



Back To Chiropractic CE Seminars

Physiotherapy ~ 6 hours

Presented by

Marcus Strutz, DC



Back To Chiropractic Continuing Education Seminars Physiotherapy ~ 6 Hours



Welcome:

This course is approved for 6 Hours of Physiotherapy for the Chiropractic Board of Examiners for the state of California and is also accepted in Colorado, Iowa, Michigan, Oregon and Washington.

There is no time element to this course, take it at your leisure. If you read slow or fast or if you read it all at once or a little at a time it does not matter.

How it works:

1. **Helpful Hint:** Print exam only and read through notes on computer screen and answer as you read.
2. Printing notes will use a ton of printer ink, so not advised.
3. Read through course materials.
4. Take exam; e-mail letter answers in a **NUMBERED VERTICAL** column to: marcusstrutzdc@gmail.com
5. If you pass exam (70%), I will email you a certificate, within 24 hrs, if you do not pass, you must repeat the exam. If you do not pass the second time then you must retake and pay again.
6. If you are taking the course for DC license renewal you must complete the course by the end of your birthday month for it to count towards renewing your license.
I strongly advise to take it well before the end of your birthday month so you can send in your renewal form early.
7. Upon passing, your Certificate will be e-mailed to you for your records.
8. **DO NOT** send the state board this certificate.
9. I will retain a record of all your CE courses. If you get audited and lost your records, I will have a copy.

The Board of Chiropractic Examiners requires that you complete all of your required CE hours **BEFORE you submit your chiropractic license renewal form and fee.**

NOTE: It is solely your responsibility to complete the course by then, no refunds will be given for lack of completion.

**Enjoy,
Marcus Strutz DC
CE Provider
Back To Chiropractic CE Seminars**

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**About the author:
Marcus Strutz, DC**

**Life Chiropractic College West Graduate
June 1996, Summa Cum Laude**

Professor Life Chiropractic College West, 1997-2002

- **Spinal Biomechanics** (authored course manual)
- **Physiotherapy Rehab** (authored course manual)
- **Physiotherapy Modalities** (authored course manual)
- **X-Ray Physics** (authored course manual)
- **Philosophy I**
- **Philosophy V - Practice Management**
- **Microbiology Lab**
- **Systemic Physiology Lab**

- **Private Practice, 2000-present Mendocino/Ft Bragg, CA**
- **CE Seminars, 2002-present:
Technique, Wellness (Pt Ed), Physiotherapy,
History Taking & Physical Examination Procedures**
- **Ghost Writer Practice Management, 2007-present**
- **National Board Review Instructor, 1999-2000
Dr. Irene Gold & Dr. John Donofrio**
- **Middle School Teacher Math & Science, 1989-1993**
- **Racquetball Club Pro & Weight Trainer
Walnut Creek, 1982-1987**
- **Father: Amuel Strutz DC Palmer Grad 1961**

Physiotherapy

Welcome to 6 hours of Physiotherapy. Today we will revisit physiotherapy as an excellent adjunct to the chiropractic adjustment. When used together we have a wonderful way of helping the body heal itself. Remember the body is a self healing organism, although due to limitations of matter sometimes it needs a little “push” or help to get jump started.

Much of the material in this seminar will address approaches to enhance the ability for the tissue to heal. Also I will attempt to provide some insights on patient education and stretching and strengthening exercises.

Enjoy...

Macro vs Micro Trauma

In The Beginning...

In the DC's office you typically get two types of cases, macro-trauma (think hit by a bus) or the dreaded repetitive micro-trauma (RMT). For the typical DC office 90-99% of new patients likely present with RMT instead of macro-trauma, but we shall consider both.

For this course I will assume that visceral and systemic pathology have already been ruled out and that we are dealing with classic acute and chronic soft tissue injuries.

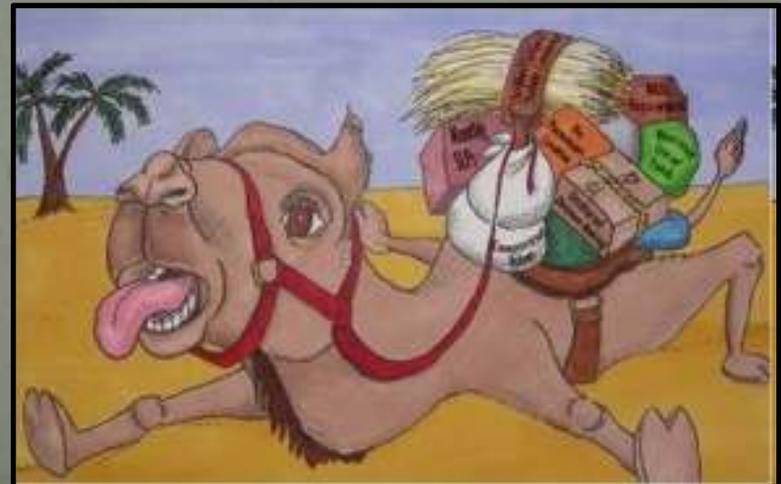
Macro vs Micro Trauma

Pt's understand macro-trauma. In fact for many pts it is the only possibility they consider. Most pt's believe that they can only get hurt from a specific incident. It is the RMT that provides confusion. Simple acts of daily living over a long period of time leads to a cumulative effect and ultimately leads to pain and dysfunction.

Use some of the following demonstrations to help the pt understand this mechanism.

I was tying my shoes and...

If you tie your shoes every day & your back goes “out” once, then it can’t be from tying your shoes- otherwise it would happen every day. What happened? Your muscles slowly fatigue over time from routine activity, inflammatory chemicals building-up & muscles go into spasm. It’s the “straw that broke the camel’s back”.



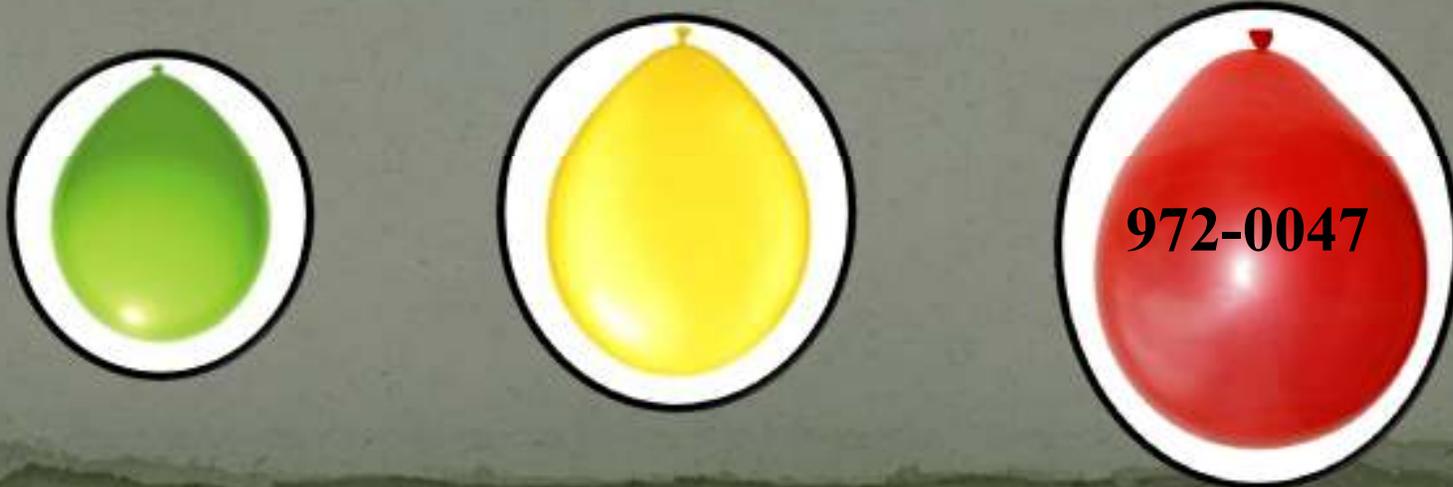
Pt Ed: Water Balloons & Chemical Build-up

Explain to the pt that cells are mostly water and that it is chemical build-up that ultimately causes the pain.

Green: Tissue is normal, relaxed & no swelling.

Yellow: Inflammation has gathered gradually due to constant overuse, but not enough to cause pain. This is where maintenance care comes in, to prevent excess chemical build-up.

Red: Excess build-up of chemicals. Inflammation is so bad that it causes pain. Put your phone number on the balloon, because that is when they call.

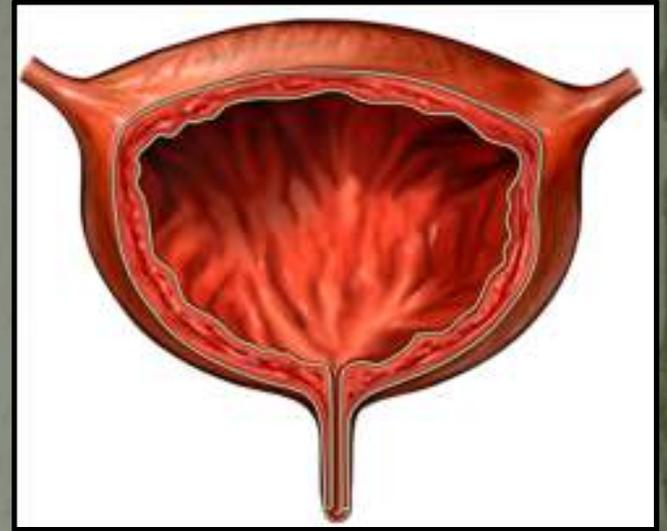


Patient Education Urinary Bladder Analogy

Think about your urinary bladder for a moment. If you **DON'T** have to pee, is there urine in your bladder?

Probably, but just not enough to give you that urge.

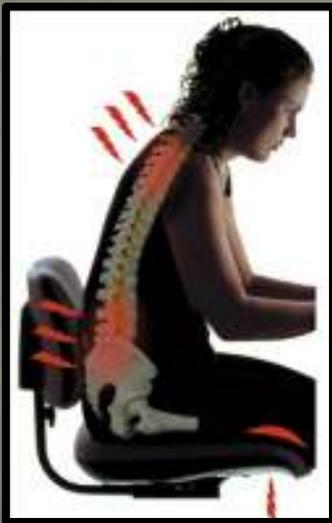
This is true for inflammatory chemicals in your muscles as well. Your tissue always has some build-up of chemicals, but often not enough to cause pain or muscle tightness. To prevent excessive build-up, maintain proper fluid flow with an adjustment.



Pt Education: RMT

Trapezius Tension

Have your pt palpate your traps first with good posture and then as you pretend to: drive, cook, brush your teeth, use a mouse, read, etc. They will experience the immediate tightness of the traps. Now explain what happens when this occurs for an extended period of time. This may also be done in the low back. Have the patient with their hand splayed out over your low back muscles. Then just repeat the above and they can feel the immediate tightness in the low back muscles. **Ask them what they think will happen if they stay in this position for a day, week, month, year or lifetime.**



Expectations of Care

The disconnect pt's have with Physical Therapy and Chiropractic is noteworthy. Many pts are quite comfortable going to the physical therapist 2-3 times a week for 6-8 weeks because classically they have had a macro-trauma, (ex. damaged knee), and they seem to understand that it takes time to rehab.

In the DC's office they think it should take one or two visits to fix as they see chiropractic as a different type of therapy.

So the disconnect is that the pt thinks two different mechanisms are occurring when it is in fact the same.

All too often the pt thinks a bone is out of place and we will just put it back in and that should just take one visit.

Pt Education: Sprained Ankle

Pts often have a hard time understanding a sprained low back or neck, so use a sprained ankle as an example. The physiology is the same and usually the pt has had experience and some understanding about a sprained ankle. For whatever reason they think these things are different.



Pt Education: My back is out, can't you just put it in?

Lets take a look at the idea that the bones goes out of place and that the DC just “pops” it back in.

This is where the pt education must be strong so they understand why it will take more than one visit.

Backs **DO NOT** go in & out. Chiropractors don't realign the spine, we increase the range-of-motion. An x-ray would show your spine in the exact same place before & after an adjustment. Why? The spine is held together with strong ligaments - without them you could easily become paralyzed by a simple fall. Chiropractors adjust “stuck” joints - which allows them to move through a free range-of-motion.

The pt will ask: Did you get “It”?

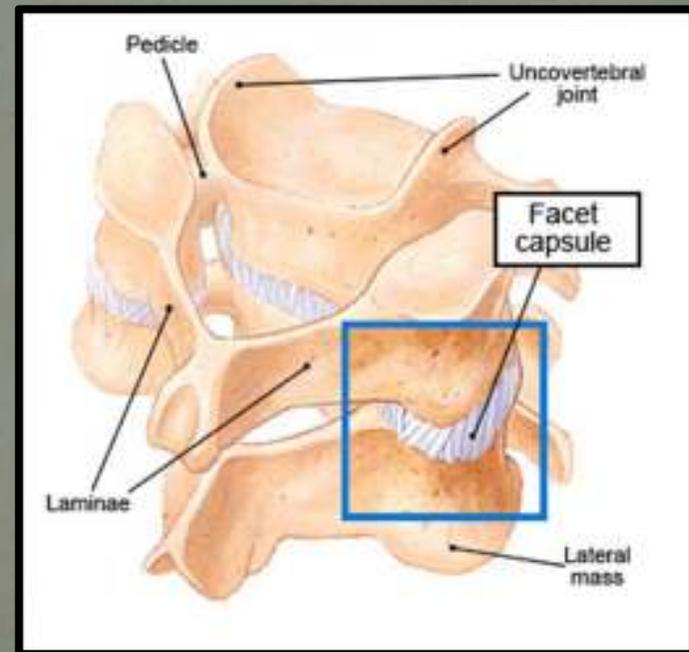
Then you respond with: “I got it”, “it moved”.

