



## The Changing Brain

Applying the principles of Neuroplasticity to Pain, Posture, Stress and Low-Tech Rehabilitation

**MAC**  
MICHIGAN ASSOCIATION OF CHIROPRACTORS

Dr. Brian Jensen

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**D.D. PALMER**  
DISCOVERER OF CHIROPRACTIC



Sept 18, 1895

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## The Changing Brain

- Chiropractors don't take pressure off nerves, they put pressure on mechanoreceptors - Dr. Ted Carrick PCC Homecoming 1991

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## How Quickly can the Brain Change?

See the finger, touch the finger. Close eyes, repeat and test accuracy

Hold pressure over the cervical facets, flexion, lateral bending and extension. C7 to C2, both sides

Retest, see the finger, touch the finger. Close eyes, repeat and compare results

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Dr Joe Dispenza - TED Talks with Dr Joe Dispenza

310,750 views • Feb 9, 2013

8.8K 28K SHARE SAVE

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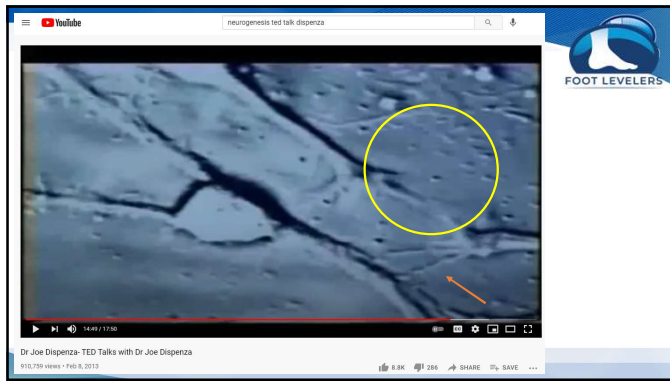
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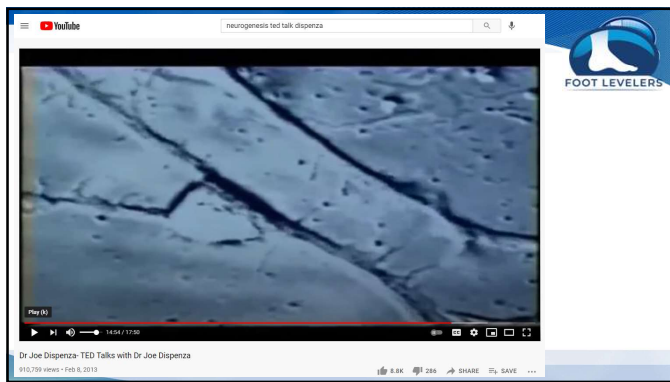
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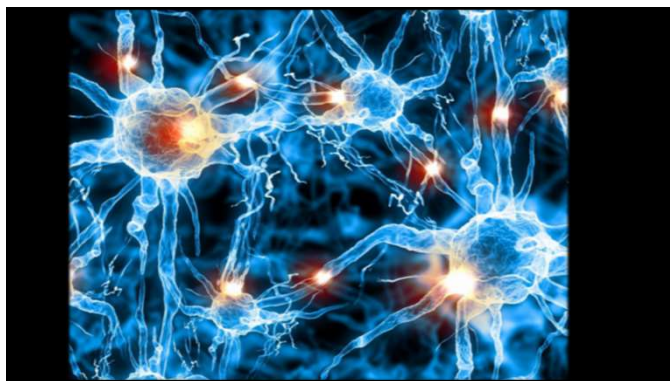
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## What Fires together, Wires together



- This phrase was coined in 1949 by Donald Hebb, a Canadian neuropsychologist known for his work in the field of associative learning.
- Hebb's axiom reminds us that every experience, thought, feeling, and physical sensation triggers thousands of neurons, which form a neural network. When you repeat an experience over and over, the brain learns to trigger the same neurons each time.

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## SPARK

THE REVOLUTIONARY NEW SCIENCE OF EXERCISE AND THE BRAIN


Supercharge Your Mental Circuits to Beat Stress, Sharpen Your Thinking, Lift Your Mood, Boost Your Memory, and Much More!

**JOHN J. RATEY, MD**  
AUTHOR OF SPARK: THE REVOLUTIONARY NEW SCIENCE OF EXERCISE AND THE BRAIN  
WITH ERIC HAGERMAN

### Neurogenesis

Brain Derived Neurotrophic Factor (BDNF)

Exercise  
Anxiety  
Stress  
Fear  
Stress Response



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Chiropractic Has Changed!

It's not about "racking a bone back into place"

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<http://www.ccp-guidelines.org/>

**The Council on Chiropractic Practice**

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Guidelines Process  
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FAQ

FREE DOWNLOADS:  
**NEW!!** The 2013 Guidelines

If you adjust kids, click here to find out why we NEED the CCP guidelines NOW!

Help fund the continued development of subluxation-based chiropractic guidelines.  
**Make a donation to CCP!**  
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**Working Definitions**

Chiropractic is:

The Art, Science and Philosophy of locating and facilitating the reduction of interference to the Neuro-based Allostatic responses of the body.

al-lo-sta-sis  
,ala-'stāsis/  
noun  
the process by which the body responds to stressors in order to regain homeostasis.

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Working Definitions

**SUBLUXATION**

Abnormal Neurological Pattern – a pattern that is not in the best interest of the body long term

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**SUBLUXATION**

- The new definition of subluxation to be used in the 4th edition of the CCP guidelines
- Subluxation is a neurological imbalance or distortion in the body associated with adverse physiological responses and/or structural changes, which may become persistent and progressive. The most frequent site for the chiropractic correction of subluxation is via the vertebral column.

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Working Definitions

**Dysponesis (Subluxation)**

Dys = abnormal or impaired

ponos = effort, work or energy.

A reversible pathophysiologic state consisting of unnoticed, misdirected neurophysiologic reactions to various agents (environmental events, body sensations, emotions, and thoughts)

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## Dysponesis

These errors in energy expenditure which are capable of producing functional disorders, consist mainly of covert errors in action-potential output from the motor and premotor areas of the cortex and the consequences of that output.

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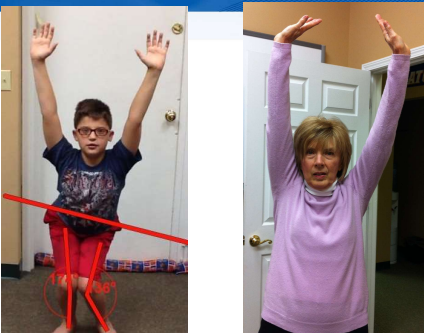
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Noxious Neurological Input = Aberrant Motor Output

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## Initial Examination

- Structural (Passive)
  - Observation
  - 3D Foot Scan
  - X rays AP LAT Cervical and Lumbar
  - Digital Posture Exam
- Functional (Active)
  - ROM, TP, Functional Squat Test, Ortho Exam
- Neurological (Control System)
  - Hand Shake
  - Reflexes
  - Bio Chart
  - Stress Response Evaluation

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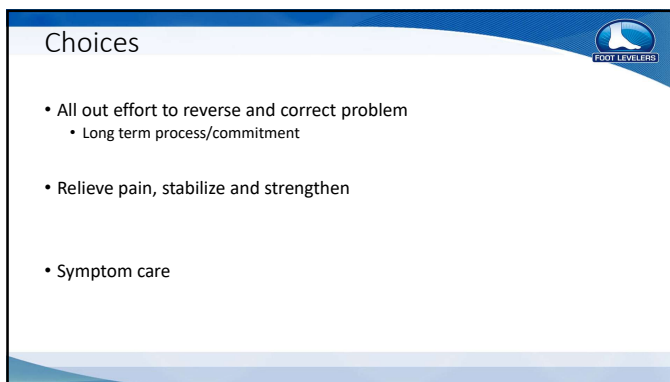
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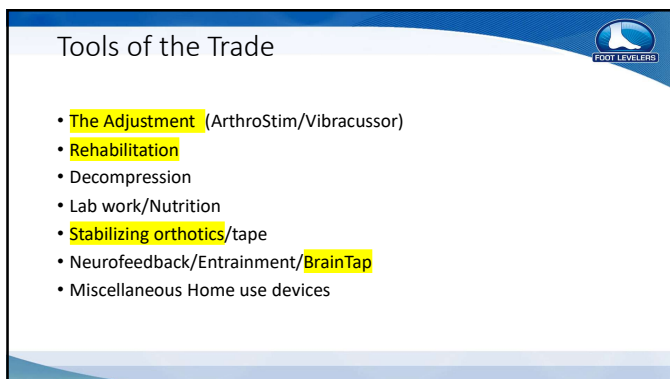
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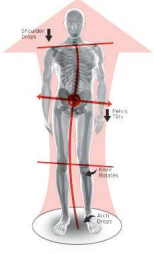


**Primary Complaints**







- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Goals**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



**Recommendations**

-  Chiropractic Adjustments ☒
-  Therapeutic Exercise ☒
-  Decompression ☒
-  Custom Orthotics ☒
-  Brain Test ☒
-  Pillows/Tools/Other ☒

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"The patient must combat the disease along with the physician." Results are not guaranteed - they are earned, by patients who are willing to work alongside of the doctor.

Hippocrates



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### Offer More



- Most people need more care over a longer period of time to achieve a healthy adaptive nervous system.
- Pain relief comes quickly
- Document progress
- Offer Rehab
- Posture restoration
- Balance / Strength Training
- Decompression

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### Frequency and Duration



- "it seems like it has taken a long time to get better..."  
22,630
- Attach yourself to the process, not the outcome. The outcome you desire is the result of the process.



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An enhanced approach to  
an old problem

The Stress Response



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Fight or Flight

The Physiology of Stress



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## Physiological Responses

- Fast Brain Waves (Beta) ↑
- HR RESP BP Cortisol Cholesterol Adrenaline  
Neck/Shoulder Muscle Tension ↑
- Digestion, Reproduction, Immune, Hand/Foot Temp ↓
- This is a NORMAL RESPONSE (SYMPATHETIC)
- Parasympathetic NS reverses these processes,
  - Rest, Heal, Repair, Grow

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A family of five were treated at the Saunders County Community Hospital Monday afternoon and released with only very minor injuries following this airplane crash in a soybean field three-quarters of a mile east of the Weston corner about 1 p.m. Monday.

## Family of Five Unhurt

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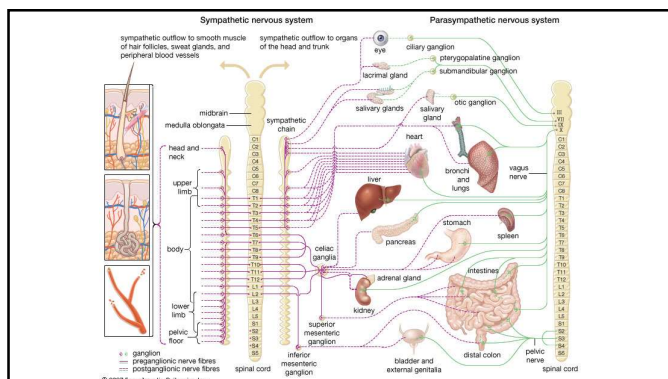
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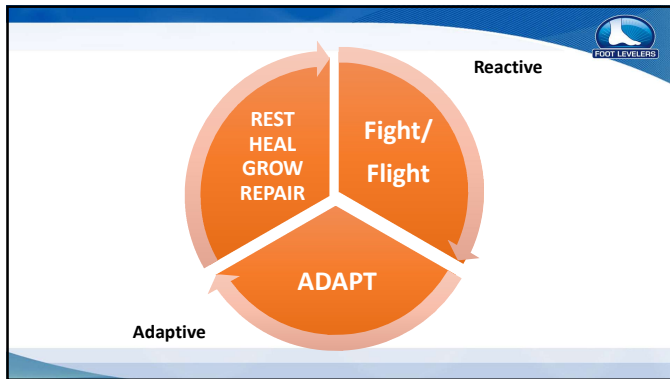
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### Adaptive Capacity

- You can't control stress, but you can manage your adaptive capacity
- When stressors exceed your adaptive capacity, you will develop problems
- Symptoms/Conditions are the consequence of a process

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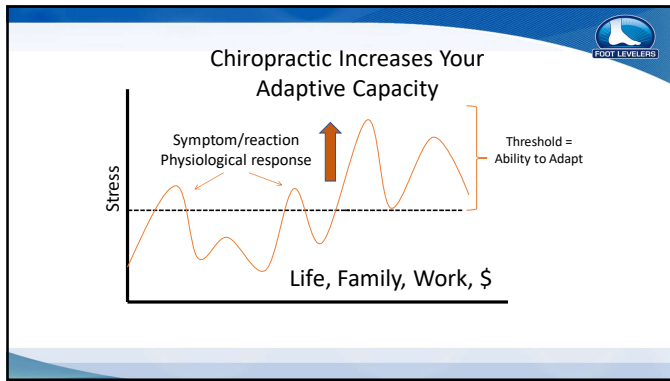
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**Failure to adapt...**

- Symptoms
- Pain
- Dysfunction
- Diagnosable Condition
- Disease
  - How do I know if I'm stuck in a pattern?

