

# Health and Wellness Seminars

## Taking Care of Your Spine Seminar

### Presentation

<https://bit.ly/spine-care-seminar-presentation-2023>

### Video

<https://youtu.be/fCdc892hgTY>



# Taking Care of Your Spine

Dr. Ryan Griffiths

Physical Therapist

Certified Strength and Conditioning  
Specialist



# About the Presenter

- Graduate of Shenandoah University (SU) Doctorate of Physical Therapy program (DPT)
- Certified Strength and Conditioning Specialist
- Adjunct Professor Franklin Pierce University (FPU) and Lab Assistant at SU and FPU DPT programs
- Army Non Commissioned Officer in Charge of Operational Law 18<sup>th</sup> Airborne Corps and Battalion Legal Non Commission Officer 7<sup>th</sup> Special Forces Group
  - Deployed to Afghanistan and Colombia
- Carpenter Roundhouse Railroad Museum
- Husband and father of four



# What is Physical Therapy (PT)?

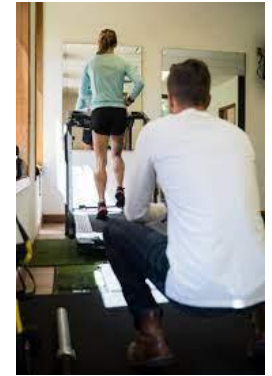
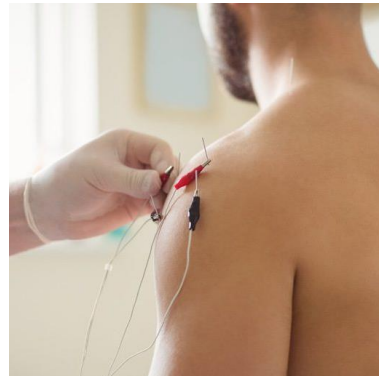
- PT is a **holistic** treatment used to restore **functional movements**, such as standing, walking, bending, lifting, and moving different body parts and proper **movement patterns**, such as running, throwing, and kicking.
- PT is education, instruction, and guidance in exercise and movement to **empower** you to **heal** and grow naturally and learn how different **body systems integrate** with movements
- PT can be both **corrective** and **preventative**.
- PT is the potential for **one-on-one** patient-therapist connection and treatment
  - Able to spend the most **one-on-one** time with patients than perhaps any other medical professional

# What does a Physical Therapist do?

- **Movement Expert** who improves quality of life through prescribed exercise, hands-on care, and patient education
- **Diagnoses and Treats** individuals of all ages, from newborns to people at the end of life. Many patients have injuries, disabilities, or other health conditions that need treatment and, based on their movement patterns, PTs tailor treatment plans to individual health issues
- **Cares** for people who simply want to become healthier and prevent future pain.
- **Examines** each person and develops a treatment plan to improve their ability to move, reduce or manage pain, restore function, and prevent disability.