Remember your pts **DO NOT** know what “it’ is.

They have no idea what a joint complex is or how it functions. They DO think you are “popping” it in!



IT?

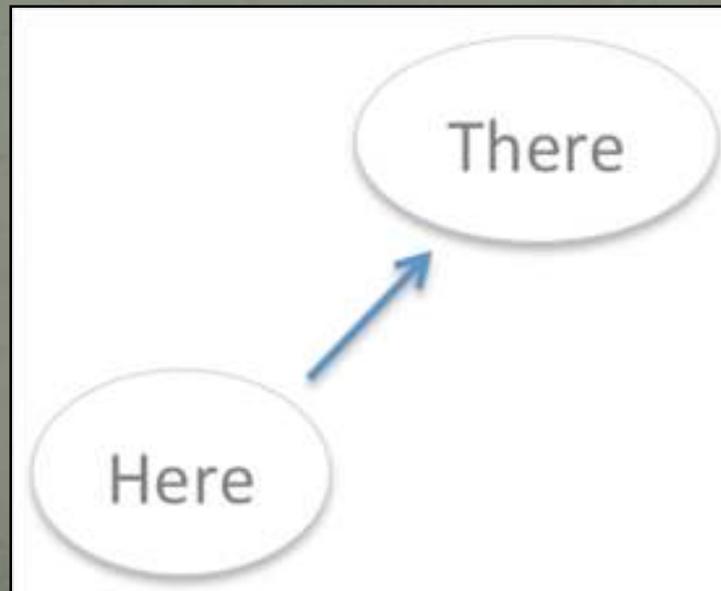


Watch What You Say!

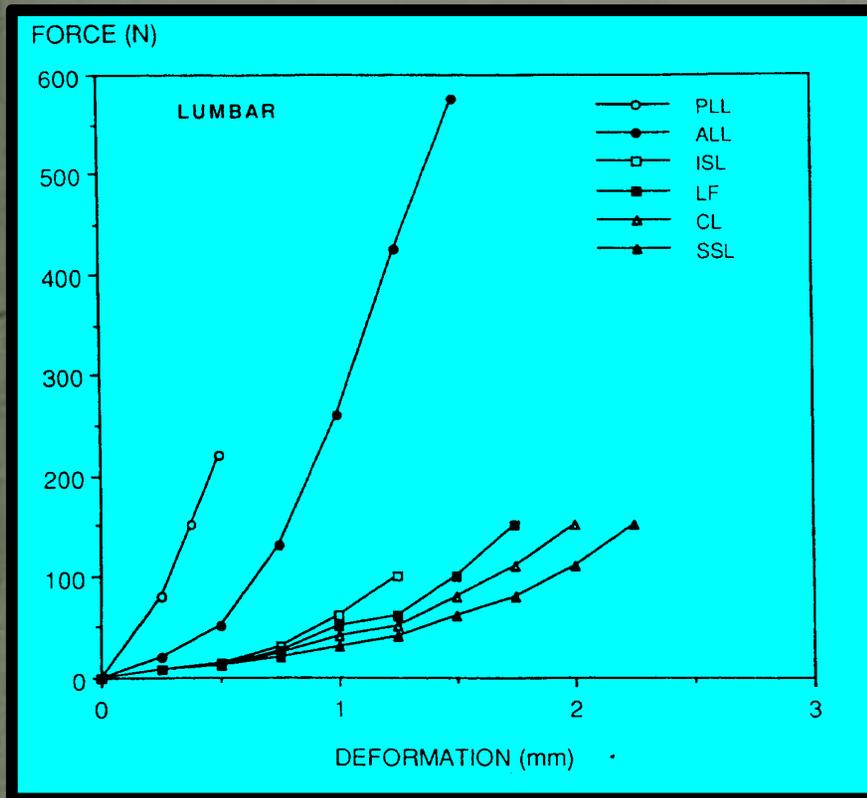
Did “it move”? Is “it” in? All these imply that the bone moved from here to there.

In fact, the bone moved from here and back to the same place, so from here to here. So it moved left lets say a few millimeters and then returned to the original position.

What did happen is that the joint can now move through a more complete range of motion, but the bone has **NOT** moved to a new location or been realigned with a single adjustment.



Why The Bone Does Not Change Position



**Force-deformation curve
of the spinal ligaments**

Forces exerted during an adjustment, (short duration) are not sufficient to cause a change in the viscoelastic component of the ligaments. Ligaments return to their original length after an adjustment.

To change the length requires sustained forces: muscle tone, gravity and/or traction.

This graph shows the spinal ligaments and that ligaments that are far from the axis of rotation (supraspinous ligament) have greater elasticity than ligaments that closer to the axis of rotation, (PLL). This is due to the concentration of elastin in each ligament.



More evidence that DC's do not change the alignment of the spine is that NFL players X-rays are identical before & after games. Hopefully you are not adjusting harder than this!

Pt Demonstrations:

Bend your finger & let it go.

Does it stay misaligned? No.

Why not?

Crack all your knuckles.

Do they become misaligned? No.

Why not?



Are All Ligaments Created Equal?

No each ligament has different elastic qualities based on the amount of elastin fibers in each ligament.

The periodontal ligament has very non-elastic ligaments as their job is to hold the teeth in place. (This is why we need braces, sustained traction, for 2 years to straighten teeth.)

SI joint ligaments are strong for pelvic and trunk support but have some elasticity to allow for motion. The upper cervical ligaments are the most elastic of these three as they need to allow for motion and support is not as burdensome as in the pelvis and teeth. This elastic property of the upper cervicals is why we can see small changes on film in this region with a single adjustment.

**How Long Does It Take
To Lengthen A Ligament?**

Or For You To Do The Splits?

**Another simple example for pts is asking them how long
it would take to gain this type of flexibility.**



Motion Studies

Why are motion studies performed after a MVA?
More evidence that ligaments do not easily allow for change on film. Even after a car accident we still need a motion study to see if there are lax ligaments. The bones are **NOT** all misaligned after the accident.



Misalignment on X-ray

Which area is most likely subluxated?

Which area are you most likely to adjust?

Which pt is in the most pain?

Did the pt on the right get hit by a car?

Could you realign them with one adjustment? Why not?

Would you adjust the pt on the left? What are the listings?



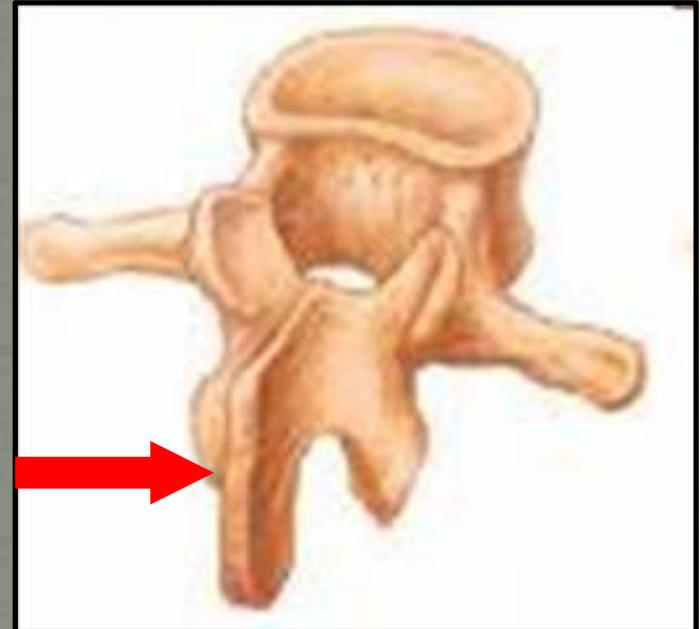
Motion vs Realignment

Are we moving the bone?

If we adjust this vertebra to the right what happens?

Possibilities:

1. It stays to the right
2. It goes to neutral, (realigned)
3. It returns to where it started



It depends on what's causing the misalignment:

1. Shortened ligaments
2. Chronic muscle contraction
3. Inflammation
4. Acute muscle contraction
5. All four

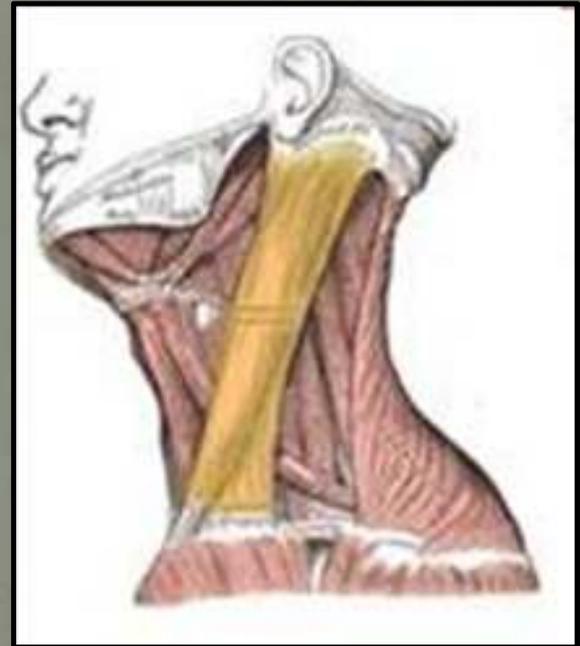


The vertebra will return to its' starting position unless the only factor causing the misalignment is an acute muscle spasm. (The next 3 slides give examples of acute muscle spasm scenarios where the bone in fact will change position. Remember this is the exception rather than the rule).

*Many pathologies can also cause misalignments

Acute SCM Spasm Torticollis

Here is an obvious example.
With the acute SCM spasm we have gross misalignment on film.
With a proper adjustment (protocol discussed next slide) we can get a major realignment.
This occurs as the only factor is the muscle spasm.



Acute SCM Spasm Torticollis

- 1. History, X-ray & exam to rule out fracture & torn tissue**
- 2. O'Donoghue's Test to DDX muscle vs ligament, also helps to calm pt down. When the pt lifts/moves their head they have extreme pain. With acute torticollis the DC should be able to move the pt's head some (1-4mm) with less or no pain, proving to the pt that it is indeed just a muscle spasm.**
- 3. Ice, spray & stretch, ischemic compression on attachment site away from pain. Try pushing in on the muscle attachments (gently at first) and hold to help stop the muscle spasm.**
- 4. PNF stretching**
- 5. Adjustment (don't miss)**

Unstable Spondy?

In this case again we have lax ligaments that allow the vertebra to shift. Remember we have a non-ossified pars defect. Muscles can easily go into spasm causing pain & other symptoms.

This vertebra will move on film, similar to a flexion-extension x-ray study of a whiplash pt.



Okay so what is causing the problem if the bone is not out of place?

First off the bone may well be misaligned, but the fact remains we are not aligning the bones.

So with macro-trauma and RMT the following occurs:

1. Acute or chronic contracting muscles
2. Acute/chronic chemicals flow into the cells
3. Acute/chronic inflammatory chemicals trapped in cells
4. Soft tissue adhesion formation
5. Decrease in proper joint motion

Note: Be careful pointing to an x-ray or spine and saying: “I will be working on this misalignment.” The pt will likely assume that you will be realigning the spine. They also believe the popping sound is the bone re-aligning.

So What Is That “Popping” Sound?

Synovial fluid in your joints contains oxygen, nitrogen & carbon dioxide. When you adjust a joint you stretch the joint capsule, ↑ the volume by 15-20%. This creates a partial vacuum & the gas rapidly releases due to the pressure change. (Boyle's Law, 1662).

The gas is about 80% carbon dioxide & takes about 20 mins to return to the synovial fluid. There are no studies that suggest “cracking” your knuckles will cause arthritis.