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**New Patient**

- Observation/Consultation
- Bio Chart
- Structural Exam/ Foot Scan
- X rays
- Posture Exam
- Stress Response Evaluation

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# The Stress Response Evaluation

The Physiology of Stress

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# Something to Consider

- The Conscious Brain
  - 40 bits/second
- The Subconscious Brain
  - 40,000,000 bits/second

- The Biology of Belief- Lipton

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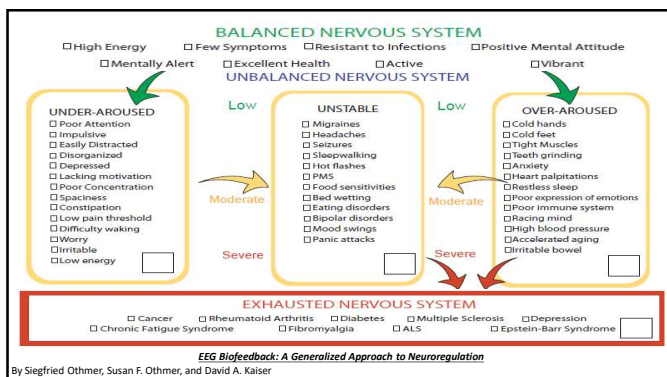
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## Suggested Reading

- The Biology of Belief- Lipton
- Breaking the Habit of Being Yourself-Dispenza
- Why Zebras don't get Ulcers- Sapolsky
- The Honeymoon Effect-Lipton
- Spark-Ratey
- The Brain that Changes itself- Doidge



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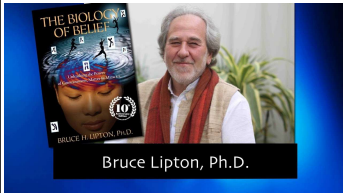
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"The body can defend itself  
(Flight Fight)...  
or grow (Heal)...

It can not do both at the same  
time!"



Bruce Lipton, Ph.D.



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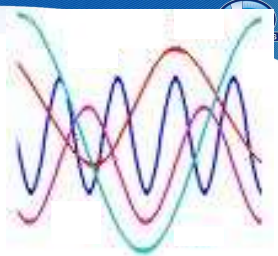
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## Gray Matters

- the perfect waves

Beta Waves  
Alpha Waves  
Theta Waves  
Delta Waves



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### 3 Levels of Beta



- Low Range 13-15 Hz Attention without vigilance (reading a book)  
SMR- frequency of the ArthroStim Instrument (defrag computer)
- Mid Range 16-22 Hz Focused attention on sustained external stimuli
  - Conscious Rational Thinking
- High Range 22-50 Hz Short term survival mechanism, Long term source of stress- Produces Stress chemicals- Too much focused concentration on environment

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### High Range Beta



- Anxiety
- Worry
- Anger
- Pain
- Suffering
- Frustration
- Fear
- Competitive States of Mind



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### High Range Beta



- High beta in the short term is good! Survival
- Long term emergency mode
  - Requires immense amounts of energy
  - Creates imbalance in brain function
  - Affects Heart, Digestion, Reproduction, Immune function, insulin insensitivity, obesity
- High Beta- incoherent brain signals/stress chemicals (the outer world is the only reality)
- Sustained High Range Beta makes it hard to focus on Our Inner Self

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## Lipton - Cellular Function States

Growth/repair (Alpha/Theta/Delta SLOW )

This is found in the balanced NS which can move freely through response frequencies as the environment demands.

Defense (fight/flight) (Beta FAST) State of high arousal design for crisis management of short duration only .

Cells can only maintain one state at a time and these states are controlled by the nervous system

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## 2005 Research

### Chiropractic Adjustments Effect Change in Brain Wave Function.

The effect of the Chiropractic adjustment on the brain wave pattern as measured by EEG. – R. Barwell, A. Long, A. Byers, C. Schisler – winner 2005 International Research Paper Symposium - Sherman Chiropractic College

## 2007 Research

### Dr. Haavik-Taylor was able to measure how brain waves are altered before and after spinal adjustments.

Research published in the November-December issue of the Journal of Manipulative and Physiological Therapeutics and reported on by Scoop Health from New Zealand on November 23, 2007,

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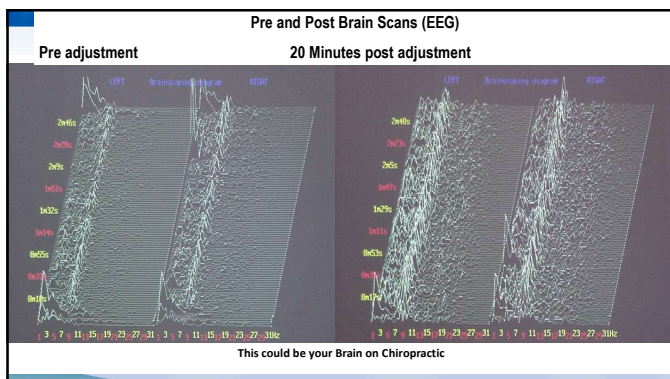
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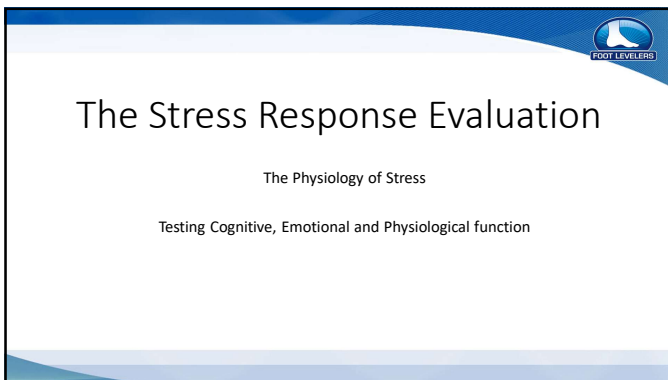
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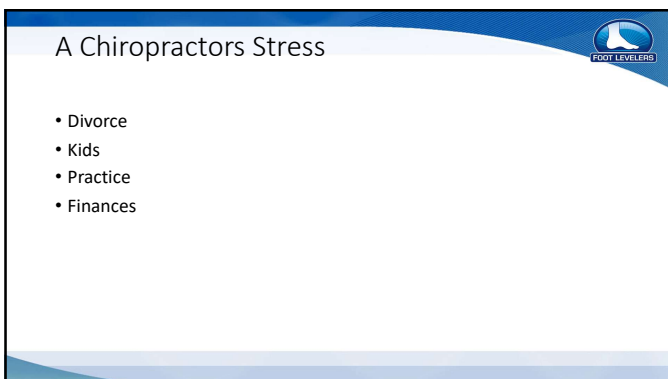
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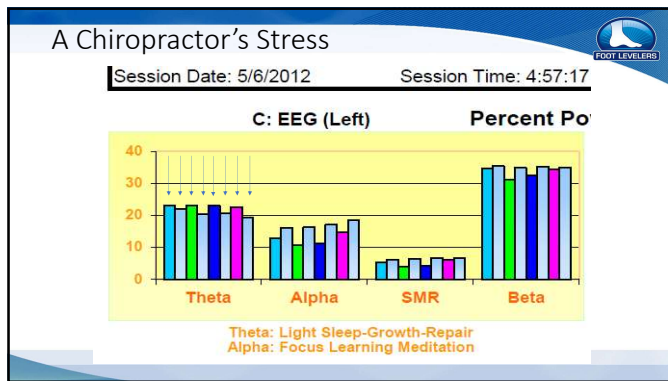
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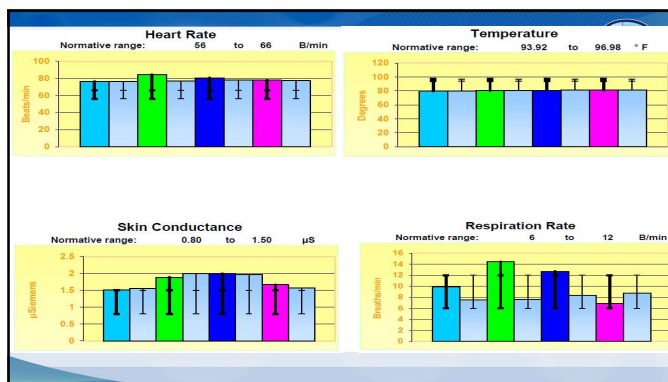
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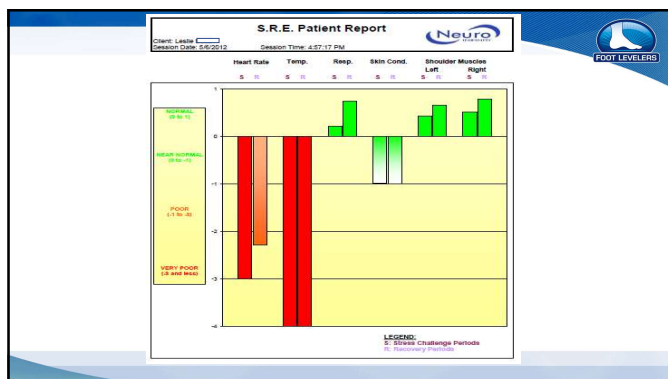
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**Areas to Target**

- Start changing these neurological patterns - chiropractic care
- Improve heart rate
- Improve HRV
- Improve temperature
- Improve SC
- Improve Alpha
- Improve Brainwave pattern
- Add bio/neuro feedback

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**Follow Up Test (Re-exam)**

Find the pattern  
Interrupt the pattern  
Create new patterns

Anxiety, heart rhythm issues, emotional trauma...

