate and long-term effects of a multimodal program, with the addition of forward head posture correction, in patients with chronic discogenic lumbar radiculopathy.

METHODS

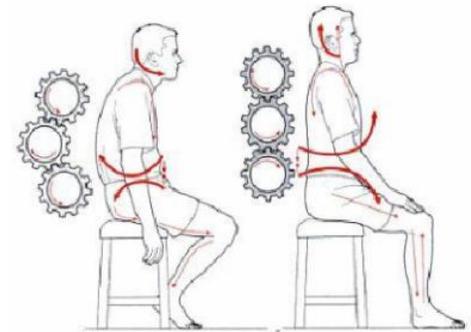
This randomized clinical study included 154 adult patients (54 females) who experienced chronic discogenic lumbar radiculopathy and had forward head posture. One group received a functional restoration program, and the experimental group received forward head posture corrective exercises. Primary outcomes were the Oswestry Disability Index (ODI). Secondary outcomes included the anterior head translation, lumbar lordosis, thoracic kyphosis, trunk inclination, lateral deviation, trunk imbalance, surface rotation, pelvic inclination, leg and back pain scores, and H-reflex latency and amplitude. Patients were assessed at 3 intervals (pretreatment, 10-week posttreatment, and 2-year follow-up).

RESULTS

A general linear model with repeated measures indicated a significant group \times time effect in favor of the experimental group on the measures of ODI ($F = 89.7$; $P < .0005$), anterior head translation ($F = 23.6$; $P < .0005$), H-reflex amplitude ($F = 151.4$; $P < .0005$), H-reflex latency ($F = 99.2$; $P < .0005$), back pain ($F = 140.8$; $P < .0005$), and leg pain ($F = 72$; $P < .0005$). After 10 weeks, the results revealed an insignificant difference between the groups for ODI ($P = .08$), back pain ($P = .29$), leg pain ($P = .019$), H-reflex amplitude ($P = .09$), and H-reflex latency ($P = .098$). At the 2-year follow-up, there were significant differences between the groups for all variables adopted for this study ($P < .05$).

CONCLUSIONS

The addition of forward head posture correction to a functional restoration program seemed to positively affect disability, 3-dimensional spinal posture parameters, back and leg pain, and S1 nerve root function of patients with chronic discogenic lumbar radiculopathy.





10 LBS. OF ADDITIONAL BODY WEIGHT – EQUALS 48,000 LBS. OF KNEE PRESSURE PER MILE

"The accumulated reduction in knee load for a 1-pound loss in weight would be more than 4,800 pounds per mile walked," notes Stephen P. Messier, Ph.D., the leading author of the study.

"For people losing **10 pounds**, each knee would be subjected to **48,000 pounds less in compressive load per mile walked**. Although there are no longitudinal studies indicating that weight loss in humans slows the progression of knee OA, a reduction of this magnitude would appear to be clinically relevant."



Normal joint force

Joint with increased pressure due to obesity



Fig. 2

Clinical – if your patient is obese, is walking a good choice for increasing metabolic workload to lose weight? How about cycling, swimming, weight training??

Brett J. Lemire, DC CSCS

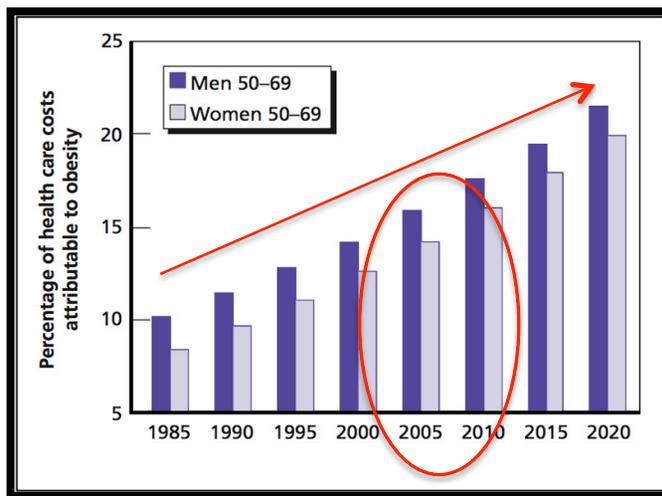
To get action, should we scare the patient?