**Okay, let's move on to this idea of lack of joint motion.
What happens?**

Deconditioning Syndrome

Negative Effects of Immobilization (begins as soon as 4 hours)

Muscle

- **Weakness**
- **Incoordination**
- **↓ flexibility**
- **↓ oxidative potential**
- **↓ muscle mass**
- **↓ cross-sectional area**
- **↓ mitochondrial content**
- **↑ connective tissue fibrosis**
- **Type I & II muscle atrophy**
- **20% loss of muscle strength per week**

More Negative Effects of Immobilization

Joint Immobilization

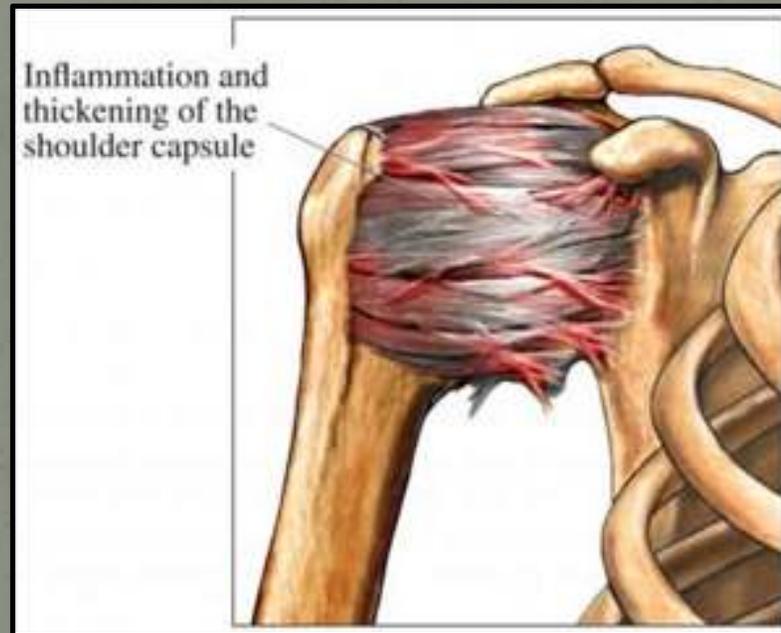
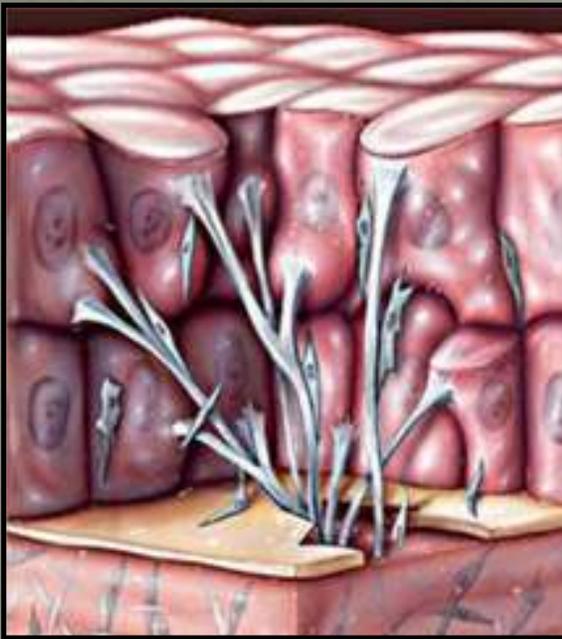
- Capsular adhesions
- ↓ ligamentous tolerance (includes annular disc weakness)
- Shrinks joint capsule
- ↑ compressive loading
- Irreversible changes after 8 weeks

Disk Biochemistry

- ↓ oxygen
- ↓ glucose
- ↓ sulfate
- ↓ proteoglycan content
- ↑ lactate concentration

Scar Tissue

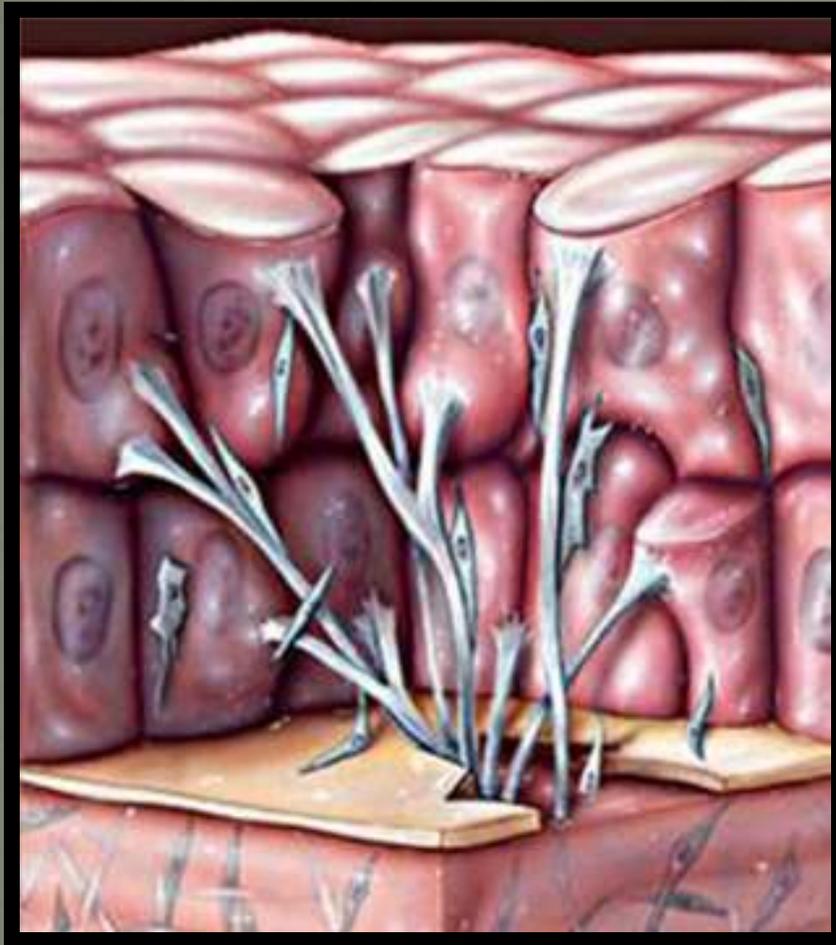
Excess scar tissue with no motion



With motion, healthy connective tissue can form and strengthens joint



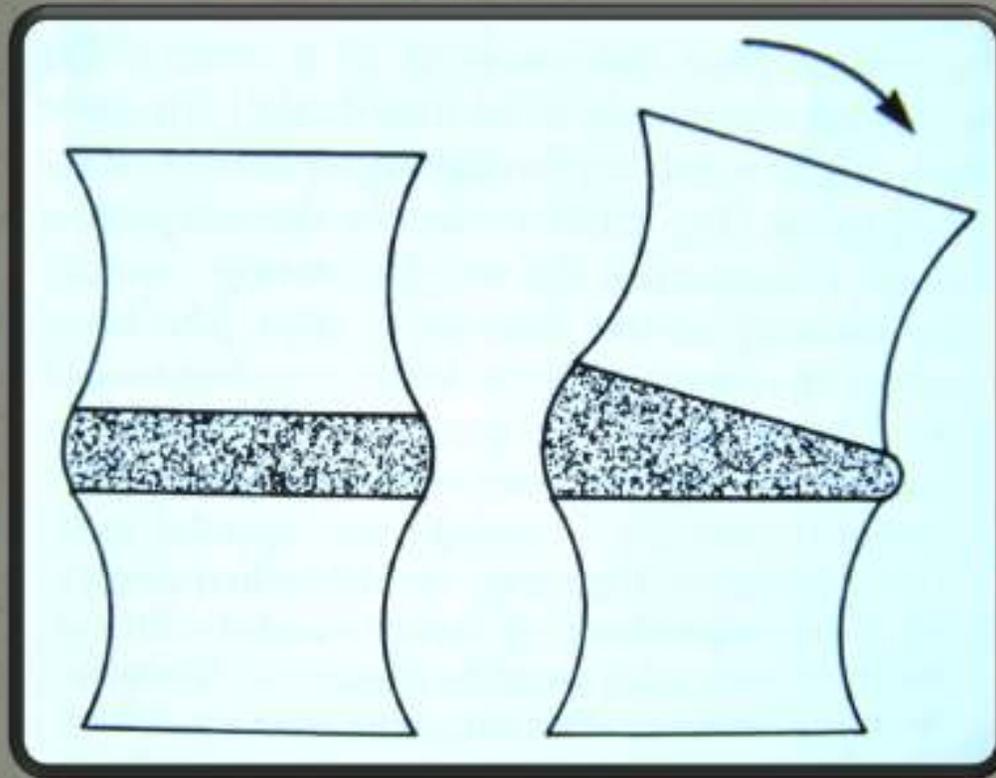
Scattered toothpicks, shrink wrap or a spider's web are all examples of the pattern of adhesion formation.



**Fibrin deposits
result in chronic
inflammatory
conditions.**

Spine, 1987

Disc & Joint Health



Motion helps remove wastes and fluids & improve flow of proper nutrients into the disc.

More Negative Effects of Immobilization

Bone

- Bone demineralization
- ↓↓ bone density with lack of weight bearing
- ↑↑ bone density with increased weight bearing

Cardiopulmonary

- ↓↓ in V_{O2} max
- ↑↑ maximal heart rate

Nervous System

- ↓↓ proprioception
- ↓↓ central neuromotor control of movement & posture

Craig Liebenson, JMPT 1992

**Okay so those are physiological effects
of lack of motion.**

So now what?

**First we have to differentiate between
different forms of care.**

**Let's consider the chiropractic adjustment,
physiotherapy and medical care.**

**The pt presentation is the same,
it is the approach that is different.**

Here is what is happening:

1. Acute or chronic contracting muscles
2. Acute/chronic chemicals flow into the cells
3. Acute/chronic inflammatory chemicals trapped in cells
4. Soft tissue adhesion formation
5. Decrease in proper joint motion

Go to the next slide to see how each discipline cares for the above.
Remember these are generalizations, but pretty close.

	DC	PT	MD
1	Adjustment Fast Stretch Soft Tissue Work	Slow Stretch Soft Tissue Work	Muscle Relaxant Pain Killer
2	Ice	Ice	Anti-Inflammatories
3	Adjustment For Motion Exercises ~ Heat Soft Tissue Work Modalities	Heat Exercises Modalities	Muscle Relaxant Pain Killer
4	Adjustment For Motion Exercises ~ Heat Soft Tissue Work Modalities	Heat Exercises Modalities	Muscle Relaxant Pain Killer
5	Adjustment For Motion Exercises ~ Heat Soft Tissue Work Modalities	Heat Exercises Modalities	Muscle Relaxant Pain Killer

1. Acute or chronic contracting muscles
2. Acute/chronic chemicals flow into the cells
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4. Soft tissue adhesion formation
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Let's Review The Benefits of The Chiropractic Adjustments

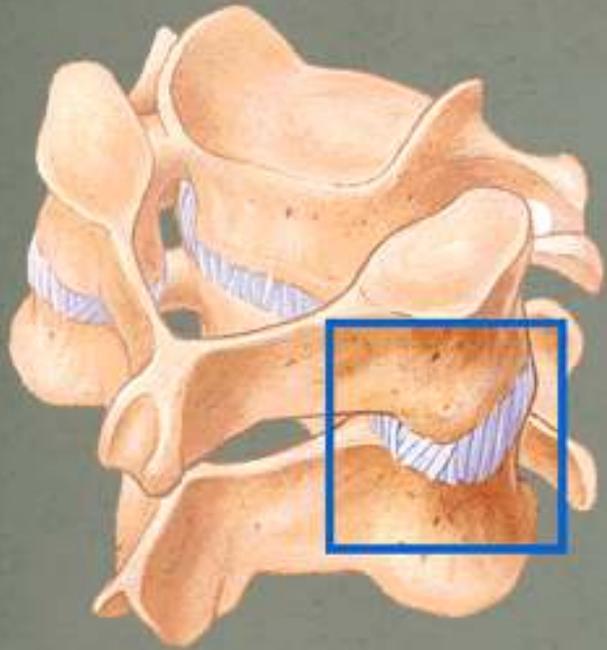
Once serious pathologies such as fractures, torn soft tissue, infections, tumors, cauda equina syndrome & visceral disorders are ruled out, then chiropractic adjustments are beneficial as the mechanical tissues of the spine (muscles, tendons, ligaments, joint capsules & discs) -respond to & heal well if adjusted.

Adjusting restores motion & overcomes abnormal restrictive barriers.

The Benefits of Adjustments

- 1. Restores motion - both symmetry & ROM**
- 2. Normalize biomechanics & load distribution**
- 3. Pumps out waste products & edematous fluid**
- 4. Improves nutrition to discs & articular cartilage**
- 5. Relaxes tight muscles**
- 6. Normalizes proprioception – position sense & kinesthesia**
- 7. Stimulates sensory-motor reflexes which improve dynamic muscular stabilization of joints**
- 8. Accelerates healing - as movement:**
 - A. ↑↑ metabolic rate**
 - B. ↑↑ collagen & protein production**
- 9. Improves the alignment of new connective tissue.**

Malik Slosberg, DC



Hypomobility results in degenerative changes & adhesions around the facet joints.

Adjusting gaps the joint & breaks up adhesions, re-establishing joint motion.

JMPT, 2004

Tissue Growth & Repair

Tissue growth & repair is influenced by mechanical loading & is positively affected by body postures that minimize adverse mechanical stresses & strains. Chiropractic rehab focuses on normalization of aberrant stresses & strains on spinal tissues. Therefore, postural chiropractic adjustments, active exercises & stretches are necessary for maximal spinal rehab.

JMPT, 1998.

Case Management

Pain Theory vs Functional Theory

Okay here we go, now for more good stuff!

Pain Theory is the idea that all we want to do is decrease or stop pain. This usually is what the new pt wants or at least thinks they want when they first come in.

Functional Theory is the idea that we want the body region, soft tissue and joint to return to a maximum level of functionality.

So this is the huge disconnect between the DC and the pt and why many pts are skeptical about chiropractic when they first come in. It is paramount that the pt understand the difference between the two ideals.