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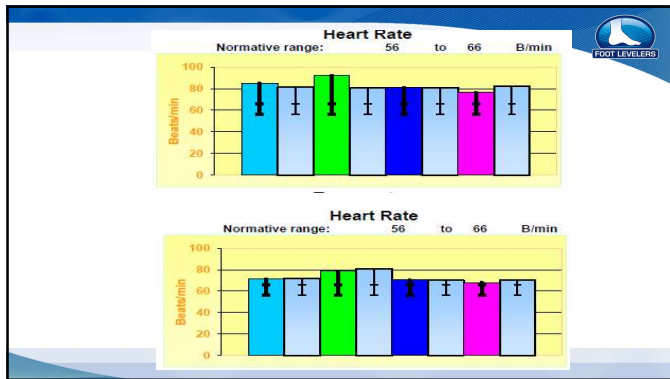
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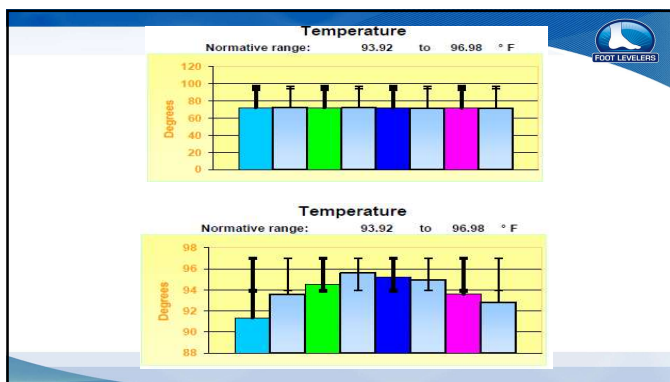
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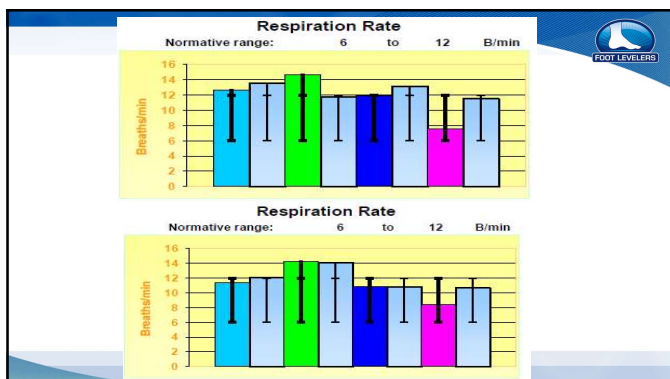
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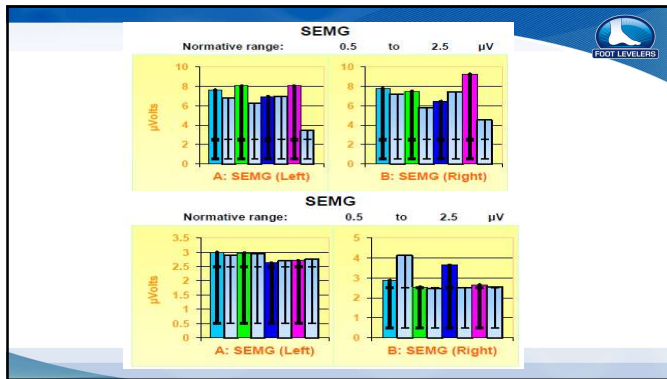
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### BrainTap Frequencies

- Alpha and Theta increase lymphatic flow in the brain, decreasing inflammation, increasing blood flow
- Sleep problems, need more Theta – bridge frequency to Delta
- Training in Alpha improves intuitive brain-planning, creating...
- Chronic pain- train in low beta (SMR)

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### Patterns

- Our Subconscious can drive how we feel
- This drives physiology
- Good or Bad, this physiology can become habituated
- Good News!! The subconscious can learn a new program!

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## BrainTap Headset

- Sharpens the mind
- Provides freedom from stress
- Delivers blissful sleep
- Keeps the brain lively and youthful
- So much more!

- Reduces or eliminates brain fog and negative mind chatter
- Helps increase energy
- Promoted relaxation, which contributes to Healthy Sleep Habits

- Reduced unwanted habits and behaviors
- Enhanced productivity, memory, focus and creativity
- Improved quality of life

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Anxiety /Stress/ Sleep

Habits

Health Problems



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BrainTap Relax, Reboot, and Revitalize your busy brain. Exclusive Offer! GET A FREE 15-DAY GIFT

HEALING YOUR BODY STARTS WITH RETRAINING YOUR MIND



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The nervous system is very plastic



Capable of neuroplasticity and reorganization throughout life

Dr Malik Slosberg, DC MS  
Research update, September 2011

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Stress, trauma, toxicity can damage tissues of the body and adversely cause “smudging” affecting the underlying neural control mapping or patterns that are responsible for coordinating and influencing physiological processes of the tissues.

Dysfunctional neural control patterns or mapping, can be perpetuated via neuroplasticity and may continue to exist long after tissue damage has been repaired. Left uncorrected, these patterns can initiate/perpetuate many of the problems that motivate individuals to seek help.

**Injury**

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The motor cortex appears to have discrete areas dedicated to the activation of individual muscles

These territories or maps in the cortex can change as a result of injury and pain as well as training

Neuroplasticity

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### Neuroplasticity

- Changes in the cortex maps, such as overlapping of territories which normally control separate muscles results in changes in the threshold of firing, inhibition, atrophy, fine motor control and specific firing of small groups of individual muscle fascicles.
- Pain or injury cause maps of discrete neurons to change or SMUDGE
- The distinct area associated with distinct neurons becomes "blurred"

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Discrete maps are smudged and overlap leading to a loss of fine motor control.

Distinct groups of fascicles can no longer be controlled separately and function as a larger block of muscles with less fine discrimination and motor control. (Recruitment)

Neuroplasticity

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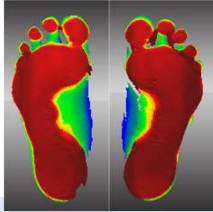
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What is an obvious source of pain and mechanical dysfunction that can cause smudging?



FOOT LEVELERS

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Larger blocks of muscles working together prevents movement of painful or injured area reducing risk of increased stress, excess movement, re injury or increased pain

This results in fine motor control loss and changes in coordination may increase risk of injury due to stiffness, decreased ROM, hypomobility and accelerated degeneration

Neuroplasticity

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Appropriate exercise training and possibly spinal manipulation may be able to reorganize the corticomotor maps and improve motor control

Several studies have demonstrated that specific exercises can lead to both corticomotor reorganization and improved motor function

Neuroplasticity

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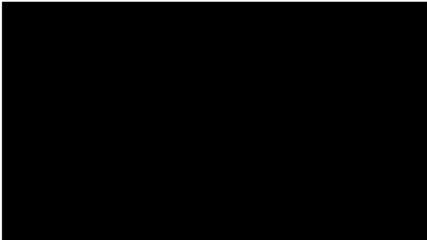
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Creating new neural networks with  
adjusting Technique



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6/22/16, 2:59 PM

11/16/16, 6:10 PM

Your Posture Comparison from the Side View

6/22/16, 2:59 PM

11/16/16, 6:10 PM

Body Region	Shift (Translation)	
	6/22/16 2:59 PM	11/16/16 6:10 PM
Head	2.50" forward	1.08" forward
Shoulder	4.21" forward	1.55" forward
Hips/Pelvis	1.12" backward	0.83" forward
Knees	0.79" forward	1.79" forward
Total Deviations	8.62"	5.06"

Your head weighs approximately 16.0 lb, however, due to the physics of your postural deviations, your 'effective head weight' changes, which means it 'feels heavier' to your body. The effective weight of your head for the exam on 6/22/16 was 55.9 lb and on the follow-up exam dated 11/16/16 it weighed 33.3 lb, accounting for a total change of 40.5%.

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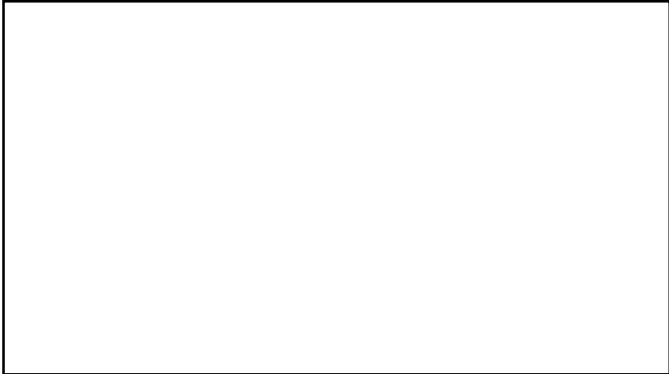
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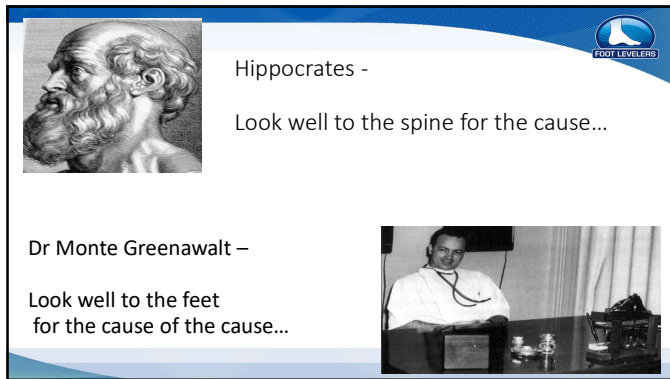
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Slide 90 features a blue header with the 'FOOT LEVELERS' logo. On the left is a black and white portrait of Hippocrates. To its right, the text reads: 'Hippocrates - Look well to the spine for the cause...'. Below this, on the left, is the text: 'Dr Monte Greenawalt - Look well to the feet for the cause of the cause...'. To the right of this text is a black and white photo of Dr. Monte Greenawalt, a man in a white lab coat with a stethoscope, sitting at a desk with a typewriter and other items.

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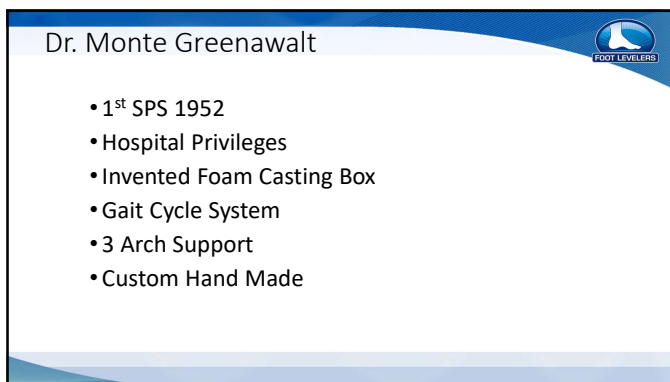
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Slide 91 has a blue header with the 'FOOT LEVELERS' logo. The title 'Dr. Monte Greenawalt' is at the top left. Below it is a bulleted list of achievements: '• 1<sup>st</sup> SPS 1952', '• Hospital Privileges', '• Invented Foam Casting Box', '• Gait Cycle System', '• 3 Arch Support', and '• Custom Hand Made'.

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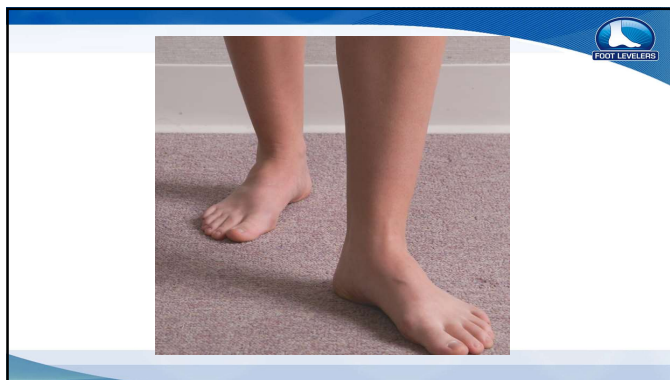
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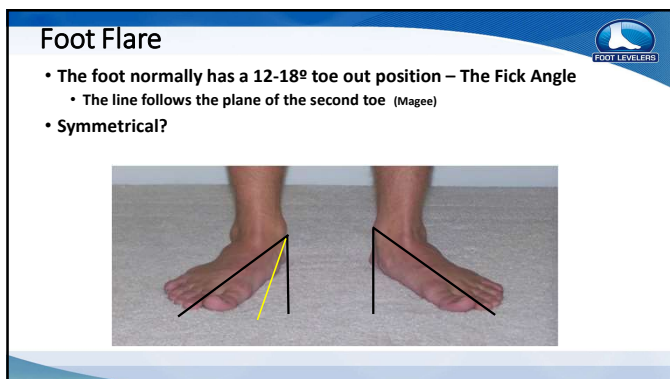
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### Patellar Approximation

- Associated with the Q-angle (Quadriceps angle)
- Lines from the ASIS to the center of the patella and from the tibial tubercle to the center of the patella
- 15-18° WNL (Men ↓ Women ↑)
  - Magee

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### Bowed Achilles Tendons

Bowed Achilles Tendons Indicates excessive pronation

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### Low Medial Arches

- Decreased Medial Longitudinal Arches
  - Commonly termed – fallen arches
- Navicular Drop Test
  - Postural Stability Indicator (PSI Card)
    - Magee
    - Cook - Hegedus
    - FL