<https://www.apta.org/your-career/careers-in-physical-therapy/becoming-a-pt>

# What does a Physical Therapist do?



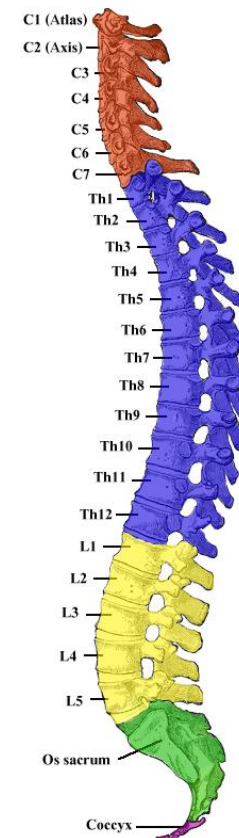
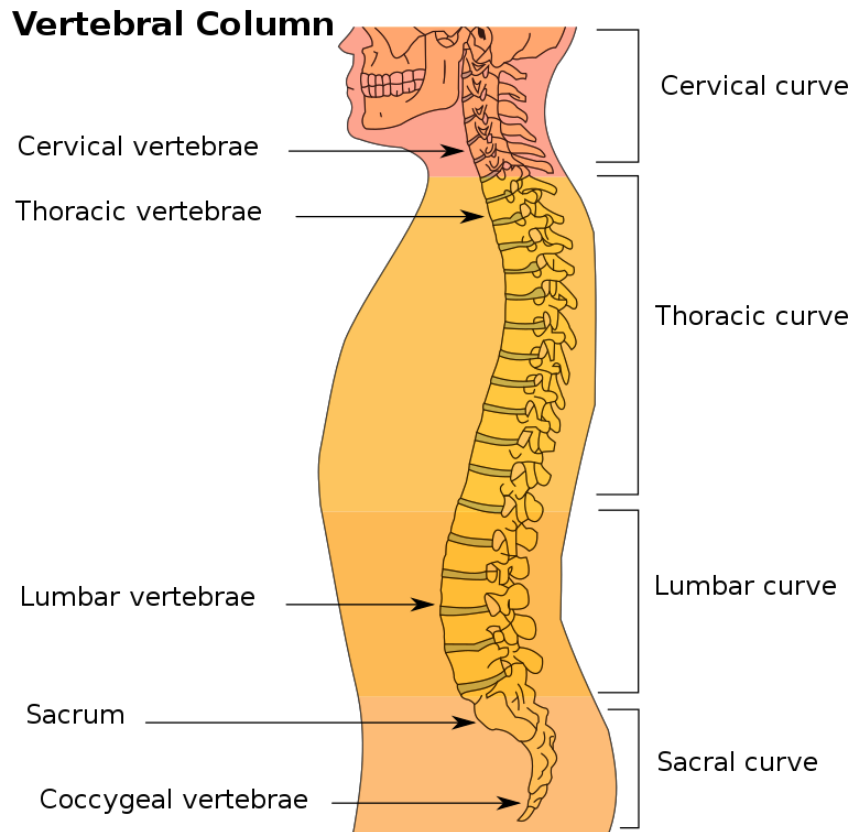
# Understanding the Spine

- Spine Segments & Curvatures
- Structure & Function
- Vertebra & Disc Anatomy
- Nervous System
- Vertebra & Disc Innervation
- Muscular System of the Spine
- Deep Local Stabilizer Muscles



# Understanding the Spine:

## Spine Segments & Curvatures



# Understanding the Spine:

## Structure & Function



Cervical



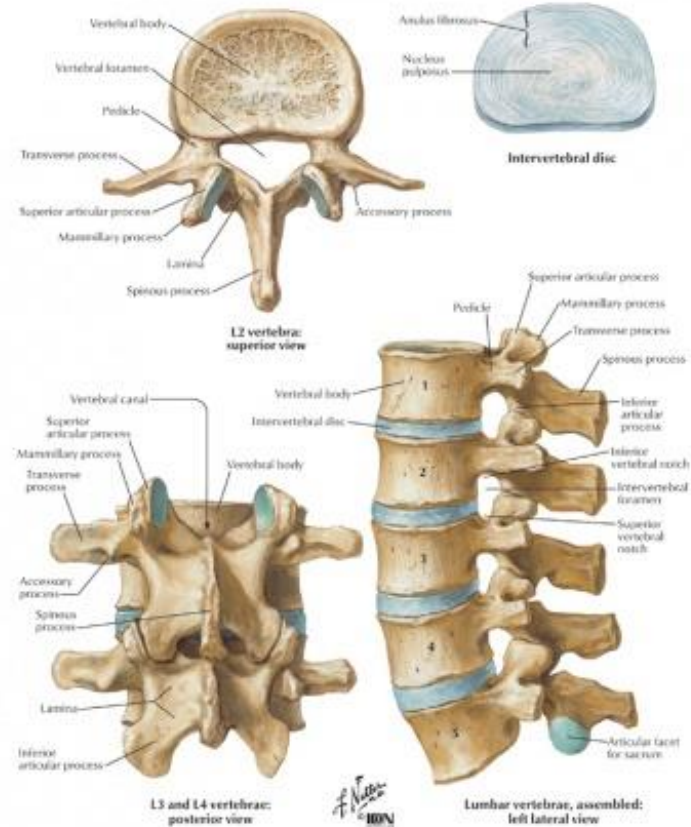
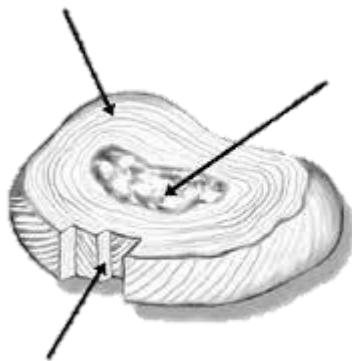
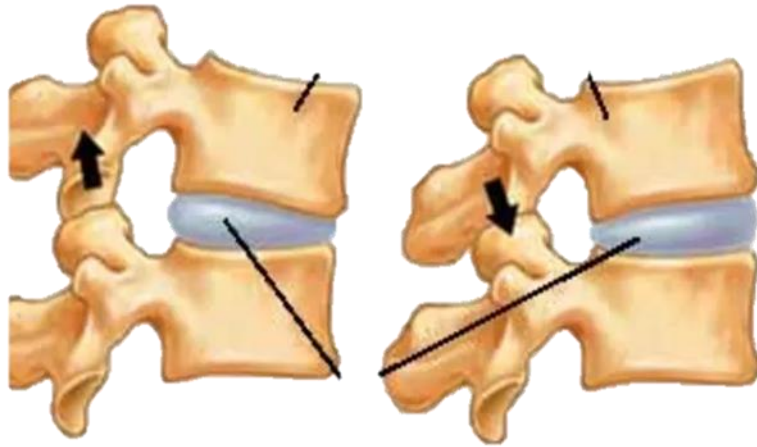
Thoracic