Pain Theory vs Functional Theory

Pain Theory:

↓ Pain

Immobilize

Ice

Effects:

Muscles atrophy/weaker

Muscles tighten

↑ Adhesions

↓ Proprioception

↓ Fluid flow

Functional Theory:

Speed healing

Mobilization

Heat

↓ pain

Effects:

Muscles stronger

Muscles looser

↓ Adhesions

↑ Proprioception

↑ Fluid flow

Pain Theory vs Functional Theory

Case Study: Basketball player has plantar fasciitis.

Do we want to decrease pain? Of course, but let's consider the risk vs reward and then make our clinical decision.

To decrease pain: ice, immobilize, anti-inflammatories and take the weight off the foot.

Physiological effects: pain decreased, muscle atrophy, adhesion formation, ligamentous shortening, proprioception diminished, decrease circulation of fluids, some function restored.

To restore function: heat, mobilize, aggressive soft tissue work and slowly add weight back onto foot.

Physiological effects: pain initially increased, muscle strength maintained, decrease adhesion formation, ligaments maintain proper length, proprioception maintained or improved, increase circulation of fluids, pain decreased, maximal function re'stored.

Pain Theory vs Functional Theory

So if my primary goal is to decrease pain you can see we have many negative physiological effects. These need to be explained to the pt so they can have options. Quite simply some pts are only interested in pain relief.

The next step is to review the stages of healing; the goals of care during each stage and the strategies.

Stages of Tissue Healing

Inflammation: Swelling, Pain, Muscle spasm, ↓ motion, ↓ function

Stage 1: Acute 0-72 hours:

- *Inflammation; chemical mediators released
- *Edema: restricts motion, ↑ pain, fibrosis
- *Motion restricted due to: pain, spasm, edema
- *Muscle spasms due to: pain
- *Causes of pain: ischemia, chemical mediators, mechanical deformation
- *Ice: vasoconstriction, ↓ pain, muscle relaxer, slows cellular metabolism

Stage 1 Goals:

↓ pain, slow & control swelling

Care:

- Rest & support
- Ice to ↓ swelling, pain & muscle spasm
- Adjust when safe

Inflammation

Protect Rest Ice Compress Elevate

Exercise: Limited, motion within limits of pain (unless leads to further inflammation).

Lifestyle/Ergonomics: Rest, maintain comfortable position, do not “freeze” rest of body.

Diet/Nutrition:

Vitamin B-Complex- Tissue repair (3x daily).

Vitamin C with bioflavonoids- Tissue repair & ↓ inflammation (3000-6000 mg daily).

Essential Fatty Acids- Evening primrose oil, flaxseed oil & fish oils ↓ inflammation.

Grape seed extract- Antioxidant.

Zinc- Tissue repair & ↓ inflammation (50 mg daily).

Superoxide dismutase (SOD)- Free radical scavenger, ↓ infection & inflammation.

Alfalfa- source of minerals.

Bilberry- contains flavonoids that ↓ inflammation.

Aloe vera, Arnica, Boswellia, Bromelain, Cat's Claw, Curcumin (turmeric), Echinacea, Ginger Root Extract, Goldenseal, Pau d'arco, Red Clover, White Willow Bark Extract & Yucca- all help ↓ inflammation.

Stage 2: Passive congestion 3 days-3 weeks:

Goals:

Remove fluid, ↑ motion, ↓ pain

- * ↑ vascular flow; exudate tends to remain in soft tissue.
- * Facet cartilage & disc nutrition: Improve motion
↑ circulation of synovial fluid and nutrients,
fluid flows into the disc and waste products can flow out.

Care:

- Adjust & soft tissue work
- Motion exercises
- Ergonomic advice

Stage 3: Repair Day 5 to 3-6 weeks:

***Scar Tissue Formation**

*↓ motion leads to: ↑ scar tissue, chronic shortening and stiffening of soft tissue, ↑ risk degeneration of bone

*↑ motion: improves alignment of connective tissue to support joint mechanics and function

Stage 3 Goals:

Restore normal motion, speed healing & ↓ pain

Care:

- Adjust & soft tissue work
- Motion exercises
- Ergonomic advice

Stage 4: Remodel:

starts in 3-6 wks, takes 3-52 wks to never depending on the severity of the injury.

Goals:

Motion: Maintain & improve

Flexibility: Maintain & improve

Functionality: Maintain & improve

Chronic pain: ↓ & ↓ risk of exacerbation

Degeneration: ↓ risk

Care:

- Adjust & soft tissue work
- Motion exercises
- Ergonomic advice

Goals of Care:

1. Pain relief
3. Restore function
4. Reduce risk of exacerbation
5. Reduce risk of degeneration

Again this is where a disconnect with the pt may occur!

- How long does it take for pain relief?
- How long does it take for tissues to heal?
- How long does it take to restore function?

If the pt does not understand the questions above then they will be confused and not understand a care plan that goes beyond pain relief.

Application of Ice

Ice is classically applied during the acute stage.
The rules say every 20 minutes for every 2 waking hours.

Let's modify! In most chiropractic practices new pts present with repetitive micro-trauma NOT macro-trauma. Consequently the pt may not be experiencing rapid inflammation. Consider using heat, not icing!

I use heat about 90% of the time on my pts rather than ice for this very reason. Ice slows healing. If this is an elite athlete that has worked real hard during the game or a severe acute injury, then yes ice. For the average pt that has put in an 8 hour day at a desk, heat makes more sense. Let's explore.

For years, health care providers & pts have been told to ice torn, bruised or sprained muscles to reduce the swelling.

Professor Lan Zhou and colleagues at the Neuroinflammation Research Centre at the Cleveland Clinic in Ohio discovered inflamed cells produce a high level of a hormone called insulin-like growth factor-1 (IGF-1) which significantly increases the rate of muscle regeneration. This suggests muscle inflammation after acute injury is essential to repair. Icing slows down the healing as it prevents the release of this hormone.

This changes the idea that swelling must be controlled in order to encourage healing and prevent pain.

Additionally this could change how much pt monitoring is required when potent anti-inflammatory drugs are prescribed over a long period. It's been known for a long time that excess anti-inflammatory medication, such as cortisone, slows wound healing.

Federation of American Societies for Experimental Biology, Oct 2010.

More Studies

When ice is applied to a body part for a prolonged period, nearby lymphatic vessels begin to dramatically increase their permeability (lymphatic vessels are ‘dead-end’ tubes which ordinarily help carry excess tissue fluids back into the cardiovascular system).

As lymphatic permeability is enhanced, large amounts of fluid begin to pour from the lymphatics ‘in the wrong direction’ (into the injured area), increasing the amount of local swelling and pressure and potentially contributing to greater pain.”

Sports Medicine, 1986.

More Studies

The use of ice in the management of acute soft tissue injuries is widely accepted and practiced. This review was conducted to examine the medical literature to see if there is evidence of positive clinical outcomes following the use of ice.

The criteria included:

- reduction in pain
- reduction in swelling or edema
- improved function
- return to participation in normal activity

Conclusion: There is insufficient evidence to suggest that ice improves clinical outcomes in soft tissue injuries.

Journal of Emergency Medicine, Feb 2008.

Application of Ice

To repeat I would still ice with severe acute inflaming injuries.

Ice physiological effects:

Tissue response: decreased motion

(see previous slides on deconditioning syndrome)

↓ Pain

↓ Fluid flow

Muscles tighten

↑ Adhesion formation

↓ Proprioception

Take home point: For wounds to heal we need to control inflammation, not too much, and not too little.

Application of Ice

So when ice is used here are some key points:

1. Make sure there is overactive swelling occurring.
2. Apply ice every **hour** for 5-20 minutes depending on the thickness of the tissue and depth of the injury.
3. Massage the ice in when possible as this improves the depth of penetration and decreases pt discomfort.
4. If the ice pack is left on for more than 10 minutes, a reflex reaction may occur (Hunting effect) where the blood vessels dilate and blood is again pumped into the injured area, causing further bleeding and swelling.
5. Ice the tissue in a stretched elongated position. The idea here is to maintain the length of the tissue instead of shortening it, which will allow the joint motion to be maintained at some level. Also this will increase the depth of penetration of the icing effect.

And now for some heat!

Heat physiological effects:

↑ fluid flow

↓ pain

Maintains joint motion & tissue flexibility

(reversing all the effects of deconditioning syndrome)

Minimizes adhesion formation

Minimizes proprioception loss by allowing for proper joint motion



Application of Heat!

So when heat is used here are some key points:

1. Make sure there is NO overactive swelling occurring.
2. The longer the heat is applied, the better. The length of time is based on the type of and/or magnitude of the injury. For minor back tension, 15-20 minutes may be sufficient. For more intense injuries, 30 minutes to 2 hours, or more may be more effective. Also consider the thickness of the tissue and/or depth of the injury.
3. Massage the heat in when possible as this improves the depth of penetration and increases pt comfort.
4. Heat the tissue in a stretched elongated position. The idea here is to maintain the length of the tissue instead of shortening it, which will allow the joint motion to be maintained at some level. Also this will increase the depth of penetration of the heating effect.

Fluid Flow To Various Tissues

One of the main factors that determines the length of time an injury takes to heal is fluid flow to the damaged tissue.

The simple rule is the more the tissue can move without risking re-injury the faster it will heal. With more motion we get increased fluid flow.

The greater the blood supply the faster it will heal.

Fascia, tendon, cartilage and discs all have minimal if any direct blood supply and depend on proper motion to get nutrients “pumped” in and waste products “pumped” out. Muscle and skin have a much greater blood supply and consequently will typically heal faster.

How Much Motion?

When rehabbing soft tissue and joints the question has to be how much motion should be used?

First it depends on the integrity of the soft tissue and joints and the pain involved. The rule is as the tissue becomes healthier and the pain decreases then it can move more.

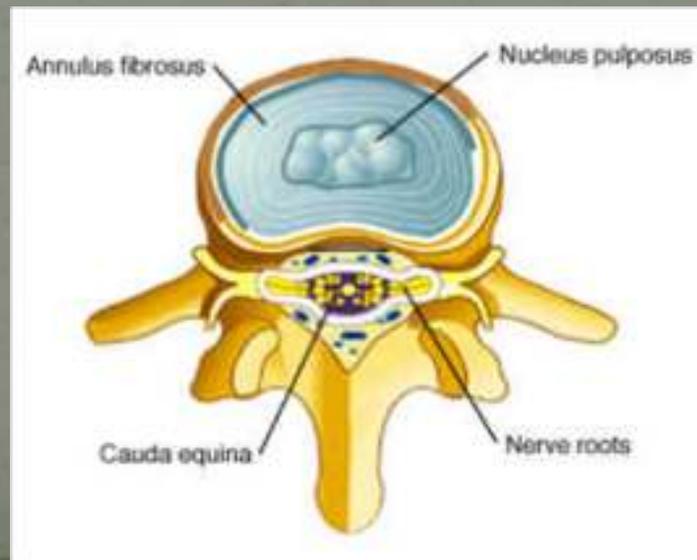
Don't be overly aggressive nor too cautious. The risk of re-injury always outweighs the possible benefit of more motion. This is true for adjusting, stretching and strengthening.

Motion & Nutrition

Immobilization arthropathies are probably due to nutritional failure. Avascular cartilage, behaving like a water filled sponge, gives off fluid on compression & takes it up on release of pressure.

Alternate compression & re-expansion allows a supply of nutrients & removal of metabolic waste.

Arthritis & Rheumatism, 1984

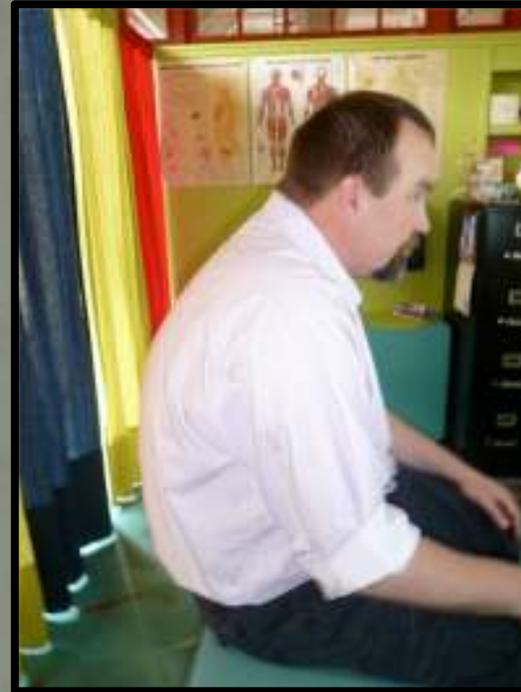


Patient Education: The Sponge

A dried-up & wet sponge are good examples of fluid flow & dehydration of the disc. Have the pt push on the wet & dry sponge so they can see how the water moves in & out of the healthy “disc”. Also note how the dry sponge has lost height.



Imbibition for the Discs



Swaying back & forth is great to prevent back stiffness & pumps the discs. Have the pt sit-up straight and then slouch over. It is as if you are grabbing your L3 and moving it forward and back.

Diagnosis Dictating Care?

Careful with this one. DC's go through a lot of schooling and courses in diagnosis. When billing insurance the question always comes up: what is your diagnosis? This is fine, figure out to the best of your ability what the problem is and then forget it!

Why you ask? If we name the problem the pt often develops a stigma and then labels their injury or themselves, as in "I have carpel tunnel syndrome" or "I have fibromyalgia".