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**Uneven Wear Pattern**

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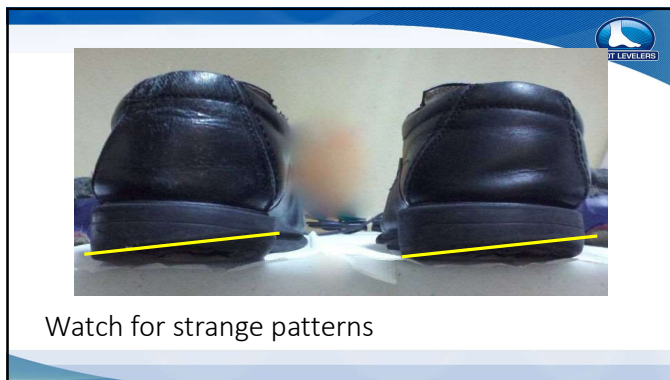
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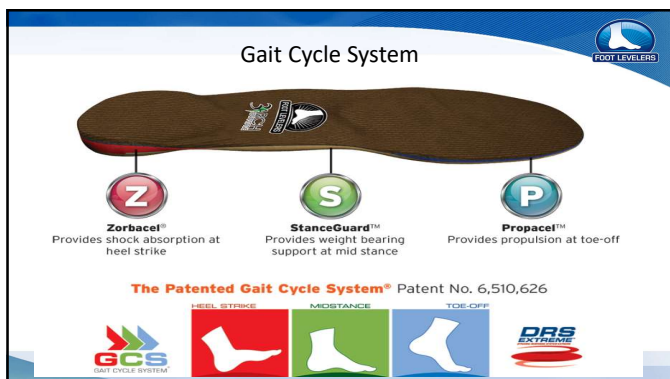
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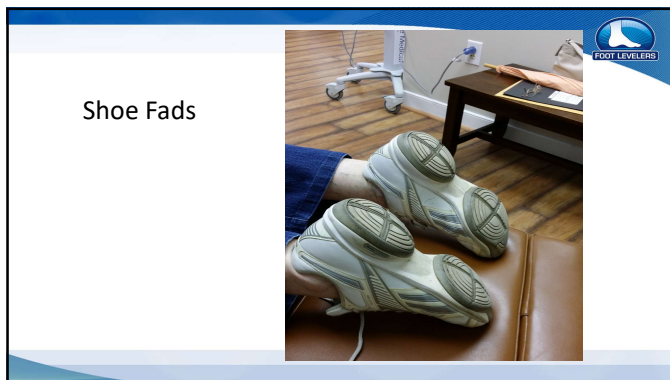
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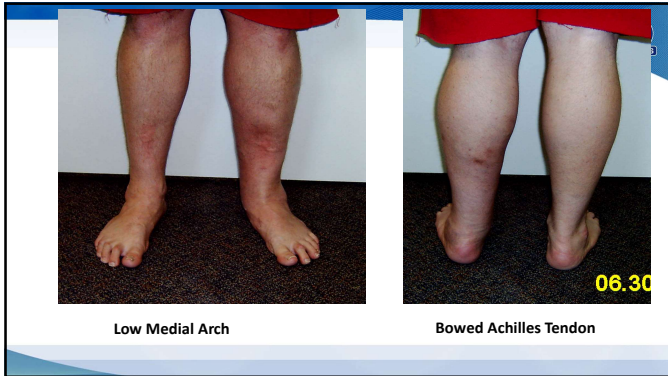
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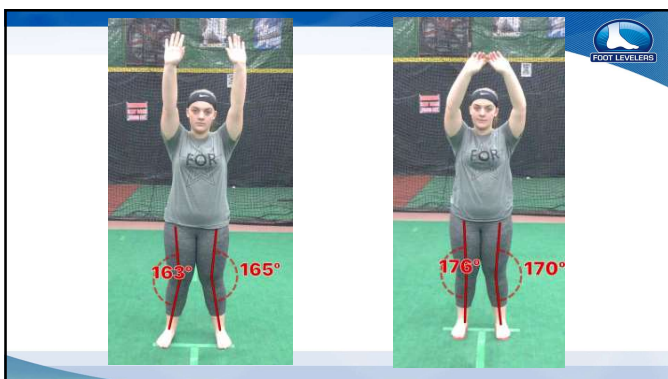
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## Lower Extremity Biomechanics

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## Research: Sports Medicine

- The amount of navicular drop (an indicator of excessive pronation) is greater in people who tear their anterior cruciate ligament.

Beckett M, et al: *Incidence of hyperpronation on the ACL injured knee: A clinical perspective*, Athletic Training, 1992 (27) 58-62

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## The Revised Navicular Drop Test: Inter- and Intra- Examiner Reliability of an Improved Test for Medial Arch Collapse

John K Hyland DC, Gary Brazzelli  
2001 WFC – 6th Biennial Congress, Paris, France, May 24-26, 2001



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## Patient Education

### The Ah-ha moment

- Foot Spine Connection
- Foot Knee Connection
- Posture

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## Check the Hips

### Hibb's Test



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## Foot Levelers Kiosk



### Let's take a look at the Feet!

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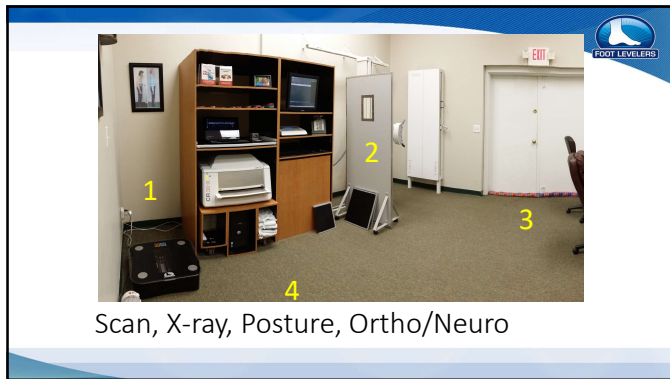
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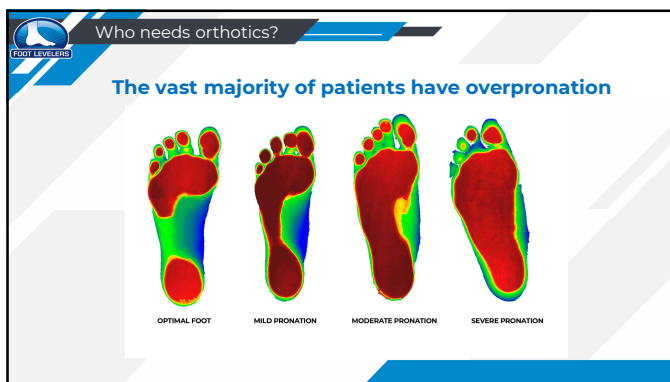
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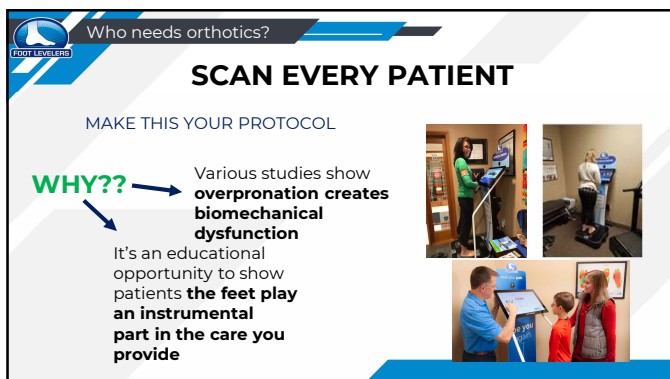
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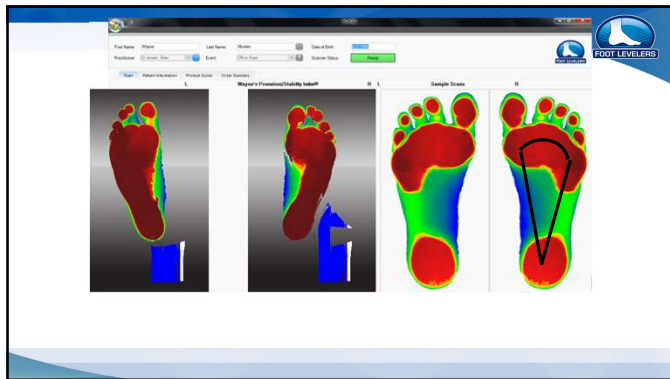
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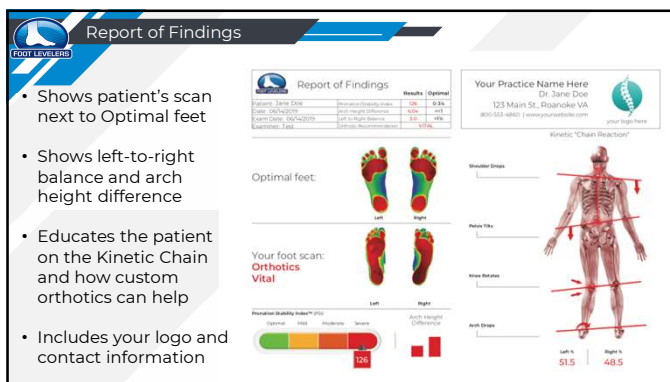
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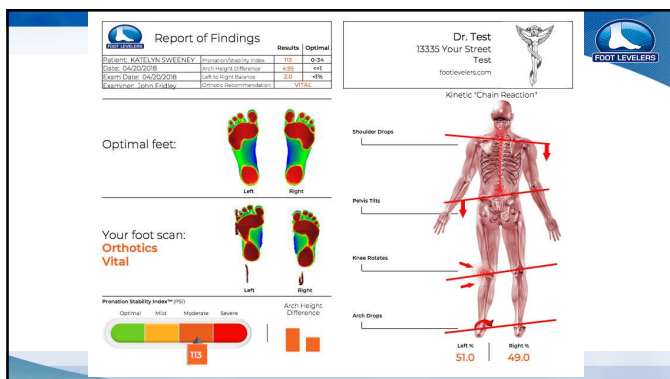
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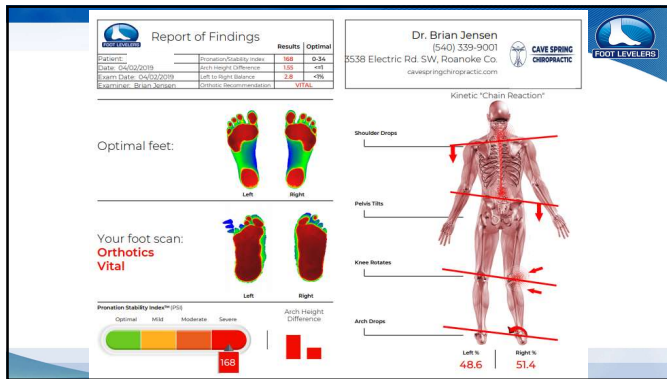
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**2nd Page of ROF**

- Check for forward head carriage and posture
- Helps explain foot-spine connection
- Reminder about benefits of multiple pairs of custom orthotics

**Posture (without orthotics)**

**Corrected Posture (with orthotics)**

**Tech Neck** — Forward Head Carriage — Increased Load on Spine

**Low Back Pain** — Rounded Shoulders — Thoracic Extension — Sacral — Abnormal Wearing — Asymmetrical Stress

**Knee Pain** — Shin Splints — Ankle Tendinitis — Plantar Fasciitis

By stabilizing the feet, custom orthotics improve posture and help reduce pain.

Based on your report, multiple pairs of custom orthotics are recommended.

170

**Patented Design**

Foot Levelers is the **ONLY** company that makes custom orthotics to support all 3 arches of the foot.

**Foot Levelers holds the patent on this technology!!**

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## Plantar fascia

The plantar fascia is richly innervated especially where it joins with the myofascia of the abductor hallucis and abductor digiti minimi. Together with the flexor hallucis longus and flexor hallucis brevis muscles, abductor hallucis aids the flexion of the big toe.

The muscle also helps in maintaining the medial longitudinal arch of the foot while walking.

Abductor hallucis muscle is innervated by the medial plantar nerve (S1 - S3), the larger of the two terminal branches of the tibial nerve.

Pacini and Ruffini corpuscles were also observed suggesting that the plantar fascia has a role in proprioception, stability and in peripheral motor control of foot movements.