HX & EXAM - BODY MASS INDEX

RAND Corporation researchers have conducted a series of studies analyzing obesity trends and estimating their effects on future health care costs. They found that

1. obesity in the U.S. population has been increasing steadily over the past two decades — and **severe obesity is increasing the fastest**
2. obesity translates into **higher health care costs and contributes to disability at all ages**
3. **traditional clinical approaches, in particular bariatric surgery, cannot slow the trend**
4. **Medicare and Medicaid savings stemming from increasingly good health among the elderly could be swamped by the cost consequences of disability among the young.**



Clinical: Doctor needs to discuss with the patient, the link to between CVD, stroke, cancer and movement related disability needs to take place.

30% of the population has some form of faulty neuro-developmental issues

During the history, especially with pediatric and the adolescent patient you should question the parent or guardian regarding the patient

- Was your child pre-mature or full-term at birth?
- **Suffer any sort of infantile respiratory distress syndrome (IRDS)**
 - Surfactant development is insufficient which leads to atelectasis and IRDS.
 - Labored breathing on under-developed sternal-cartilage can lead to pectus excavatum
 - Altered neurodevelopment of the CORE, breathing patterns and postural function of the diaphragm.
- **Did they hit normal milestones in the first 12 months of life?**
 - Didn't rollover, sit-up or crawl (early walker, not enough "tummy time" etc.)
- Have you notice clumsiness (possible - central coordination disorder)
- Have notice quirky habits or gestures (possible - persistent primitive reflexes: can affect how they sit, read, talk, etc.)

Brett J. Lemire, DC CSCS



**OUTCOME IS FAULTY OF FAULTY SOFTWARE (CNS)
& HARDWARE JOINTS, MUSCLES, FASCIA!**

FHP & BREATHING - FUN+KIN

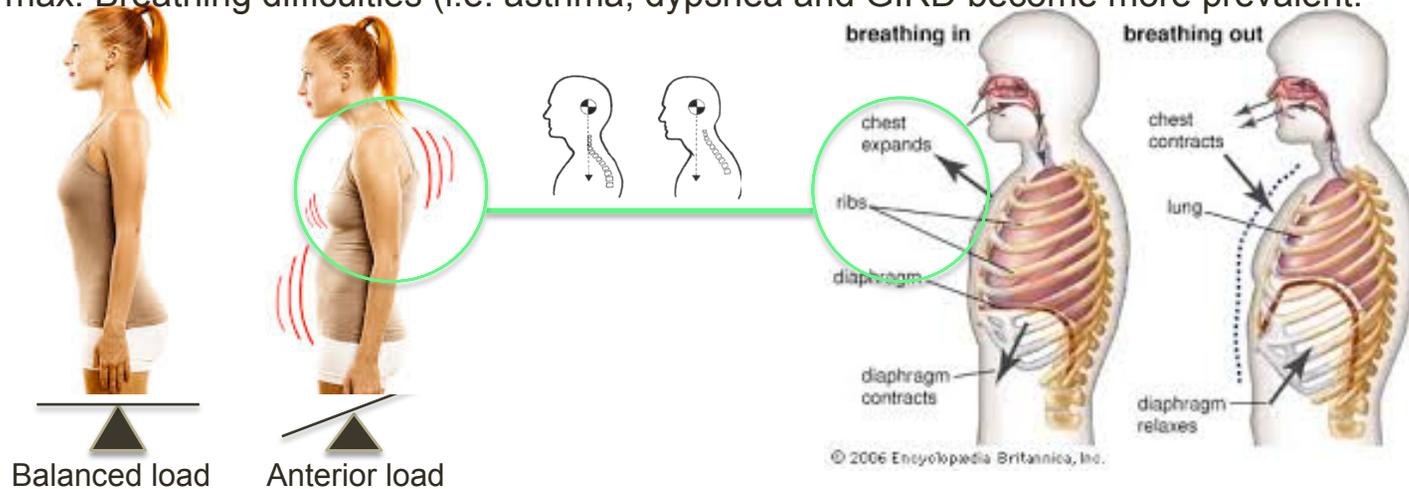
Clinical – As you can see FHP causes an increase in thoracic kyphosis and compression of the upper ribs into the lower ribs causing;

1. Chest breathing versus diaphragmatic (decreased tidal volume).
2. Loss of ribcage compliance (joint dysfunction, fascial restrictions & trigger points throughout the thoracic cage, spine and scapula.
3. Increased cardiac and vascular pressure.

The head forward drives the sternum down & back, preventing from increasing its A-P dimension on inspiration.

According to Karel Lewit, MD – “until breathing is normalized, all other patterns remain faulty”

The result is immediate and progressive loss of respiratory capacity (up to 30%), tidal volume and VO2 max. Breathing difficulties (i.e. asthma, dyspnea and GIRD become more prevalent.