Diagnosis Dictating Care?

The other huge problem with a specific diagnosis is often the DC gets caught treating the diagnosis instead of the pt.

For example:

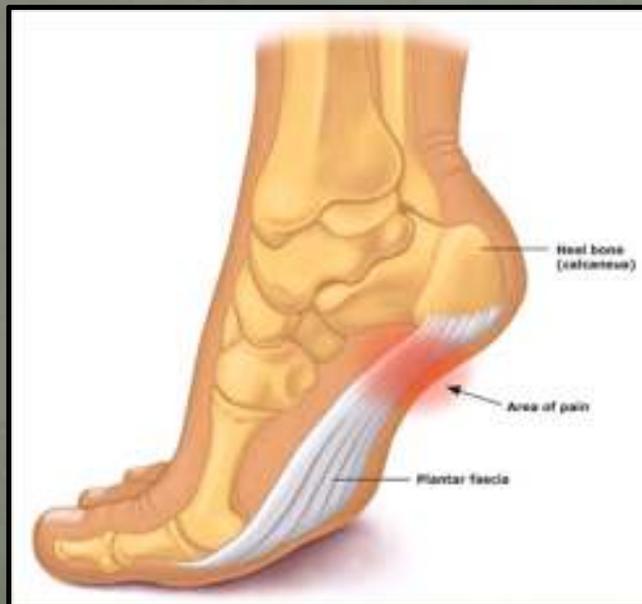
If a pt has a rotator cuff injury and you diagnosis it as a supraspinatus injury then perhaps you ONLY work on that muscle. Fair enough the supraspinatus is the primary problem, but be sure to work the entire shoulder girdle as the rest of the muscles are assuredly involved at some level.

The willingness to go the extra mile and work the entire shoulder will give you better and faster results, which leads to better pt retention and possibly more referrals.

Diagnosis Dictating Care?

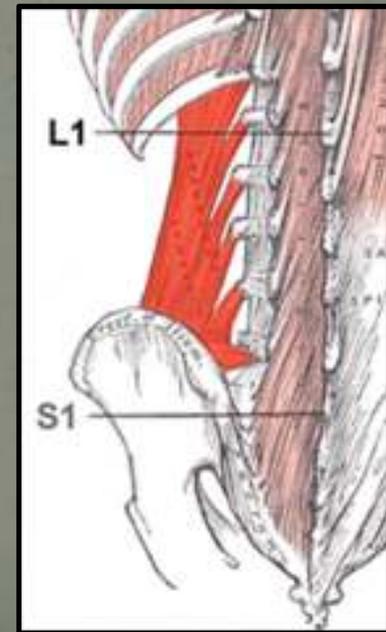
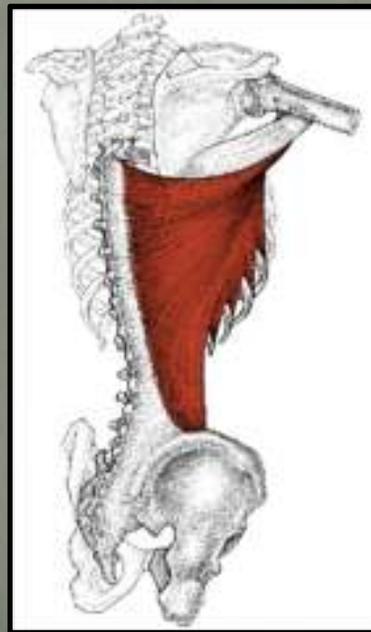
One more example: If a pt has plantar fasciitis you need to not only work on the bottom of the foot, but the gastrocnemius and soleus complex as well.

New rule: always work all surrounding muscles and joints of the injury site. We can name the problem for coding purposes but we need to be thorough and complete with our care.



Multiple Fiber Directions

Before we get into rehab protocols let's discuss fiber direction. Many muscles have multiple fiber directions, (ex: trapezius, lats, pec major & quadratus lumborum). So if you are doing soft tissue work, stretching or strengthening these muscles we must pay attention to the fiber direction and be sure to work the given muscle in **ALL** directions.



Why Soft Tissue Work?

Chiropractic is an amazing discipline. Adjusting joints is extremely effective. The shortcoming though is when the pt's problem is far away from the joint complex. Large muscles often have fibers that radiate far away from the primary joint which makes it more difficult for the adjustment to work on those distant fibers.

The following muscles are prime examples: Masseter, scalenes, middle trapezius, muscles of the upper arm and forearm, lats, quadratus lumborum, gluts, quads, hamstrings, calves and plantar fascialia.

So for these groups we need to do some soft tissue work and then adjust.

Soft Tissue Work: Goals

↑ fluid flow, trapped waste products out, new nutrients in

Allow for muscles to relax to regain elasticity and length

↓ pulling tension on the tendons and ligaments

Break up and/or elongate adhesions to allow for their reabsorption

↑ joint motion

↓ pain

↓ probability of having surgery

Soft Tissue Work: Protocols

1. Be as aggressive as the pt can tolerate. This is important as this is NOT a soft loving massage.
2. Start away from the most sensitive area & work toward it.
3. Dig in ALL directions: some say to go with the fibers, some say to go cross-friction across the fibers, but the best way is to go in ALL directions. So with the fibers (toward the heart to protect the veins) cross fiber and at oblique angles as well. Why? Adhesions form in random directions at all depths. See next slide for a reminder about adhesion patterns.

Experience The Adhesions

Dig into the extensors on your forearm, it will likely be uncomfortable and feel as if someone put Rice Krispies under your skin and in your muscles. You should also be able to feel adhesions in the adductors in your hands and the plantar fascia of your foot.

Try this: Pretend to grab the steering wheel. Notice your hand is curled in a “flexed position”.



Experience The Adhesions

Try this: Pretend to grab the steering wheel with one hand or have your hand hovering over a computer mouse. Notice your hand is curled in a “flexed position”.

Now palpate your flexors and extensors in the forearm.

You will notice that both muscle groups are contracting at the same time as they are stabilizing the wrist joint. Consequently you will likely have adhesions in both muscle groups. In fact because the extensors are smaller and weaker it is likely that they will be affected the most.





Scattered toothpicks, shrink wrap or a spider's web are all examples for the pt to explain the pattern of adhesion formation.

Soft Tissue Work: Protocols

4. Be sure to get all the surrounding tissues. You will likely find adhesions in areas that do not hurt, so make sure you work that tissue as well.
5. Do this once a week for 4 weeks or as necessary.
6. No ice afterward we are trying to induce fluid flow.

Soft Tissue Work: Methods

The key is to be aggressive, work in multiple directions and go deep. Dig in with your elbow or use your fist by twisting it back and forth. Careful using too much thumb, that saddle joint will wear down in time.



Soft Tissue - TMJ



Using thumb in a downward motion, work thru the adhesions in the masseter muscle. Many surgical dental pts will have problems as their jaw is held open for extended period of time. The idea is to break up the adhesions & cause inflammation; thus starting the healing process in the muscle.

Soft - Tissue Forearm



For most wrist, elbow & forearm conditions, deep adhesions have formed & need to be broken up. This is aggressive & the pt will be sore afterwards. No ice, we want the inflammation.

Wrist – Radial/Ulnar Sheath Shimmy



The sheath between the ulna & radius can also form adhesions.

Aggressively shaking the bones up & down will assist in mobilizing the tissue.

Wrist - Open Hand Stretches



**Great stretch for flexor muscles & tendons.
Hand is splayed on the wall with shoulders perpendicular to the
wall. Rotate the head away to help stretch the neck as well.**

Popliteus Release



Working the popliteus muscle behind the knee can give relief for radiating pain & locking knees.

Soft Tissue - Calves



**Calf adhesions can be broken up
using thumbs or forearm.
Always push toward the heart.**

Soft Tissue - Feet



For Plantar fasciitis dig aggressively through the bottom of the foot with a tennis ball. This breaks up adhesions & causes inflammation helping the tissue heal.

No ice afterwards.
Don't forget to go into the gastrocnemius/soleus complex.

Soft Tissue - Feet

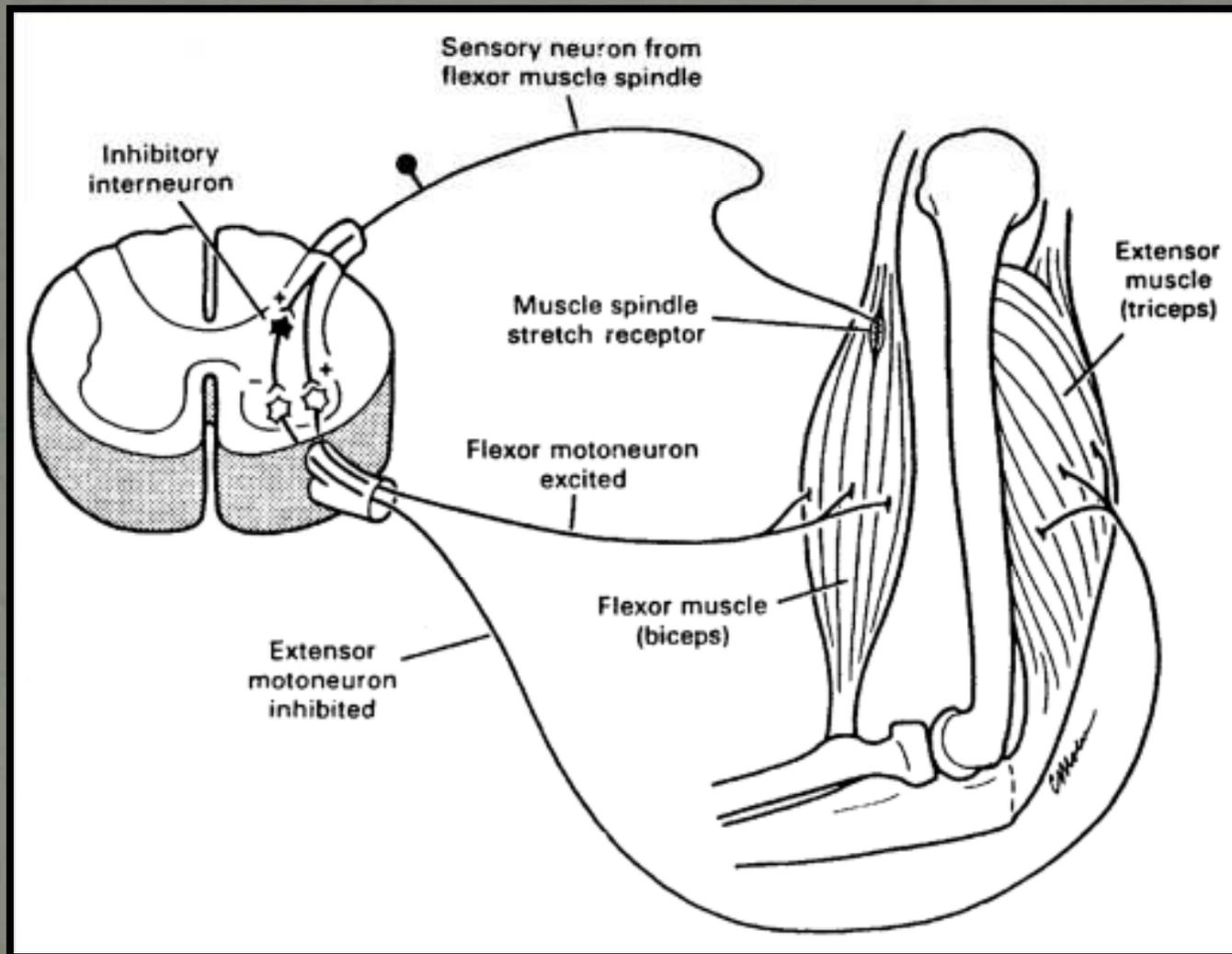


For Plantar fasciitis dig aggressively through the bottom of the foot. This breaks up adhesions & causes inflammation helping the tissue heal. No ice afterwards.