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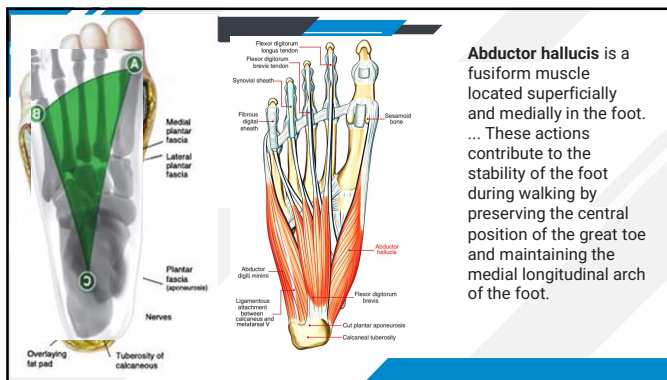
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The image contains two diagrams illustrating reflex arcs. The top diagram shows a simple muscle stretch reflex arc: a muscle spindle is stretched, which causes reflex contraction of the muscle-tendon complex. The bottom diagram shows a simple inverse stretch reflex arc: the stretch of the Golgi tendon organ (GTO) causes reflex inhibition of the muscle-tendon complex, leading to relaxation.

**Simple muscle stretch reflex arc:** the stretch of the muscle spindle causes reflex contraction

**Simple inverse stretch reflex arc:** The stretch of the GTO causes reflex inhibition. (Relaxation)

Accompanying images include a photograph of a hand pressing a button and a diagram of a foot showing the location of the muscle spindles and Golgi tendon organs in the plantar fascia.

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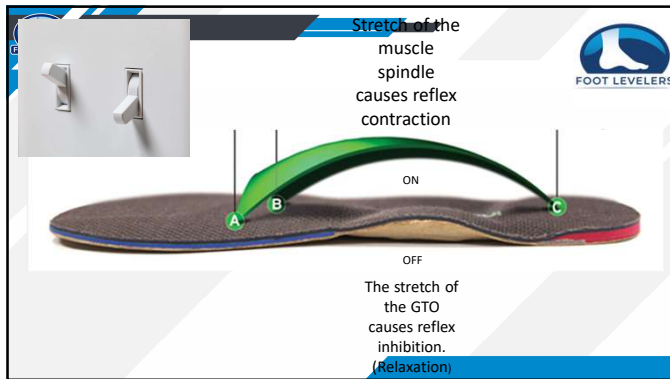
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Chiropractic offers the Best Option Because

- What's the second thing you do after you whack your elbow on the door frame?

You Rub it!

Proprioception vs. Nociception



FOOT LEVELERS

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**Plantar fascia**

The fundamental role of the plantar fascia is to:

- support the medial, lateral, and transverse arches
- dissipate the shock forces generated during gait
- provide propulsion from the stored strain energy in the tissue.

FOOT LEVELERS

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**Research-Proven**

- Foot Levelers custom orthotics are backed by many clinical research studies
- A recent study published in the **"Archives of Physical Medicine and Rehabilitation"** proved Foot Levelers custom orthotics reduce Low Back Pain by **34.5%!**
- The same study found Foot Levelers custom orthotics **improve function by 18.5%!**

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**Radiographic Evaluation of Weight Bearing Orthotics and their Effect on Flexible Pes Planus**  
JMPT 1999; 22:221-6  
 Kuhn, Shibley, Austin, Yochum

- Biomechanical Faults in the Pedal Foundation can adversely affect ANY of the joints and structures of the Foot/Ankle complex, lower extremities, pelvis and spine
- (Upper Extremity???)
- Conclusion-This study supports the use of a custom made flexible orthotic for the improvement of pedal structural alignment

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**Orthosis / Orthotic**

- a device or support, esp. for the foot, used to relieve or correct an orthopedic problem

**Stabilizing Orthotics**

- a support for the foot, used to block excessive pronation but allow full range of motion of the foot

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**What do Stabilizing Orthotics do?**

- Provide a balanced symmetrical foundation
- Enhance the effectiveness of treatment (adjustments/manipulation)
- Improves the quality of life by relieving postural stress
- Enhances Movement and Optimal Performance

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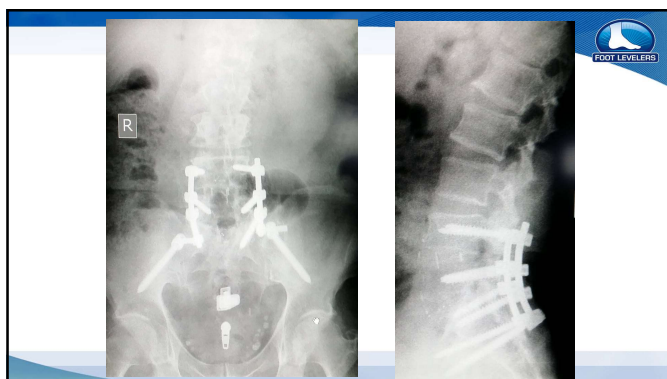
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## Functional Movement

They can't throw dirt on you if  
your still movin'

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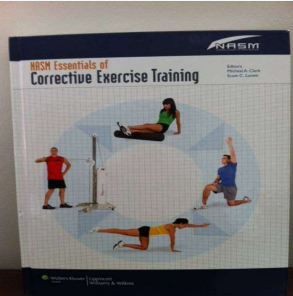
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**Dr. Kim Christensen**

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## The Functional Squat Test

- With your feet shoulders width apart, hands straight up in the air, squat down like you're sitting in a chair
- Perform the test without shoes
- Repeat test standing on sample orthotics
- Video Capture the results and analyze

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## Functional Squat

- The optimal pattern of movement that we are looking for...
  - Knees over feet
  - Hips and shoulders level
  - Arms cover ears
  - Torso and lower leg parallel

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## Functional Position

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Forward Pelvic Tilt      Backward Pelvic Tilt

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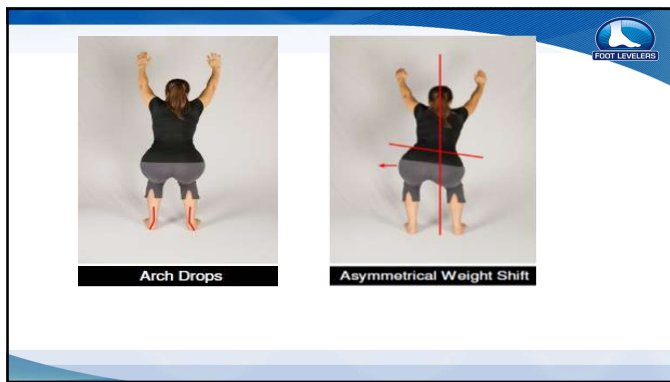
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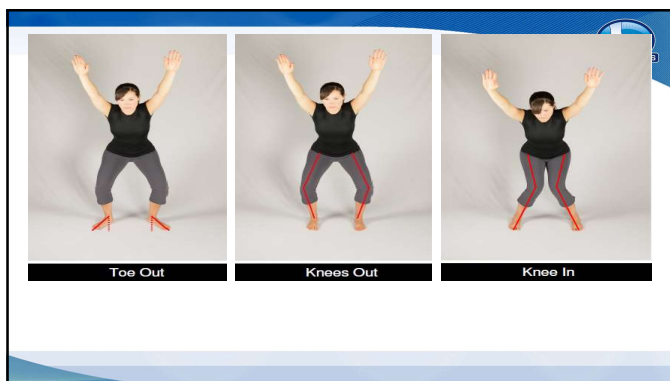
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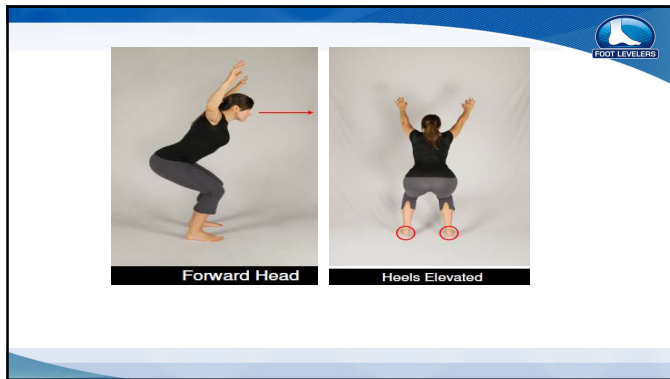
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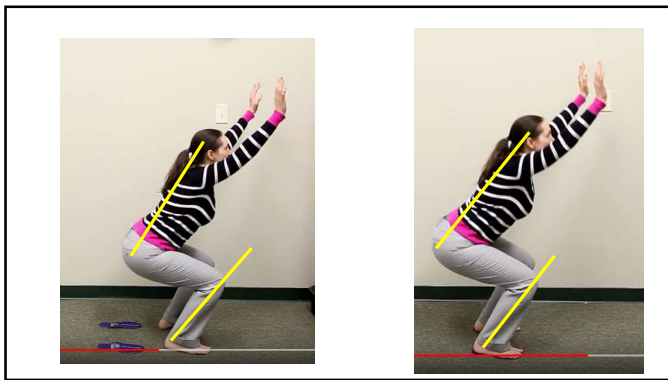
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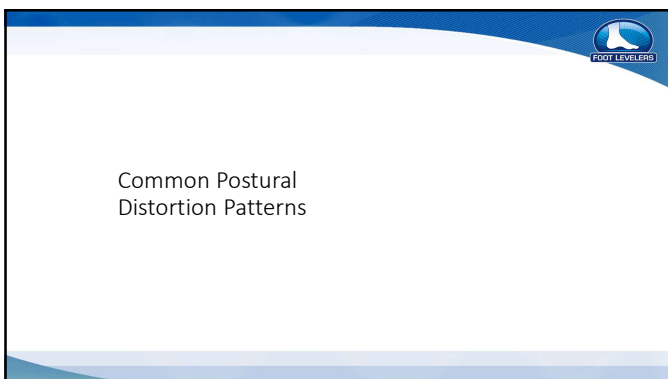
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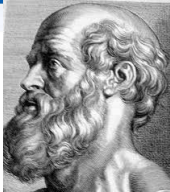
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**Hippocrates –**  
Look well to the spine  
for the cause of disease



**Greenawalt –**  
Look well to the feet  
for the cause of the  
cause...

FOOT LEVELERS

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1. Pelvic Tilt



FOOT LEVELERS

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2. Anterior Pelvic Translation