Lumbar

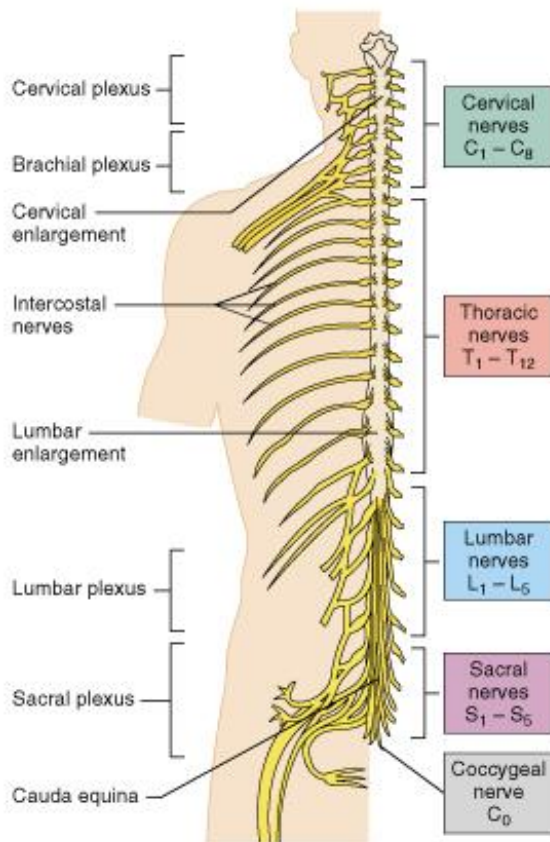
# Understanding the Spine:

## Vertebra & Disc Anatomy



# Understanding the Spine:

# Nervous System



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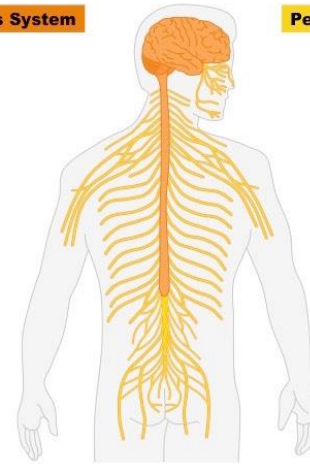
## Central Nervous System

Composed of:

- Brain
- Spinal cord

Contains:

- Relay neurons (interneurons)