Brett J. Lemire, DC CSCS

PROGRESSION OF DISABILITY^{TV}

For Nagi,

The term **impairment (dysfunction)** refers to a loss or abnormality at the tissue, organ, and body system level.

- *I develop neck pain when I sit at the computer too long*

The term **functional limitations** that represent restrictions in the performance of specific tasks by a person.

- *My neck pain prevents me from turning head side to side*

The term **disability**, refers to the limitation in performing socially defined roles and tasks expected of an individual within a sociocultural and physical environment

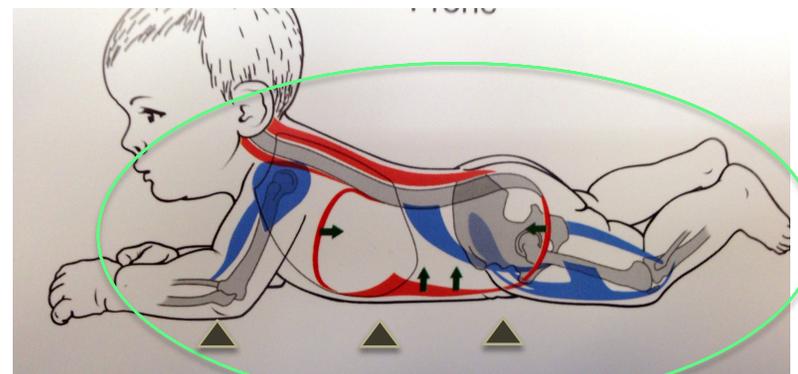
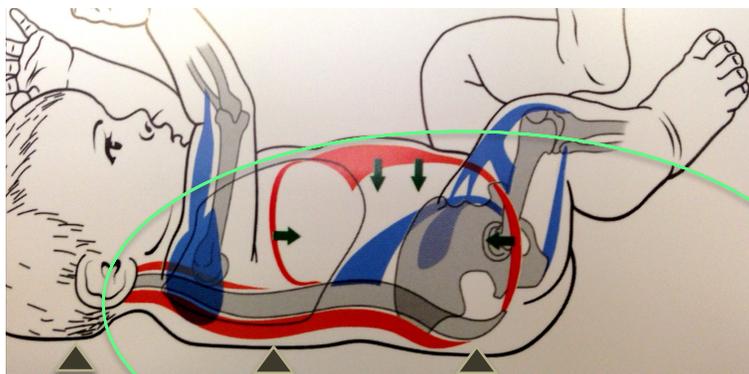
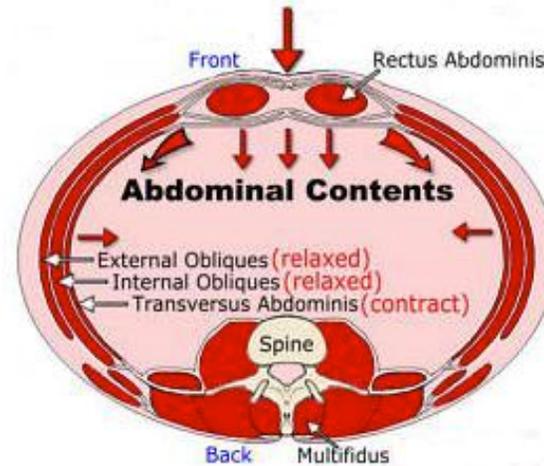
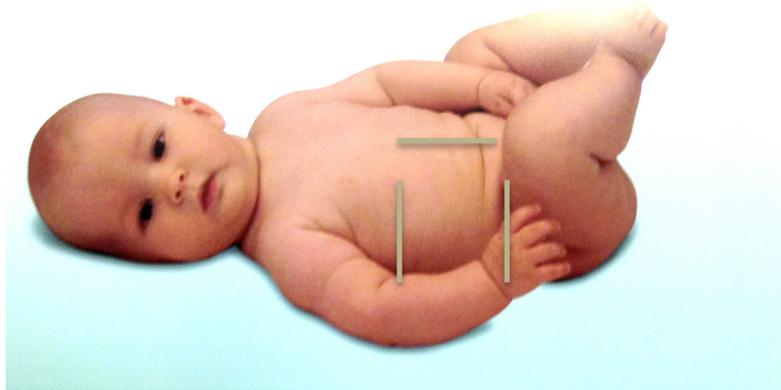
- *I'm unable to sit and work at the computer*

HOW **SITTING** ALL DAY IS
SLOWLY **KILLING YOU**





IDEAL CORE “CANISTER”