FOOT LEVELERS

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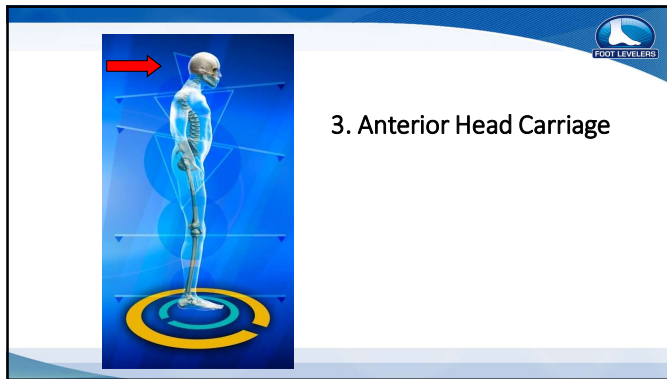
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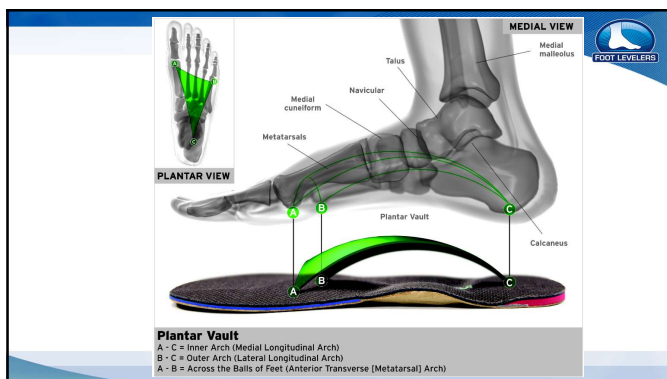
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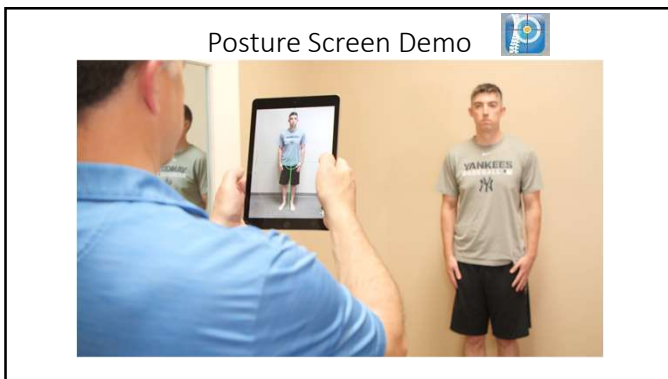
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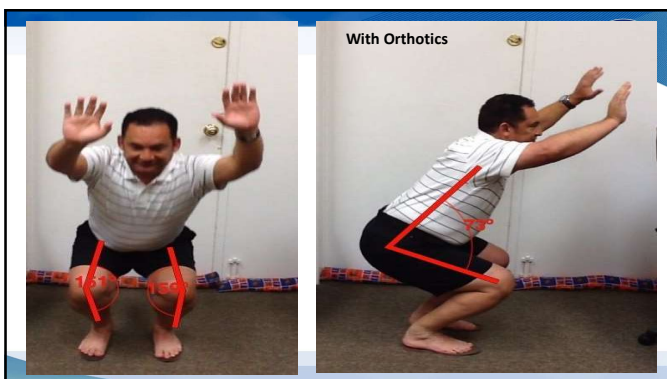
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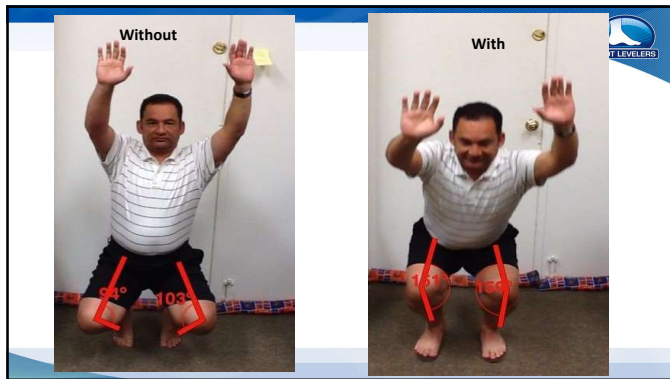
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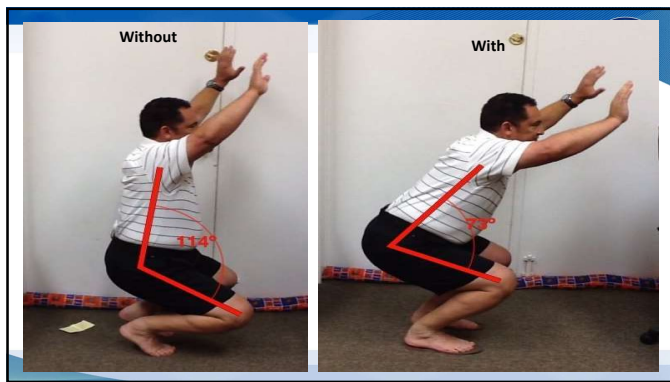
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**Without Proprioceptive Test Orthotics**



Finding	Possible Overactive Muscles	Possible Underactive Muscles	Possible Injuries
Left Knee Moves Outward	Perforans Biceps Femoris TFL/Gluteus Minimus	Adductors Complex Medial Hamstring Gluteus Maximus	Patellar Instability Patellofemoral Syndrome ACL Injury IT Band Tendinitis
Right Foot Turns Outward	Soleus Lat Gastrocnemius Biceps Femoris Perforans Tensor Fascia Latae	Medial Gastrocnemius Medial Hamstring Gluteus Medius/ Maximus Peroneus Tarsalis Popliteus	PERONEAL FASCITIS Achilles tendonopathy Medial Tibial Stress Syndrome Ankle Sprains Flatfoot Pronated Foot/Anatomy
Left Foot Turns Outward	Soleus Lat Gastrocnemius Biceps Femoris Perforans Tensor Fascia Latae	Medial Gastrocnemius Medial Hamstring Gluteus Medius/ Maximus Peroneus Tarsalis Popliteus	PERONEAL FASCITIS Achilles tendonopathy Medial Tibial Stress Syndrome Ankle Sprains Flatfoot Pronated Foot/Anatomy

Adapted from: Clark, Micheal, and Scott Lucett. "Movement Assessments." NASM Essentials of Corrective Exercise Training. Baltimore: Lippincott Williams & Wilkins, 2011. 108-120.

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**Patellar tendinopathy treatment options**

Treatment of jumper's knee begins with rest or adapting your routine to avoid putting stress on the knee. Your care team will help you to identify and correct any errors in the way you train or the way you use equipment so that your symptoms do not recur.

Over-the-counter anti-inflammatory medications such as ibuprofen may reduce pain, but they do not help to heal the tendon if symptoms have been present for several weeks. Those medications are typically not recommended for chronic patellar tendinopathy treatment. Ice and compression are better options for managing the pain.

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**If simple rest and changes in your activity do not reduce your pain, the next steps include:**

Evaluation by a physical therapist, who may suggest exercises to strengthen your lower body and improve your movement.

Wearing a patellar tendon strap around the knee, which can reduce strain. Wearing a strap is a temporary measure. It is not a substitute for physical therapy or adapting your training routine.



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**Patellofemoral Syndrome**

The most common symptoms in patients with PFPS are pain during and after physical activity, during **bodyweight loading of the lower extremities in walking up/down stairs and squatting, and in sitting with the knees flexed.** However, the **source of patellofemoral pain in patients with PFPS cannot be sufficiently explained.** There are several types of clinical manifestation of pain, and therefore a differentiated documentation of the patient's pain symptoms is necessary. The connection between strength, pain and inhibition, as well as between personality and pain, needs further investigation

Sports Med 1999 Oct; 28 (4): 245-262 0112-1642/99/0010-0245/\$09.00/0

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Format: Abstract - Send to -

*Just J Physiother*, 2008 55(1):9-15

**Females with patellofemoral pain syndrome have weak hip muscles: a systematic review.**

Prins MB<sup>1</sup>, van der Wouff P<sup>2</sup>

<sup>1</sup> Author information

**Abstract**

**QUESTION:** Do females with patellofemoral pain syndrome have decreased hip muscle strength compared with the unaffected side and with healthy controls?

**DESIGN:** A systematic review of observational studies published up to January 2008.

**PARTICIPANTS:** Females with patellofemoral pain syndrome and healthy controls.

**OUTCOME MEASURES:** Strength for at least one hip muscle group had to be included in the study. Hip muscle strength was recorded as force or torque.

**RESULTS:** Five cross-sectional studies with a mean Newcastle-Ottawa Assessment Scale score of 6 out of 9 met the inclusion criteria. Strong evidence was found for a deficit in hip external rotation, abduction and extension strength, moderate evidence for a deficit in hip flexion and internal rotation strength, and no evidence for a deficit in hip adduction strength compared with healthy controls. Moderate evidence was found for a decrease in hip external rotation and abduction strength but no evidence for a decrease in hip extension, flexion, adduction and internal rotation strength compared with the unaffected side.

**CONCLUSION:** Females with patellofemoral pain syndrome demonstrate a decrease in abduction, external rotation and extension strength of the affected side compared with healthy controls.

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**With Proprioceptive Test Orthotics**

Finding	Possible Overactive Muscles	Possible Underactive Muscles	Possible Injuries
No abnormal significant findings are noted in this movement screening.			

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**Without Proprioceptive Test Orthotics**

Finding	Possible Overactive Muscles	Possible Underactive Muscles	Possible Injuries
Left Knee Moves Outward	Piriformis Soleus Femoris TFL/Obliques Minimus	Adductors Complex Medial Hamstring Gluteus Maximus	Patellar Tendinopathy Patellofemoral Syndrome ACL Injury IT Band Tendinitis
Right Foot Turns Outward	Soleus Lat Gastrocnemius Soleus Femoris Piriformis Tensor Fascia Latae	Medial Gastrocnemius Medial Hamstring Gluteus Medius/ Maximus Peroneus Pectineus	PERONEAL FASCIITIS Achilles Tendinopathy Medial Tibial Stress Syndrome Ankle Sprains Plantar Fasciitis Soleus Tendinopathy
Left Foot Turns Outward	Soleus Lat Gastrocnemius Soleus Femoris Piriformis Tensor Fascia Latae	Medial Gastrocnemius Medial Hamstring Gluteus Medius/ Maximus Peroneus Pectineus	PERONEAL FASCIITIS Achilles Tendinopathy Medial Tibial Stress Syndrome Ankle Sprains Patellar Tendinopathy

Adapted from: Clark, Michael, and Scott Lucett. "Movement Assessments." NASM Essentials of Corrective Exercise Training. Baltimore: Lippincott Williams & Wilkins, 2011. 108-120.

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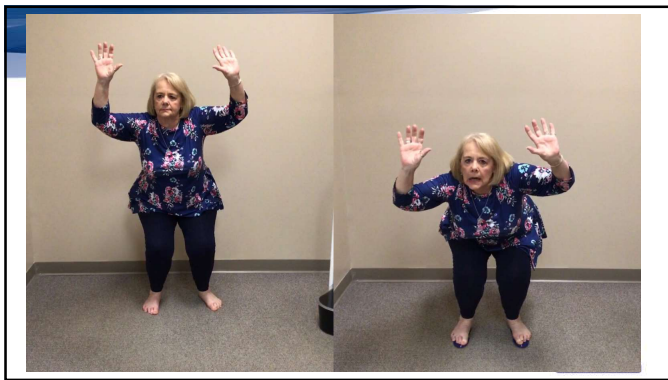
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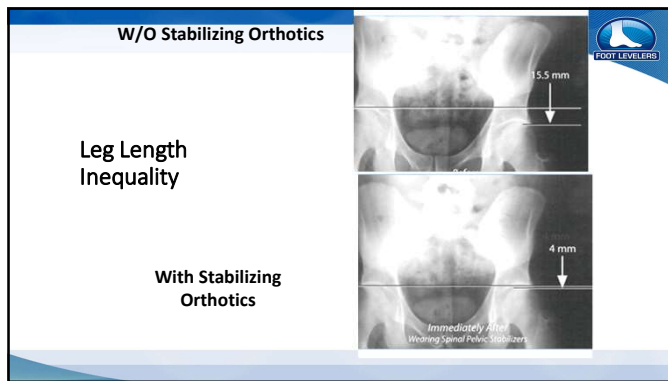
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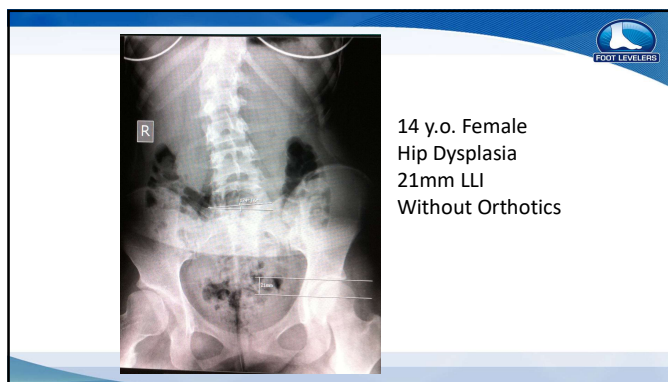
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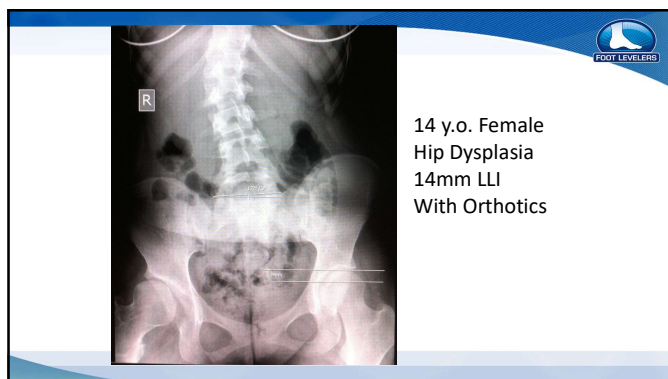
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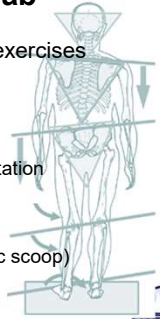