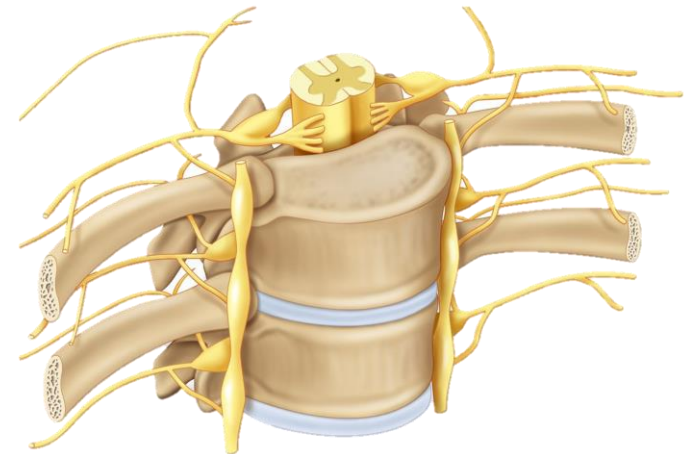
## Peripheral Nervous System

Composed of:

- Cranial nerves
- Spinal nerves
- Peripheral nerves

Contains:

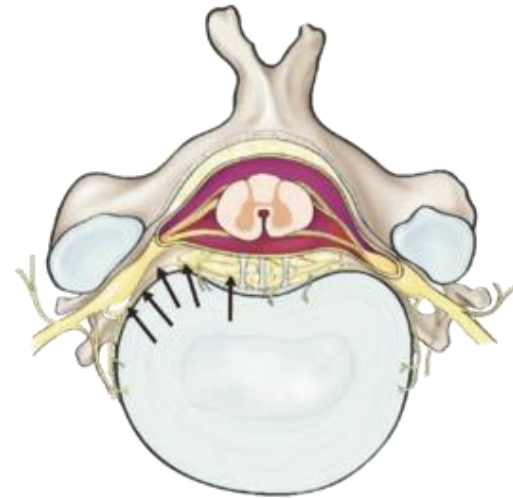
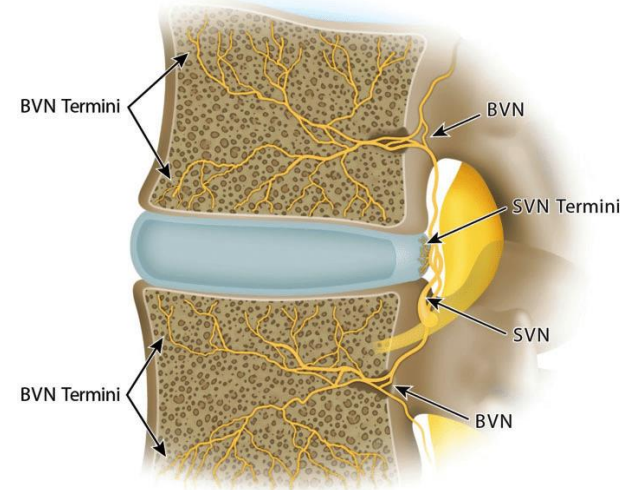
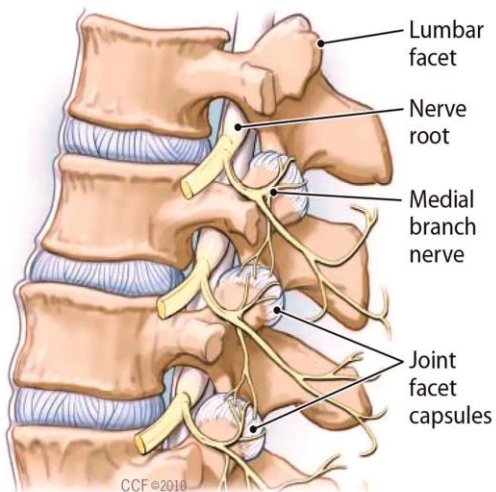
- Sensory neurons
- Motor neurons