Proprioceptive Neuromuscular Facilitation Stretching



Reciprocal Inhibition

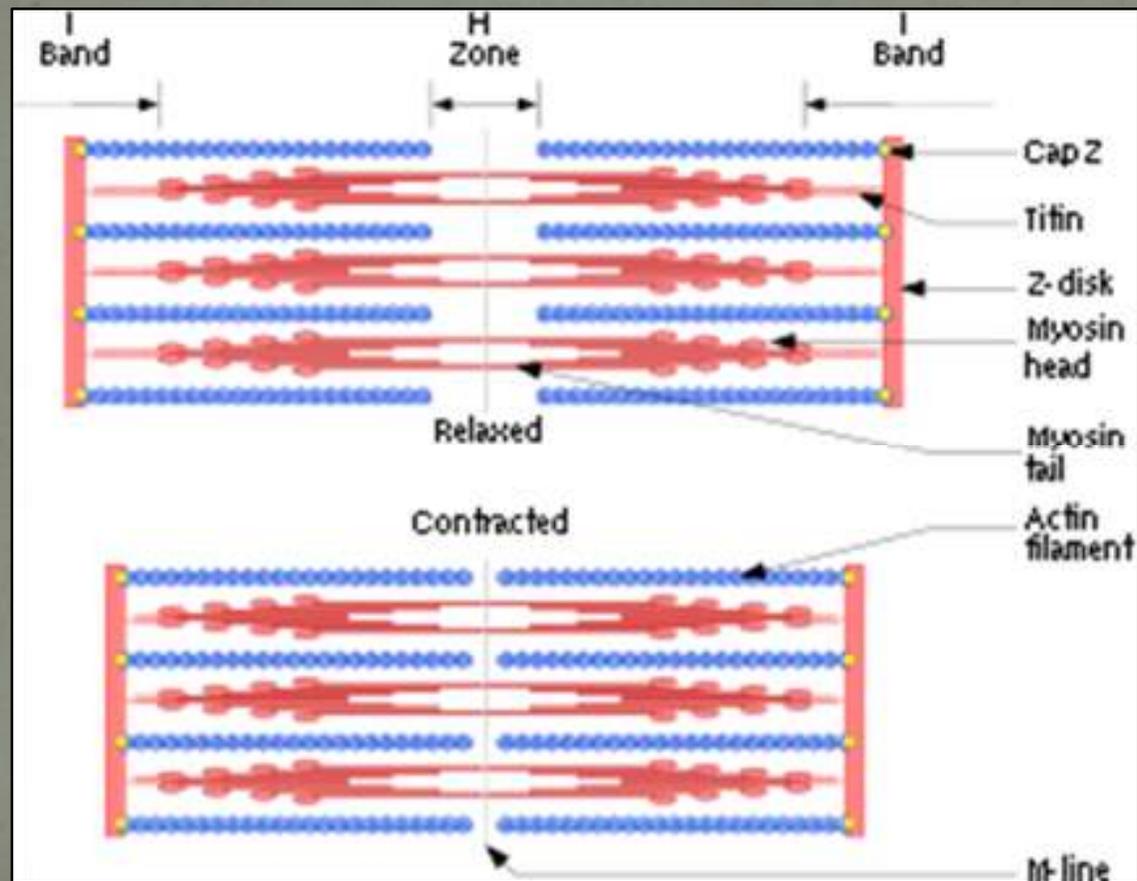


The Rules of Reciprocal Inhibition

1. Anterior muscles work opposite posterior muscles
2. Left lateral muscles work opposite right lateral muscles
3. Left rotation muscles work opposite right rotation muscles

Sarcomere Complex

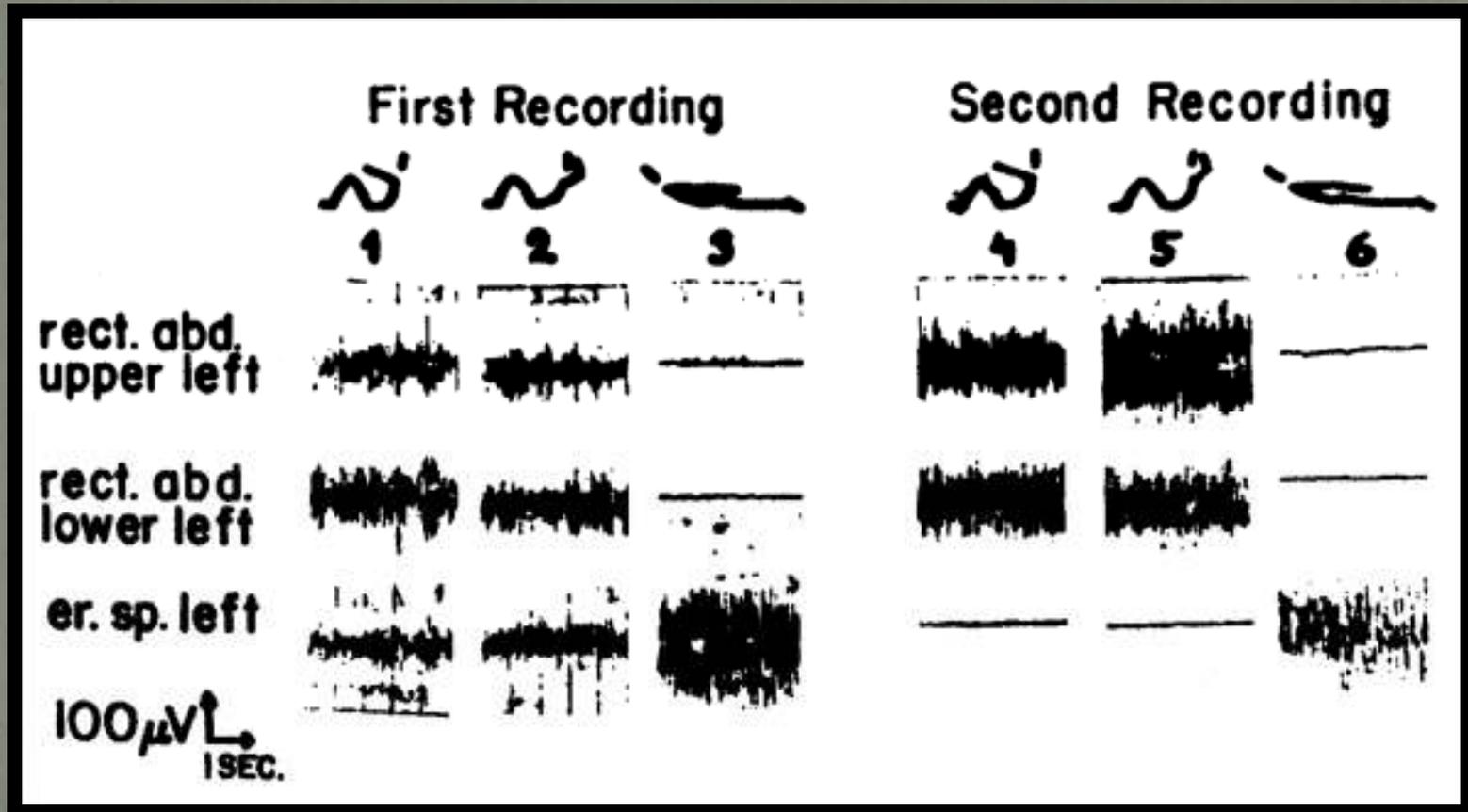
Remember muscle contraction is NOT an on-off switch, think dimmer switch where the muscle can be partially contracted.



EMG Before & After Stretching

Korr IM, Neurobiologic Mechanisms in Manipulative Therapy, 1978

Please go to next slide for explanation



EMG Before & After Stretching

In this study the pt presented with short, tight overly contracting low back muscles and consequently partially inhibited abdominals. In the first recording you see that in position 1 and 2 that when attempting to contract the abs that there is only partial contraction. Also in position 1 and 2 that the low back muscles do NOT shut off completely like they should, rather they continue to contract. In position 3 you can see that when the pt contracts the low back muscles by going into extension the low back muscles are overly excited.

After stretching you can see the muscles balance and function normally.

That is when the abs contract the low back muscles shut off and when the low back muscles contract they do not overly contract.

Korr IM, Neurobiologic Mechanisms in Manipulative Therapy, 1978

How Long Does That Take?

Good question. If it is an acute spasm perhaps it takes one quick adjustment to normalize the muscular function.

If it is a long term chronic pattern, (think pt over 40 with chronic low back tightness and a high percentage of our pt base), it may never become 100% normal.

The goal is to move away from that first recording (muscular imbalance) and get the pt closer to the second recording (balanced muscles).

Adjusting, soft tissue work, appropriate stretches all will help achieve these goals.

Okay so let's try it! **Below are the 3 PNF stretching protocols.**
Time to get out of that chair and go to work!

PNF Reciprocal Inhibition: Take muscle to be stretched to tension. Have patient contract antagonist muscle.

This inhibits the agonist. Excellent for take home stretches.

Contract antagonist & hold stretch for 15-30 seconds or less based on patient tolerance/comfort.

Repeat 3-5x or less based on patient tolerance/comfort or need.

Allow 30-60 second rest between repetitions.

PNF Contract-Relax-Passive

Contract agonist for 5-10 seconds.

Relax for 1-2 seconds, while patient takes a slow deep breath.

Passively stretch agonist & hold stretch for 15-30 seconds or less based on patient tolerance/comfort.

Repeat 3-5x or less based on patient tolerance/comfort or need.

Allow 30-60 second rest between repetitions.

PNF Contract-Relax-Contract Stretch

Contract agonist for 5-10 secs.

Relax for 1-2 secs, pt takes a slow deep breath.

Contract antagonist & hold stretch for 15-30 secs or less based on pt tolerance/comfort.

Repeat 3-5x or less based on patient tolerance/comfort or need.

Allow 30-60 sec rest between repetitions.



backtochiropractic.net

Free Practice & Patient Materials

**Try the protocols on the last side on
your hamstrings**



Best Results: Stretching

1. **Always contract the antagonist & then the agonist muscle before stretching.**
2. **or simply contract the agonist muscle & then stretch.**

Ex 1: If stretching the hamstrings, contract the quads & then the hamstrings, then go into the stretch.

Ex 2: If stretching the calves, dorsi-flex your feet & then plantar-flex your feet, then stretch the calves.

Of course do not forget about breathing!

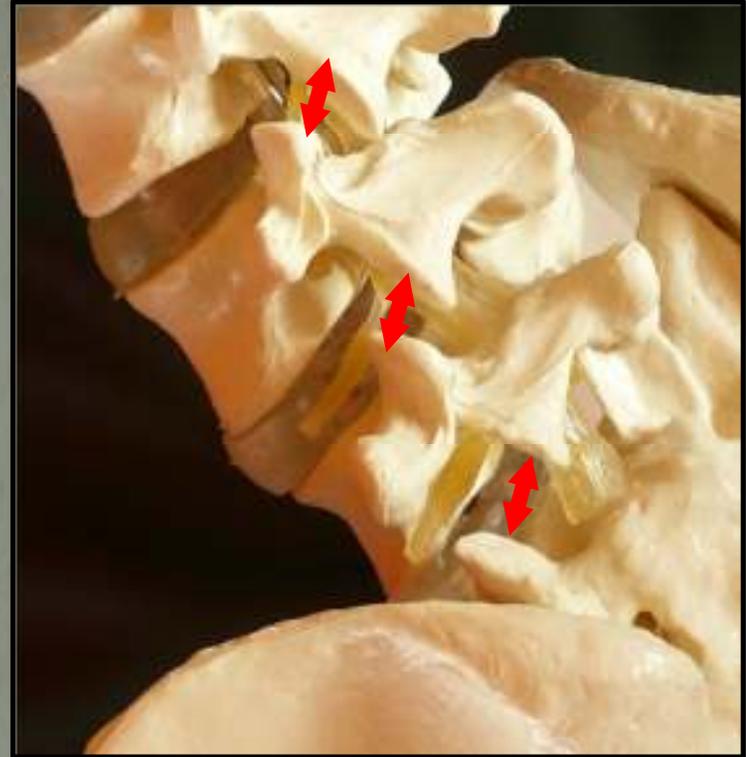
For pts take home stretches I advise to give them the contract-relax protocols as it is easiest to understand and compliance will be better. (Tell the pt to always contract the muscle they are about to stretch first.)

Low Back Seated Stretches



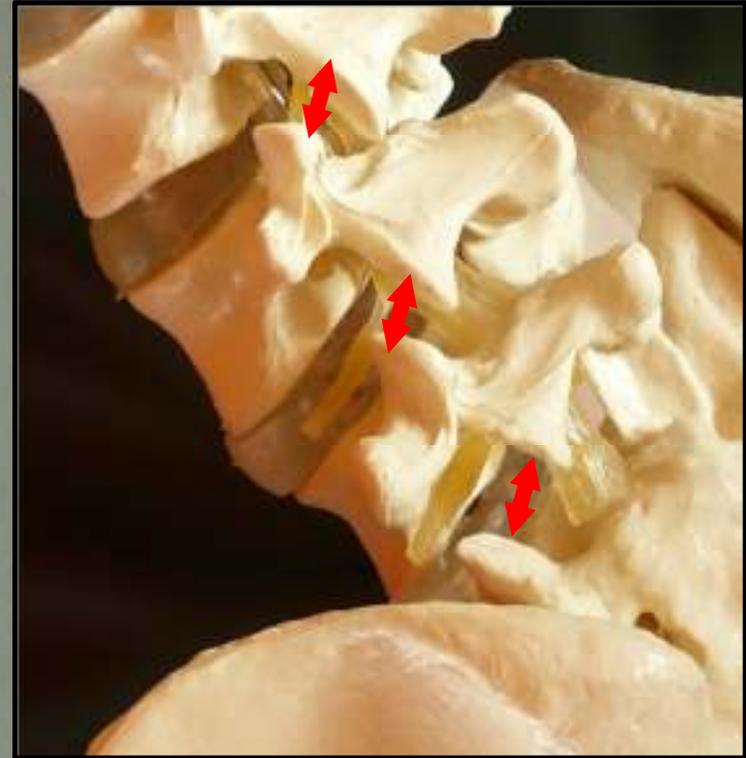
If the pt is sitting straight up the “J” shaped facets of the lumbar spine will jam with rotation. To stretch the low back in a seated position the pt must bend back and rotate with an oblique angle.