## Low Tech Rehab

2 Primary areas- 4 basic exercises

1. Cervico-thoracic
  - Posterior Translation
  - Upper Extremity External Rotation
2. Lumbar
  - Slouch Arch
  - Transverse Abdominis (pelvic scoop)

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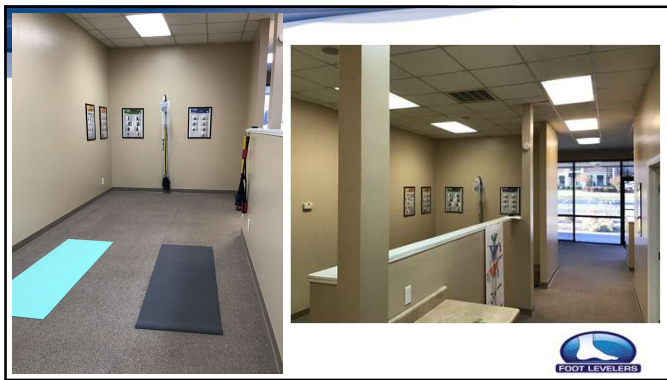
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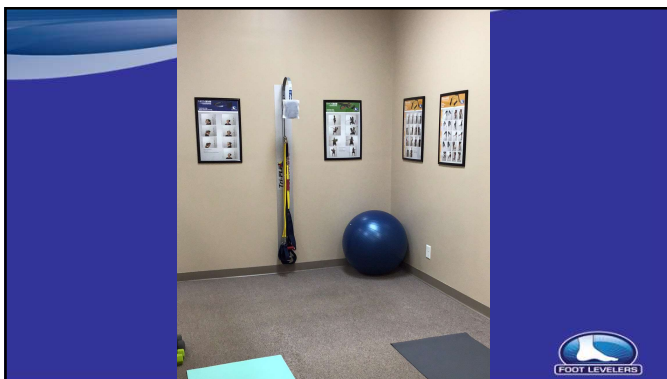
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## Postural Research



- Research indicates that anterior head translation is fundamentally accepted as abnormal and that in general, posture evaluation is repeatable and reliable.
  - JMPT Vol 23 No 9 Nov Dec 2000
- For each inch of forward head carriage, the cervical spine carries an additional 10 lbs. of weight
  - Cailliet, Soft Tissue Pain and Disability

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## The effect of adding forward head posture corrective exercises in the management of lumbosacral radiculopathy: a randomized controlled study.



### • 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 lumbosacral radiculopathy.
- [Journal of Manipulative Physiol Ther.](#) 2015 Mar-Apr;38(3):167-78. doi: 10.1016/j.jmpt.2014.11.009. Epub 2015 Feb 20. [Moustafa IM<sup>1</sup>](#), [Diab AA<sup>2</sup>](#).

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### Conclusions

Participants with FHP exhibited abnormal sensorimotor control and autonomic nervous system dysfunction compared to those with normal head alignment.


[Previous article in issue](#)
[Next article in issue](#)


### Abbreviations

CVA, craniovertebral angle; FHP, forward head posture; OSI, overall stability index; SPNT, smooth pursuit neck torsion test; SSR, sympathetic Skin response outcomes.

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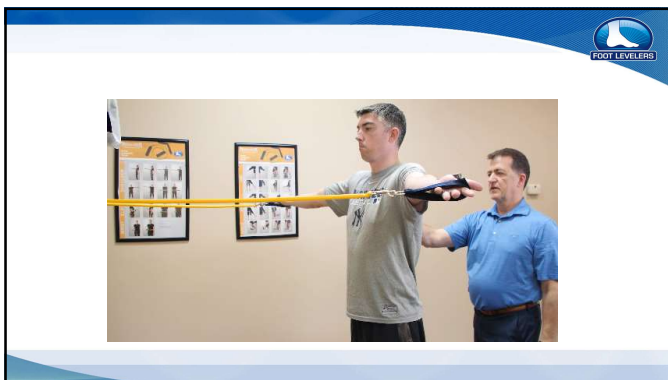
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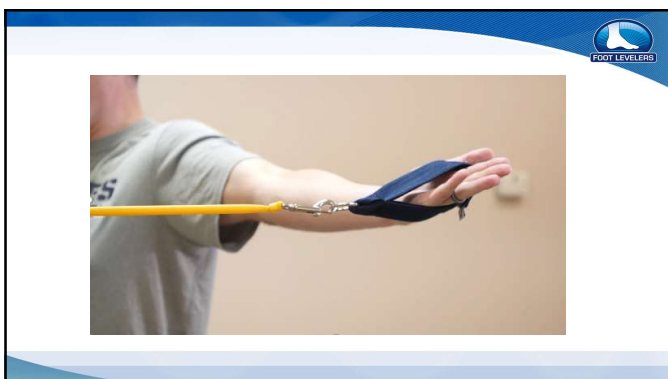
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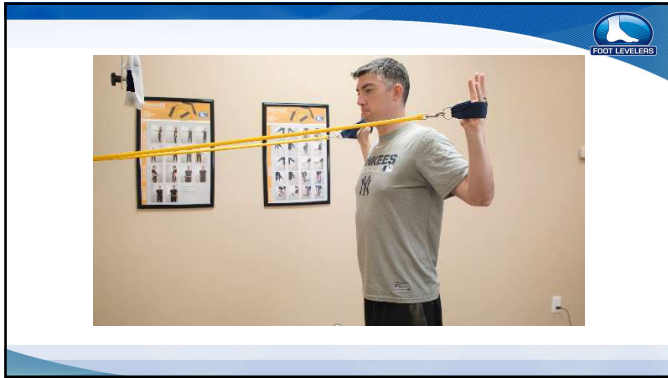
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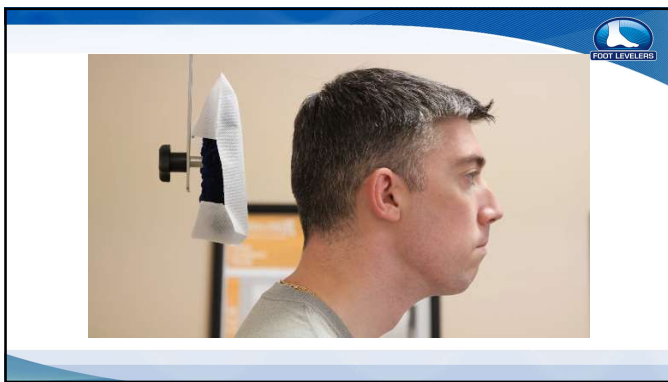
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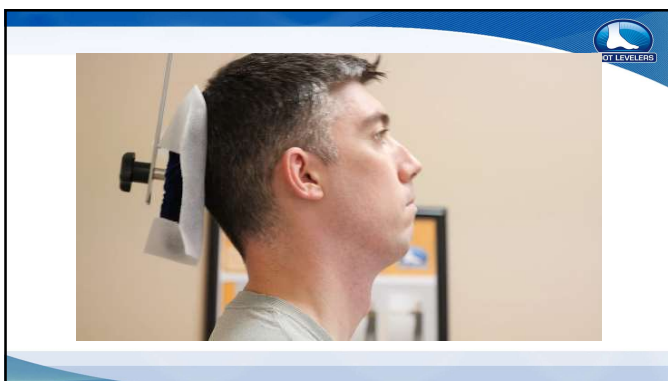
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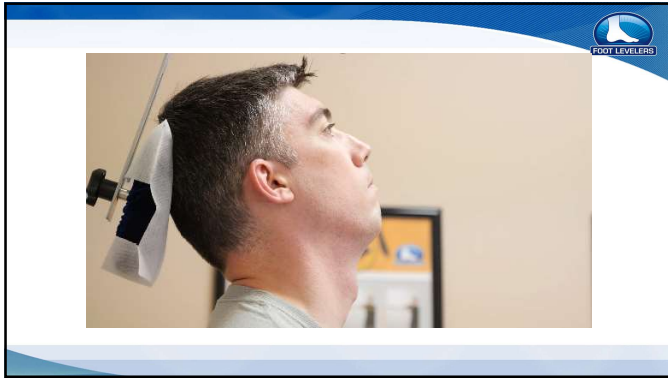
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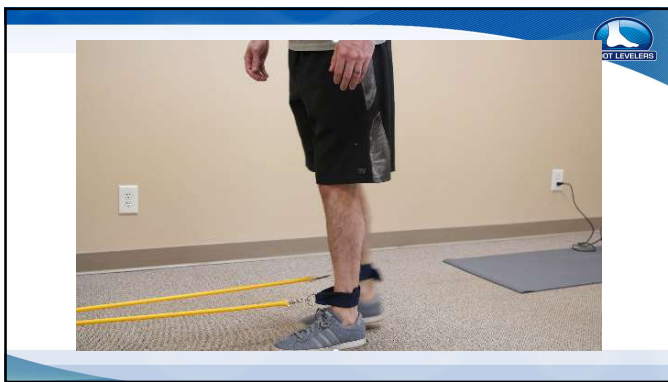
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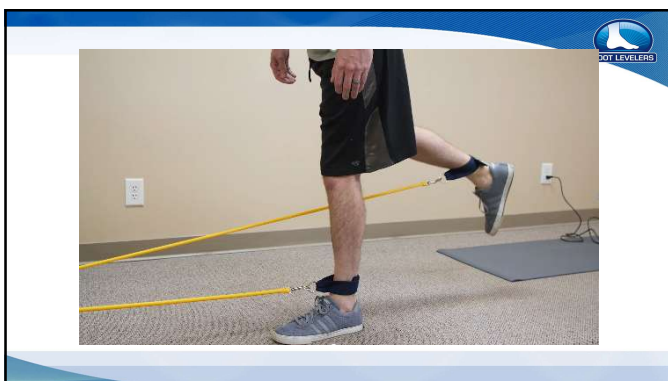
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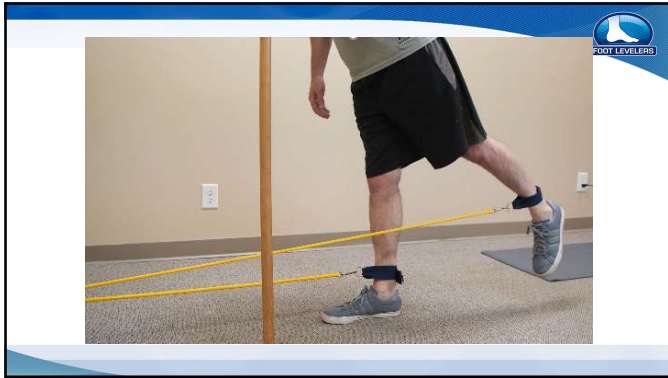
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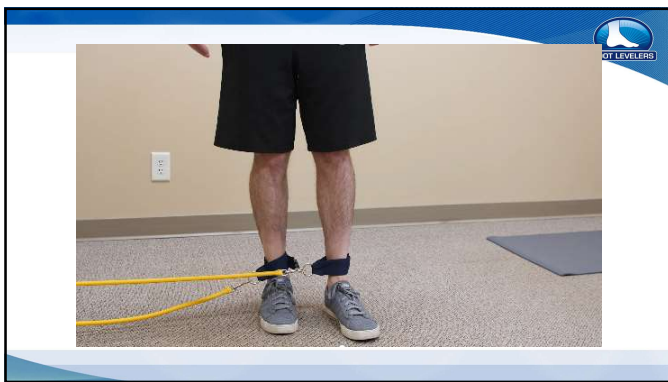
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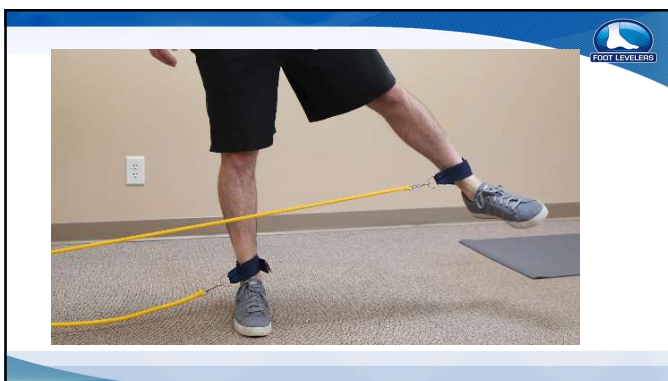
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## Anterior Cervical Translation



### Your Posture Viewed from the Side

Your head weighs approximately 9.8 lb. It is shifted 1.80" forward, 16.9° off vertical.  
Based on physics, your head now effectively weighs 27.4 lb instead of 9.8 lb.