# Understanding the Spine:

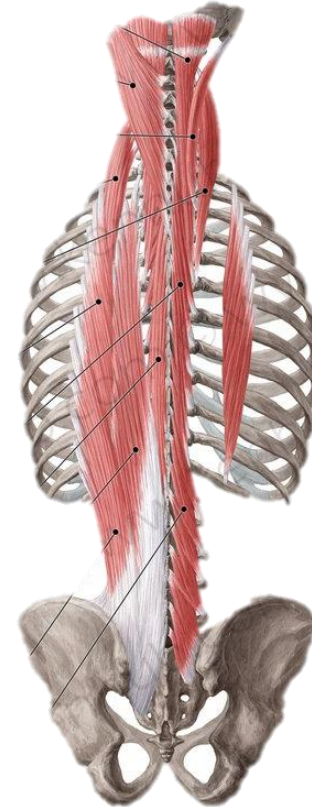
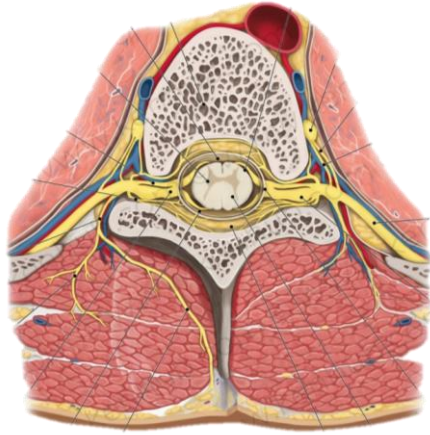
## Vertebra & Disc Innervation

- Spinal nerves
- Basivertebral nerve (BVN)
- Sinuvertebral Nerve (SVN)
- Dorsal Ramus



# Understanding the Spine:

## Muscular System of the Spine



# Understanding the Spine:

## Muscular System of the Spine

- Superficial Global Movers
  - Closer to the surface
  - Often multi joint muscles
  - Strength
- Deep Local Stabilizer
  - Deeper in the body
  - Often spans only one joint
  - Endurance