Low Back Side Stretch



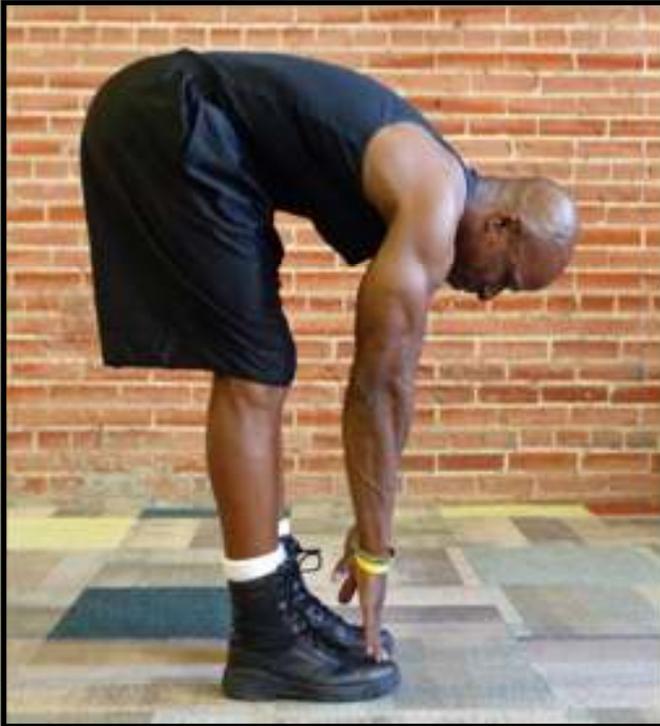
Pt lies on their side & rotates similar to a side posture adjustment. In this position the jts open most effectively.

PNF Low Back Side Stretch



In the above position the pt should slowly contract their low back muscles first, then contract the abs, and then stretch. Yes you could do that before you adjust as well, but this is a physiotherapy course.

We Learned That In School?

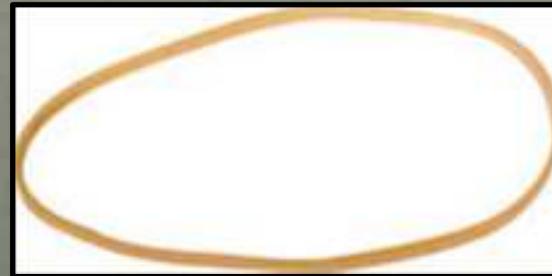


Big problem! In high school everyone learned the “low back” stretches shown above. The problem is neither one is safe or effective. This pits the DC against the PE teacher and gym instructor. Something the pt has thought was right their entire life and then the DC says “NO”. So let’s explain.

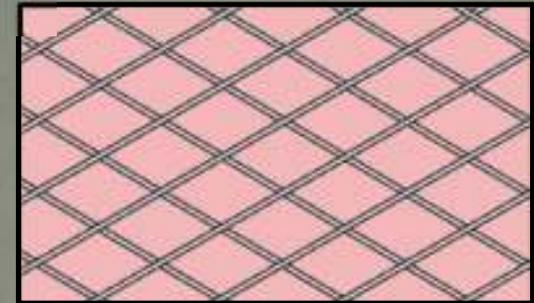
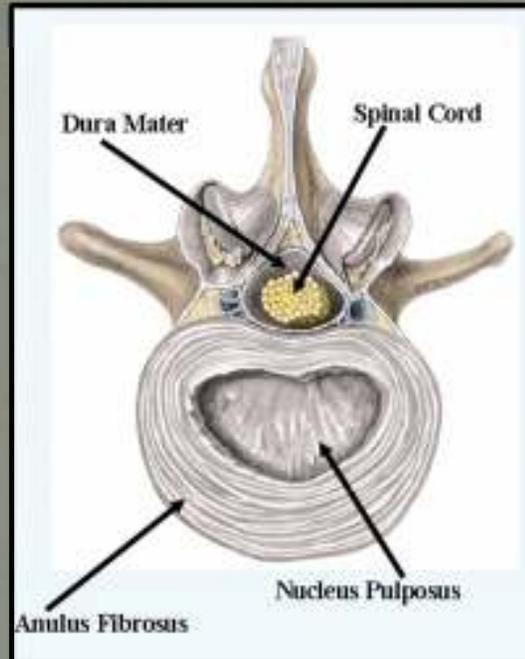
Bad Stretching



This is simply a bad stretching position. There are 4 muscle groups being stretched at once, (claves, hamstrings, low back and upper back). With no isolation the muscle group that is tightest will stretch the LEAST. To demonstrate get two rubber bands, one thick and one thin. Tie them together. As you stretch them apart the pt will see that the most elastic band (thin one) stretches more than the thick one, which is the muscle that actually needs the stretching.



Bad Stretching



**Annular Fibers:
Relaxed**



**Annular Fibers:
Under Stress**

The annular fibers of the disc are at a 30° angle, as you lean forward & rotate only half the fibers hold you up, making them susceptible to injury.

Shoulder Motion Therapy

The shoulder is an excellent example for the idea: “motion therapy must go through a complete range of motion”.

Try this: Stand up and have your hands by your side, thumbs pointing forward. Now with elbows locked touch your hands together directly over your head.

Repeat with shoulder in full external rotation (thumbs rotated out) and again with shoulder in full internal rotation (thumbs rotated in). You will notice that the ROM is not the same based on the rotation of the shoulder.

Most books say to stretch with the thumb rotated out for maximum ROM. My strong recommendation is to stretch and traction the shoulder in ALL positions, both internal and external rotation and everything in between. This allows to stretch ALL the muscles and soft tissue, not just the ones in the external rotation position.

Shoulder Motion Therapy



With the pt on their back the DC tractions the shoulder, gently moving it through an arc in line with the body. So yes do that in internal & external rotation. To be most effective also traction in arcs that will go below and above the table. Same idea as the previous slide we want to stretch as many muscle fibers as possible so traction of the shoulder must be done at every angle possible through a full ROM. (Note: of course the pt and soft tissue must be able to tolerate this, if they can not then push it right up to the point of tolerance.)

Shoulder Traction While Lying Down

While the DC tractions the shoulder I suggest also moving it in clockwise and counter clockwise circles. Large and small circles.



All the ideas given for the shoulder would be true for any joint in the body: wrist, hip, knee, ankle etc.

Again make sure the joints and surrounding soft tissue are healthy enough to handle the stretching and traction.



Codman's

Pendulum Exercises

Allow arm to dangle & have pt move shoulder through all ROM's or spell the alphabet. Great for frozen shoulders. Limitation is that as the arm swings back & forth the tissues never go through a full range of motion. This limits the recovery of the damaged tissue.

PMS Cramping



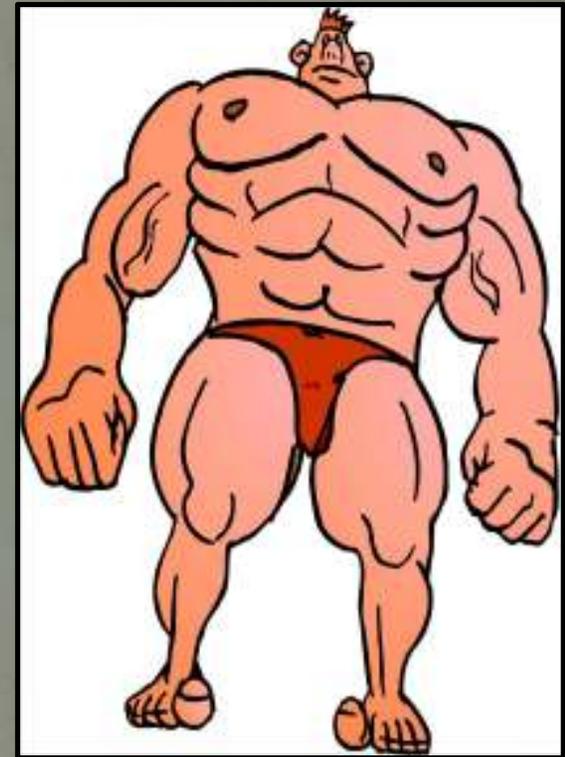
First what are these cramps? The uterus (muscle) is engorging with blood and there is either excessive fluid and/or trapped fluid. This is similar to an acute muscle spasm, except in this cause we want to **INCREASE** the fluid flow. With pt supine and knees bent, place heat across the cramping region. Then perform a cross stretch with a flat broad based contact on the inside of the pelvic bowl. Push down and out, at about 45° and hold, no thrust. Also try slowly rocking the pelvis side to side. To gain relief may take 5-15 minutes. Then adjust. Usually this needs to be done only once during a cycle, and often the chronic cramping does not come back.

Strengthening

Okay so now we are going to the gym!
Feeling strong?

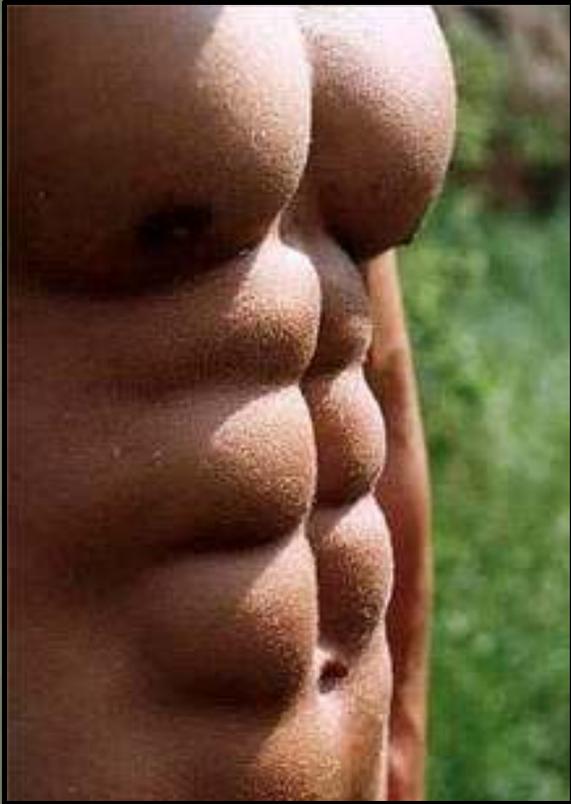
We now know 2 things:

1. muscles that are tight will not open and close through a full ROM, thus they will not strengthen effectively
2. if the muscle group that opposes the muscle we are trying to strengthen is overly contracted then the primary muscle is inhibited at some level and again will not strengthen effectively



Best Results: Strengthening

**Before strengthening always stretch
the agonist & antagonist.**



Example: If strengthening the abdominals, first stretch the low back muscles & then the abdominals to optimize muscle firing. If you just attempt to strengthen the abs without stretching the low back first the abs are inhibited and will not strengthen effectively. You're wasting your time!

**How many times have you heard
a gym trainer say that?**

Probably not many, if ever!

Proper Training?

Okay, back to the gym.

When we work our biceps trainers typically tell you to “watch your form”. Now don’t get me wrong form is important, but in the case of the biceps looking down at them actually inhibits the muscle due to the posterior tonic neck reflex.

This reflex actually excites the bicep on the side away from the side that you turned your head towards.

The reverse is true for the tricep.



Cross-Cord Training

If you hold an isometric contraction with the triceps, the biceps performance will improve 10-20%. Looking to the triceps side elicits the posterior tonic neck reflex, which will also improve bicep performance.

The best way to remember this is the position of walking.

You can use these rules in a rehab situation or working out in the gym.



Watch The Walk

Our synchronized gait will help you remember which muscle groups go together. As you step forward with your left foot all your anterior muscles fire in the left lower extremity. Your right lower extremity will be pushing back and all the posterior muscles will fire on that side. The opposite is true in the upper extremities.

Your right arm will swing forward and the anterior muscles will fire, while your left arm swings back with the posterior muscles firing.

Your head turns to the left in this case.

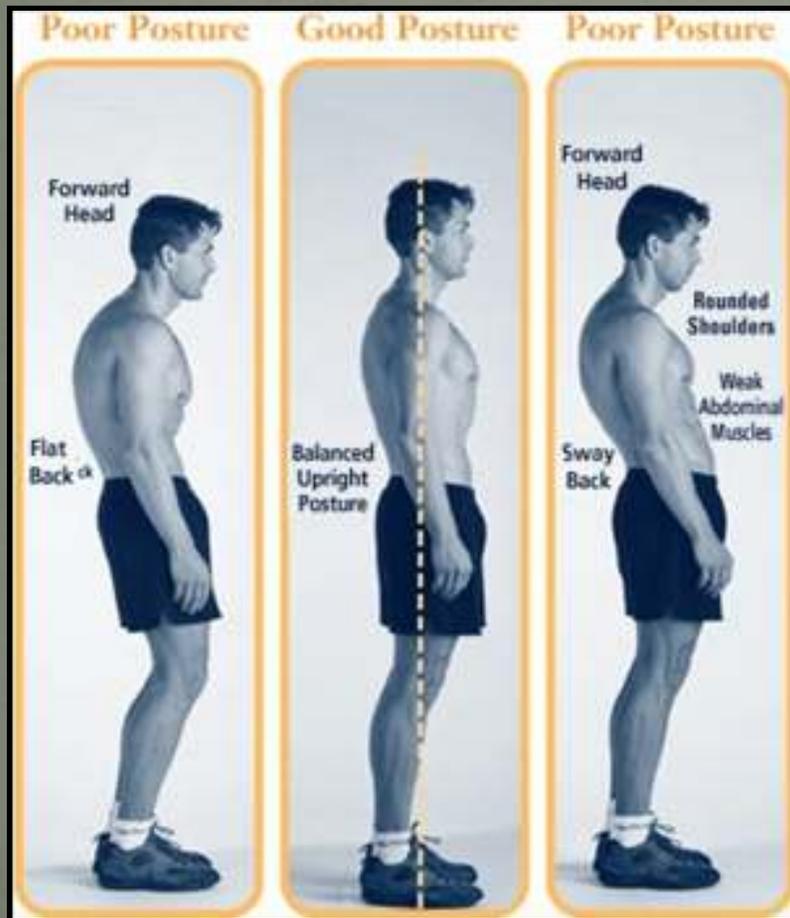
With your next step the opposite of the above is true. As you rehab or train a pt using these coordinated muscles in combination.