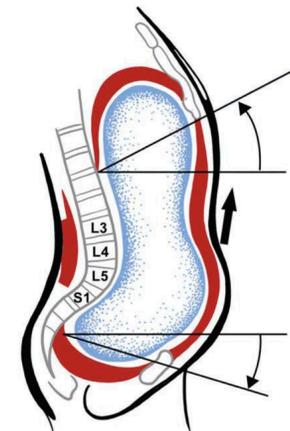
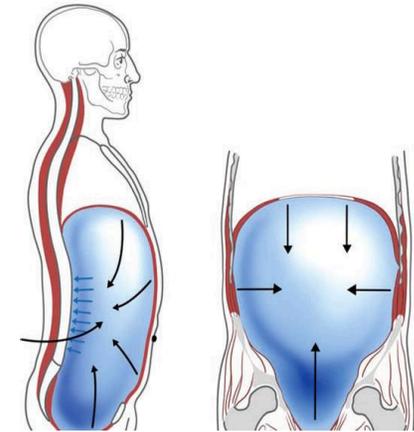


Brett J. Lemire, DC CSCS



INSPECT, PALPATE, & ASSESS THE ABDOMINAL WALL - DIASTASIS

- Elevated ribcage position
- Disconnect of ribcage to pelvis - cylinders don't align & functionally connect!
- Thinning & widening of the linea alba
- Ribcage flare @ the costal angle
- Drop in IAP during neck flexion –



Clinically, not enough IAP through abdominal mm. activity to support & stabilize the spine.



INSPECT, PALPATE, & ASSESS THE ABDOMINAL WALL - **DIASTASIS**

We are going to see adverse and accelerated changes in spinal loading, pathology, muscle imbalances, pain control, chronicity, motor control





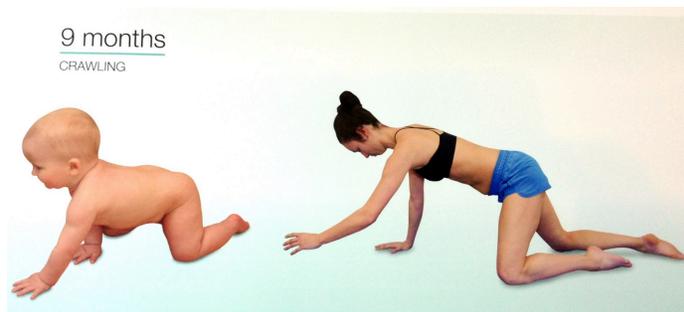
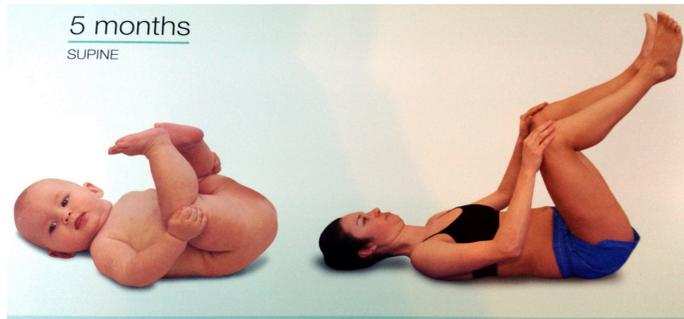
WORKSHOP

CHIROPRACTIC +DNS+CES

1. Perform a simple postural screen
(Mirror Test 1 & 2)
2. Select a couple movement screens
3. Perform a Basic Romberg & Dynamic Romberg's
4. Muscle test the ipsilateral and contralateral pattern
5. Treatment – SMT, DNS & Corrective Exercise



WORKSHOP - CHIROPRACTIC +DNS



DNS – Using 5-7-9 mo. Positions to Stabilize the spine.

1st – 5mo. 90/90° – lay supine on a firm surface, elongate the spine. Use ball or ottoman to support legs. Align ribcage to pelvis (secure “core canister”).

Diaphragm breathe in 360° “hooplike fashion.”

Lift legs 90/90, hands on outside of knees. Hold and breathe for 30 secs.

2nd – 7mo. Turning - Side lying on the elbow, hip with bottom leg semi-flexed. Top leg bent in front to bottom leg shin. Align & elongate spine. Push off elbow slight to activate core canister. Diaphragmatic breathe. Lift pelvis off the floor to support at the knee. Roll forward slightly & reach with opposite arm. Hold for 5-15 secs.

3rd – 9mo. – Crawling – Assume all-fours position with hands under shoulders & knees under hips, secure the core canister, DP breathe and crawl forwards 4 cycles & back. Progress to a Birdog crawl. Repeat 4 sets.



Use with seniors or acute patients.
Foam roller between the knees.