# Understanding the Spine:

## Deep Local Stabilizer Muscles

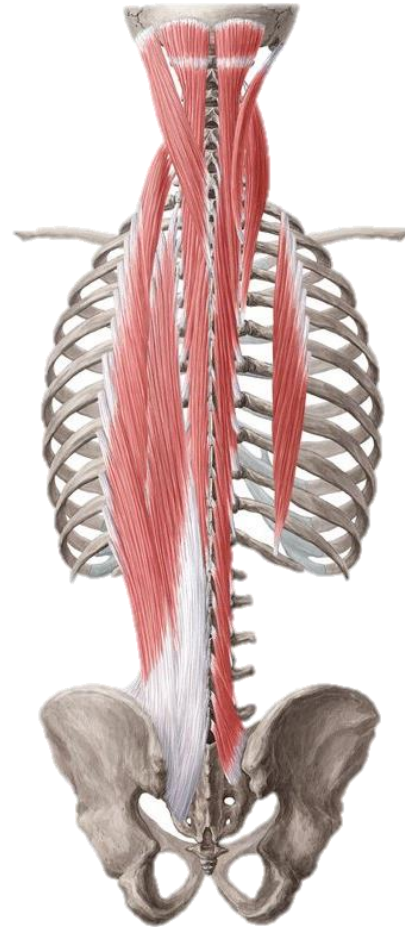
- Cervical spine



# Understanding the Spine:

## Deep Local Stabilizer Muscles

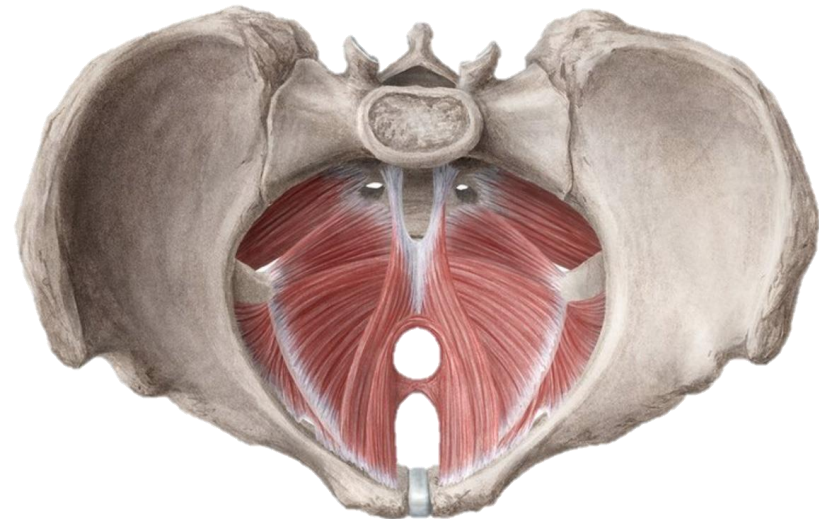
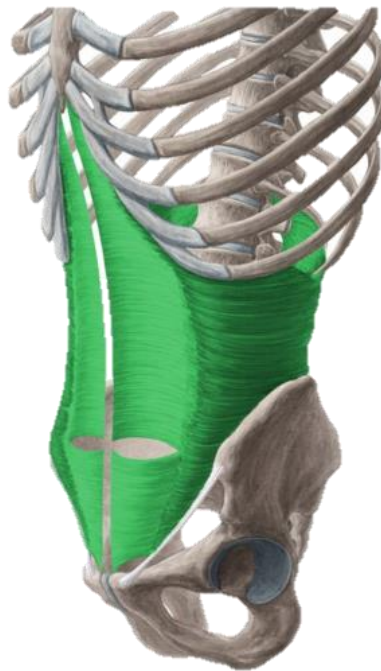
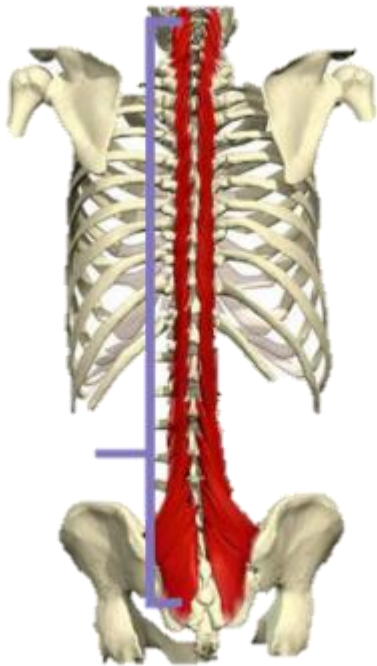
- Thoracic Spine



# Understanding the Spine:

## Deep Local Stabilizer Muscles

- Lumbar Spine



# Sources of Pain

- Bone and Joint
  - Arthritis – facet joint, uncovertebral joint, vertebral bodies, (spondylosis)
  - End plate fracture
  - Ligament dysfunction
  - Vertebral fractures
  - Spondylolisthesis
- Disc
  - Degeneration
  - Tear
  - Bulge/prolapse
  - Herniation/extrusion
  - Sequestration
- Nerve impingement
  - Arthritis
  - Spondylolisthesis
  - Inflammation
- Muscle
  - Strain/tear
  - Spasm
  - Contusion
  - Laceration
  - Fatigue
  - Poor posture
- Centralized
  - Central Nervous System

# Sources of Pain

## Systematic Literature Review of Imaging Features of Spinal Degeneration in Asymptomatic Populations W. Brinjikji et al.

**Table 2: Age-specific prevalence estimates of degenerative spine imaging findings in asymptomatic patients<sup>a</sup>**

Imaging Finding	Age (yr)						
	20	30	40	50	60	70	80
Disk degeneration	37%	52%	68%	80%	88%	93%	96%
Disk signal loss	17%	33%	54%	73%	86%	94%	97%
Disk height loss	24%	34%	45%	56%	67%	76%	84%
Disk bulge	30%	40%	50%	60%	69%	77%	84%
Disk protrusion	29%	31%	33%	36%	38%	40%	43%
Annular fissure	19%	20%	22%	23%	25%	27%	29%
Facet degeneration	4%	9%	18%	32%	50%	69%	83%
Spondylolisthesis	3%	5%	8%	14%	23%	35%	50%

<sup>a</sup> Prevalence rates estimated with a generalized linear mixed-effects model for the age-specific prevalence estimate (binomial outcome) clustering on study and adjusting for the midpoint of each reported age interval of the study.