This will enhance the contracting power of a given muscle 10-15%!



Now let's take a look at posture!

(did you catch the pun?)



Posture affects & moderates:

spinal pain

headache

mood

blood pressure

pulse

respiration

sympathetic function

homeostasis

autonomic regulation

breathing

hormone production

**American Journal of Pain
Management, 1994**

Pt Ed: Postures Effect On The Respiratory, Cardiovascular & Nervous Systems

Have your pt sit-up straight & breathe. Then have them hunch over & breathe. Ask them the difference - it's obvious. **Try breathing through a straw, to demonstrate restricted breathing.** Also perform a pre/post adjustment breathing test, or use a spirometer.

Let them know chiropractic helps maintain proper breathing. Now repeat the above, sit up straight and then hunch over. This time ask the pt if this compresses their heart. Answer: yes. Then ask if this increases blood pressure. Answer: yes again. These are simple examples to demonstrate the importance of posture in terms of oxygen consumption & cardiovascular health.

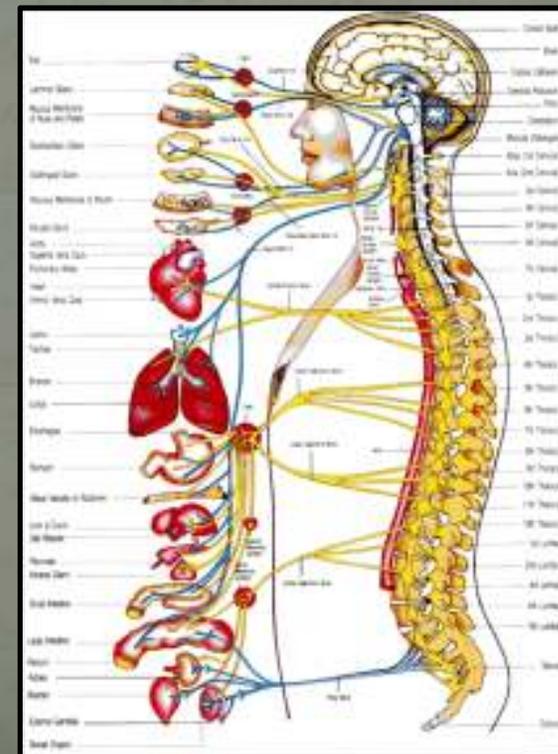
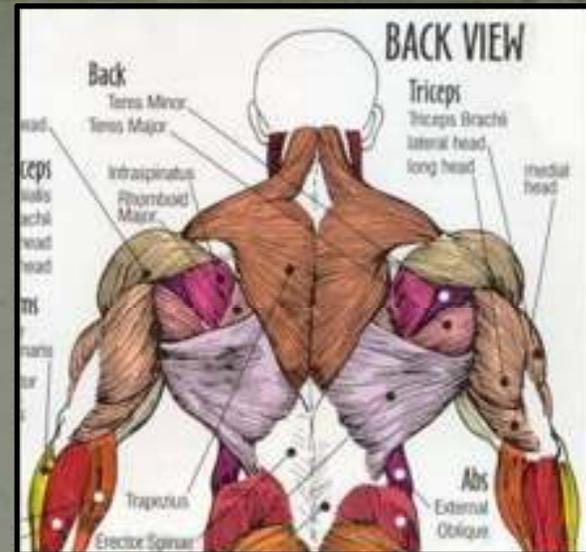


Posture & The Nervous System

AK Posture Check

Stand up straight with proper posture & put your arm out at 90° to your side, then have someone push down on it. It should be strong. Now slump over (anterior head translation & flexion) with bad posture & push down again, your arm should be weak.

Now ask the pt if they think bad posture effects only the shoulder muscle (deltoid) or do they think it adversely effects all the visceral organs and other muscles as well. Point out the brain is connected via the spinal cord to all the organs.

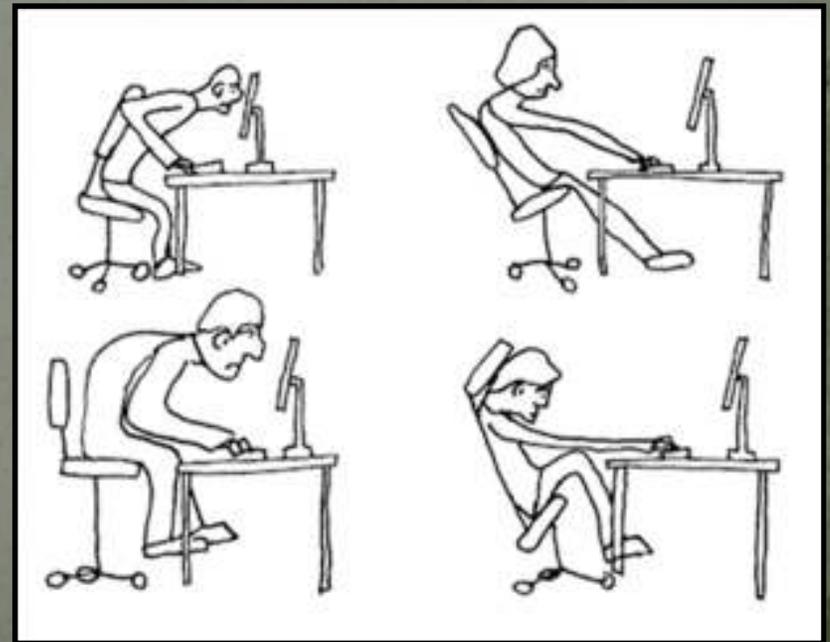


Sit-up Straight!

Loss of proper joint structure & function (due to poor posture)

↑ adhesion formation in spinal soft tissue.

Grieve, Common Vertebral Jt Problems, 1988



“Better than 90% of the energy output of the brain is used in relating to the physical body in its’ gravitational field.

The more mechanically distorted a person is, the less energy available for thinking, metabolism and healing.”

- Dr. Roger Sperry, Nobel Laureate



Don't Believe Me? Take A Look

Have your pts
observe the posture of people
over 50.

Typically people with good
posture appear healthy & people
with bad posture look ill.



And Now For Better Posture!

What to do:

1. Mobilize spine (neck & thoracics) via adjusting
2. Stretch overly contracting muscles,
 - ✓ likely anterior thoracic muscles (pec major & minor)
 - ✓ likely anterior neck muscles
 - ✓ likely low back muscles
3. Strengthen the weak inhibited muscles
 - ✓ likely the posterior thoracic muscles
 - ✓ likely anterior neck muscles
 - ✓ likely abdominal muscles

Chest Stretch

First contract the anterior muscles of the chest. This full contraction assures that the muscles are shut off and more relaxed. Then with both arms up on the doorway lunge through the doorway by placing one foot forward and the other back which helps you balance. This is the contract-relax mechanism discussed earlier.



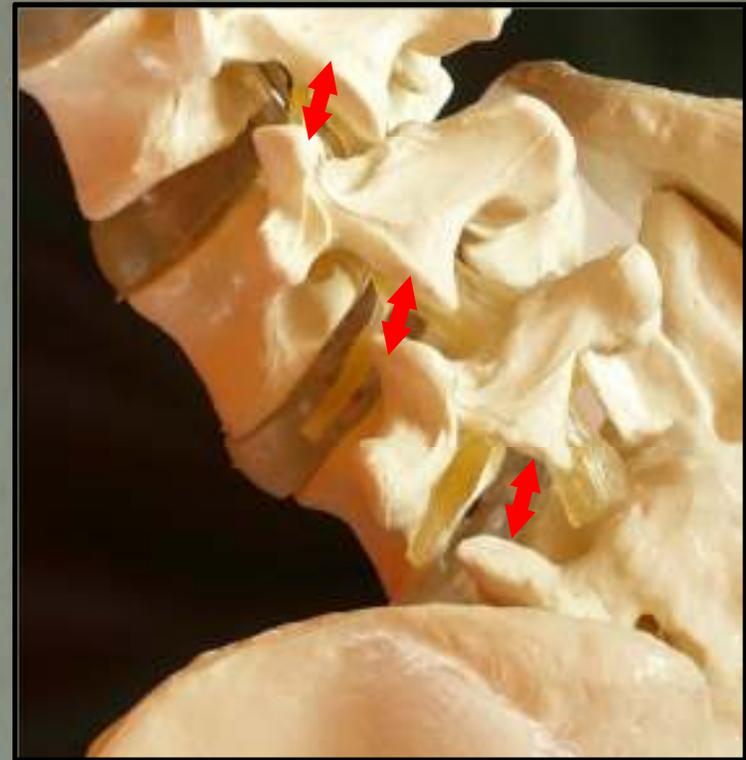
Neck Extension Stretch



Start at C7, with good posture (no anterior head translation or flexion) and place your hand on your forehead. Go into flexion as you provide resistance forcing the anterior compartment muscles to contract. Then tip the head back into extension. Fulcrum the neck over your fingers. Hold this stretch for 15-30 seconds and then move up to C6 and repeat and on up the spine. This can be done once every hour.

Stretches anterior tissues & mobilizes the neck.

PNF Low Back Side Stretch



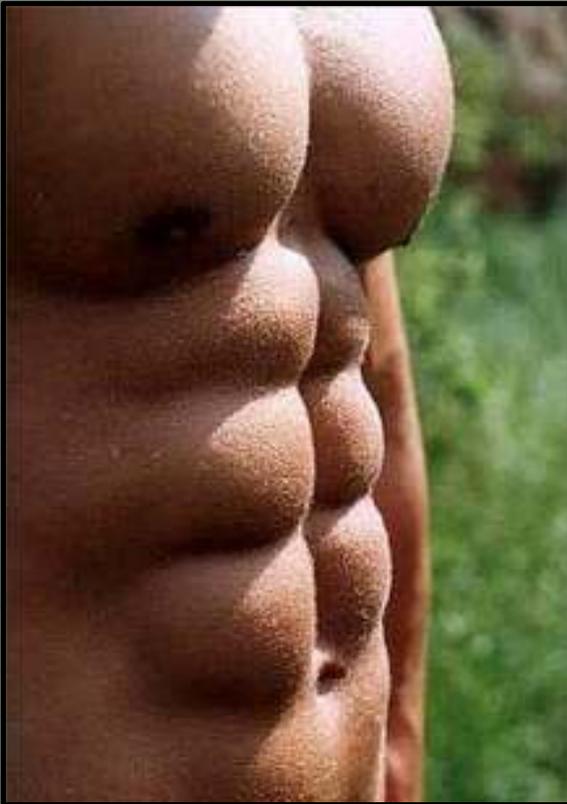
In the above position the pt should slowly contract their low back muscles first, then contract the abs and then stretch.
I know we covered this already.

Strengthen Neck & Back

When strengthening the neck & upper back muscles, first we must stretch the chest muscles. So go back a few slides and review. Contract the chest muscles, then stretch & this will optimize the muscles of the upper back to contract.

After that place both hands in front of your face as if you were praying. Now try to touch your nose to your thumbs (anterior head translation) and then move your head directly back (posterior head translation). Have the pt do this several times so they get used to the motion. Then start over, except this time as you begin to draw your head back, contract your posterior thoracic muscles and retract your scapulae so you are squeezing them together. Repeat: 3-4 sets of 10-12 repetitions. Contraction should be to pt comfort attempting to maximize their individual effort.

Strengthening Abs



When strengthening the abdominals, first contract the low back muscles and then stretch the low back muscles, to relax them. This will optimize the firing of the abdominals. If you just attempt to strengthen the abs without stretching the low back first the abs will be inhibited and not strengthen effectively. You're wasting your time!

Yes I know I repeated myself but it is a good slide worth repeating!

Shoulders & Posture

Drops “Y” Position: Pec Minor



Use drop table. DC pushes in direction of fibers or direction arms are hanging. 2-3 drops per visit on most pts, as 80-90% of pts have rounded shoulders and anterior head translation.

Tubing for Posture



During the adjustment place a foam roll (about 1 foot long) vertically between the scapulae. For home use the pt can lie over the top of the foam roll as much as possible. Start with 1-5 minutes per day for 2 weeks as they will likely experience discomfort initially. Then the pt can go as long as 20 minutes per session.

The End!

I hope you enjoyed the seminar! Now take the exam and email your answers in a **NUMBERED VERTICAL** column to:
marcusstrutzdc@gmail.com

Hope you take seminars from us in the future,

Thanks

Marcus Strutz, DC