Shoulders are shifted 2.61" backward, 7.2° off vertical.

Hips are shifted 0.42" forward, 2.0° off vertical.

Knees are shifted 0.79" forward, 3.2° off vertical.

Posture Index® Values: Side View	
Total Shifts	5.61"
Total Tilt	29.4°

Effective Head Weight  
**27.4 lb**

- Demonstrate forward head carriage with hands or on digital photos
- Observe patients hands to identify rounded shoulders

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### Your Posture Comparison from the Side View

4/18/19

Body Region	Shift (Translation)
	2/25/19 3:43 PM
Head	1.80" forward
Shoulder	2.61" backward
Hips/Pelvis	0.42" forward
Knees	0.79" forward
Total Deviations	5.61"

4/18/19 4:20 PM

1.36" forward

1.82" backward

0.95" forward

1.08" forward

5.19"

Your head weighs approximately 9.8 lb, however, due to the physics of your postural deviations, your 'effective head weight' changes, which means it 'feels heavier' to your body. The effective weight of your head for the exam on 2/25/19 was 27.4 lb and on the follow-up exam dated 4/18/19 it weighed 23.2 lb, accounting for a total change of 15.6%.

Its Pending Internationally © PostureCo, Inc. www.PostureAnalysis.com

**PostureScreen®**  
Accurate Postural Assessment

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**POST LEVELERS**

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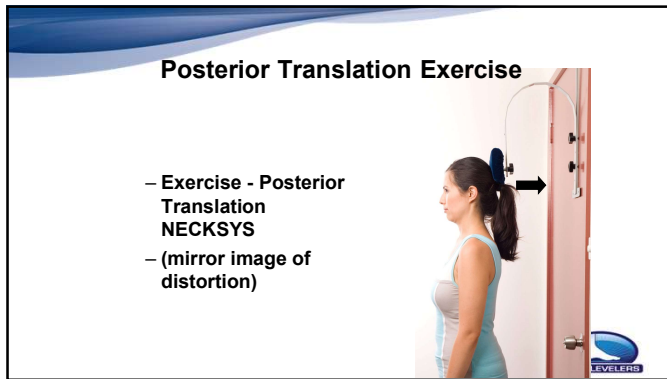
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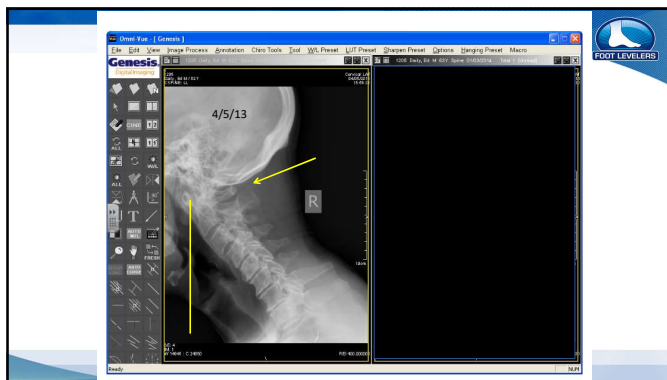
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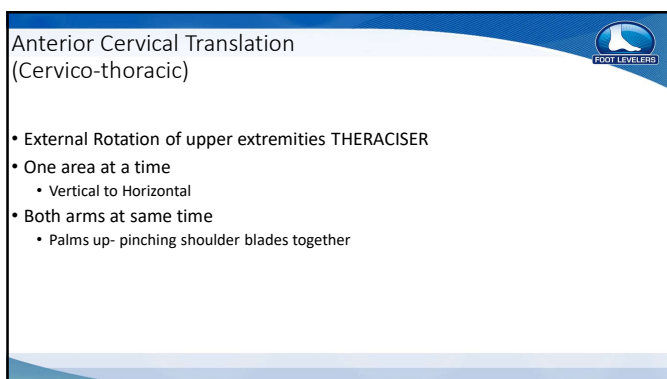
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2 Key Extension Exercises for the Shoulder

VERTICAL



HORIZONTAL



Exercise the good side first.

Start with:  
3 Sets to Fatigue  
 Duration, Reps and Resistance will increase naturally over time  
 "No Pain for Maximum Gain"

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Progress to Both Arms

- Palms facing ceiling
- 3 Sets to Fatigue
- Squeeze shoulder blades together
- No Pain for Maximum Gain



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Be sure to observe the technique of the patient so they get the optimal affect of the exercise

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Exercise for Hypolordosis



**SLOUCH**      **ARCH**

Start with:  
3 Sets of 6 Reps  
 Then increase  
 Reps and  
 Resistance as  
 tolerated  
 (10-15-20 Reps)  
 "No Pain for  
 Maximum Gain"

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Exercise for Hyperlordosis

- Pelvic Scoop
- Anchor Backsys on greater trochanter
- Weak Transverse Abdominis



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Right Sciatica

Antalgic, very painful to move

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### Exam Order

- Consult, history
- 3DBV Digital Laser Foot Scan
- X ray exam
- Digital Posture Examination
- Functional Movement Assessment with Proprioceptive Test Orthotics
- ROM, Ortho/Neuro, Palpation etc...
  - Modify order and content as needed

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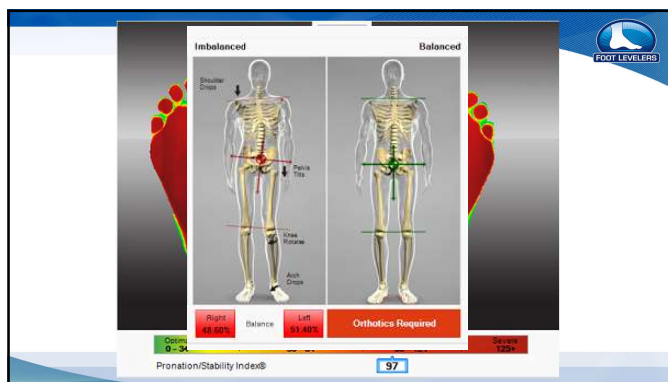
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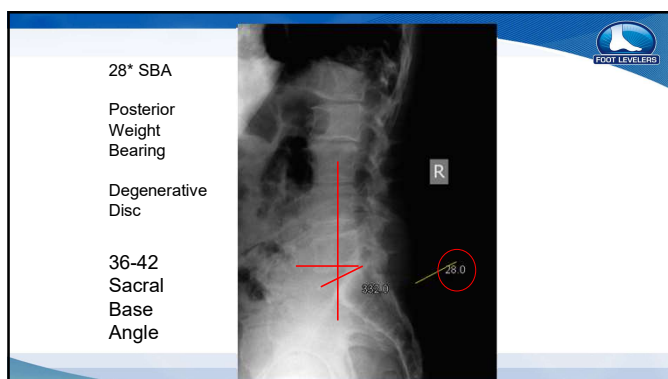
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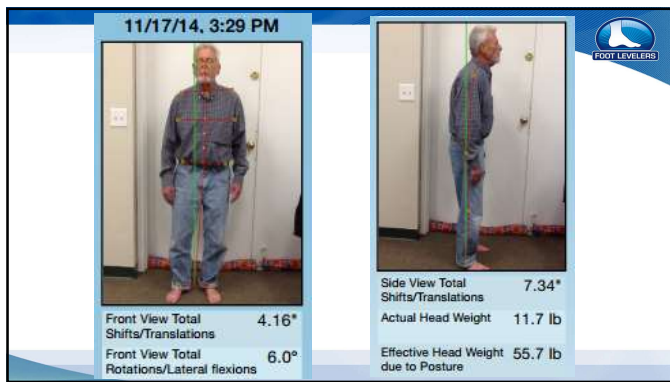
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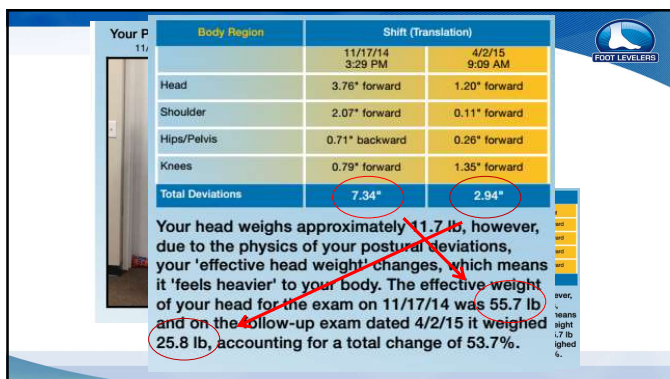
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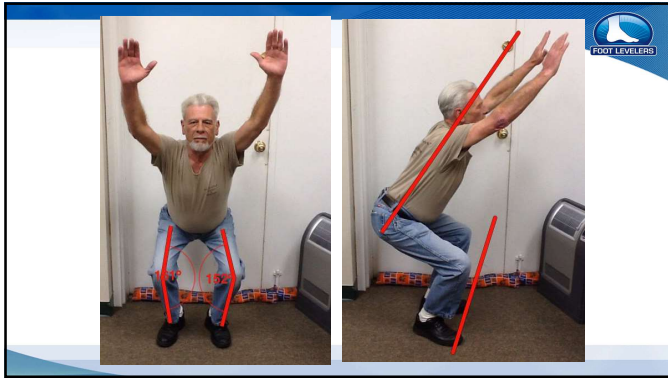
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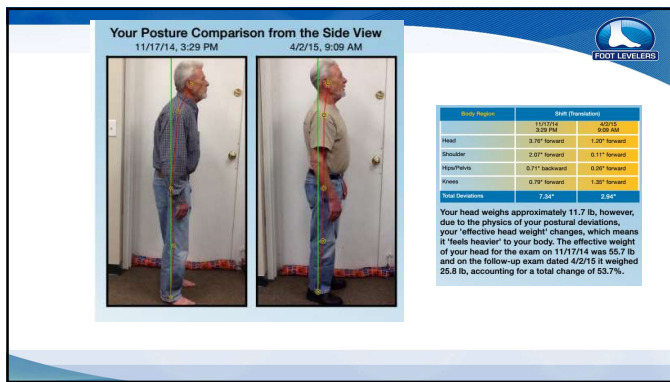
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**About Halo Posture Head Weights**



**Do Your Patients Suffer from Forward Head Posture?**

The Halo Posture™ Head Weight is a clinically-proven, effective product for correcting Forward Head Posture, restoring the normal cervical curve, and rehabilitating weak or injured cervical muscles.

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**Do Your Patients Suffer from Forward Head Posture?**

The Halo Posture™ Head Weight is a clinically-proven, effective product for correcting Forward Head Posture, restoring the normal cervical curve, and rehabilitating weak or injured cervical muscles.

**How Does It Work?**

The concept of using weights to correct imbalances in posture was first described by Nicolas Andry, the father of orthopedics, in 1741. When the HaloPosture™ is worn, the body reacts to the weight by shifting its center of mass in the opposite direction, to compensate for the increased load.

The nervous system of the body adapts in time and need to its environment. When a weight is placed on the body in the appropriate manner, and worn for a period of time, the body will adapt to this new position and gradually develop a permanent, healthier, and more balanced position. This reduces stress and strain upon the muscles and can also help low back pain.

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## Why Rehab and Pillows?



- Specific corrective exercises enhance the adjustment by changing Spinal Neuromotor Patterns
- Pillows support ideal posture, create cervical traction

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Proper Support



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Poor Support



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## Summary

- The Brain Can Change
- Repetition is important
- Use tools that feed neuroplasticity
- Patients that engage in the process get better results
- Have fun

Thank you!

Drjensen@cavespringchiropractic.com

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