# What causes these things?



# Correction & Prevention

- Core strengthening
- Strength/Resistance Training
- Posture
- Body Mechanics
- Stretching
- Mobility
- Nutrition
- Sleep



# Correction & Prevention:

## Core Strengthening

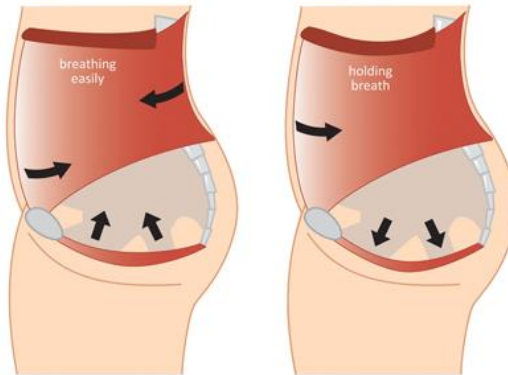
- Learning how to engage deep local stabilizer muscles
  - Transverse abdominus
  - Multifidus
  - Pelvic floor
- Correct firing of these muscles
- Training yourself to set these muscles before movement

# Correction & Prevention:

## Core Strengthening



PELVIC FLOOR MUSCLE CONTRACTION



**Correct action**  
The pelvic floor lifts, the deep abdominals draw in and there is no change in breathing

**Incorrect action**  
Pulling the belly button in towards the backbone and holding your breath can cause bearing-down on pelvic floor

© Continence Foundation of Australia



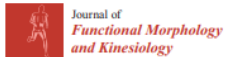
# Correction & Prevention:

## Core Strengthening

### Efficacy of Core Stability in Non-Specific Chronic Low Back Pain

Frizziero et al.

Results: Core stability provides great therapeutic effects in patients with non-specific chronic low back pain **reducing pain intensity, functional disability, and improving quality of life, core muscle activation, and thickness.** Evidences suggest that core stability is **more effective than rest or no/minimal intervention** and combination with other types of exercise for cLBP have shown grater efficacy.



Review

#### Efficacy of Core Stability in Non-Specific Chronic Low Back Pain

Antonio Frizziero <sup>1,\*</sup>, Giacomo Pellizzon <sup>2</sup>, Filippo Vittadini <sup>3</sup>, Davide Bigliardi <sup>1</sup> and Cosimo Costantino <sup>1</sup>

<sup>1</sup> Department of Medicine and Surgery, University of Parma, 43126 Parma, Italy; davide.bigliardi@unipr.it (D.B.); cosimo.costantino@unipr.it (C.C.)

<sup>2</sup> Centro di Medicina Spa, 31020 Villorba, Italy; giacomo.pellizzon@hotmail.it

<sup>3</sup> Department of Physical and Rehabilitation Medicine, Casa di Cura Policlinico S. Marco, 30100 Venice, Italy; filippo.vittadini@gmail.com

\* Correspondence: antonio.frizziero@unipr.it

# Correction & Prevention:

## Core Strengthening

### Association Between Radiculopathy and Lumbar Multifidus Atrophy in Magnetic Resonance Imaging Min et al.

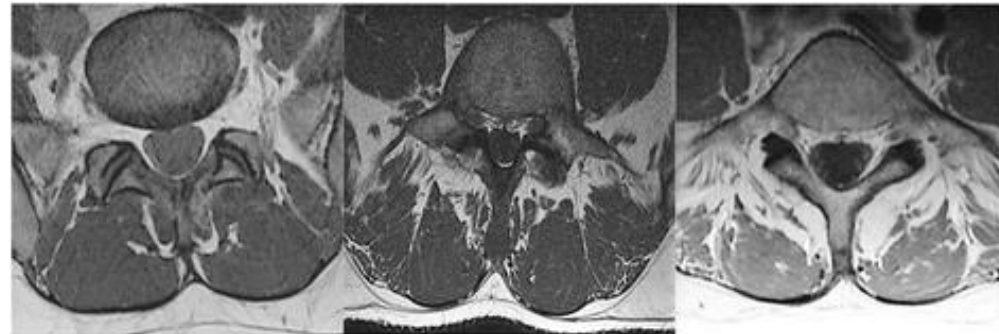
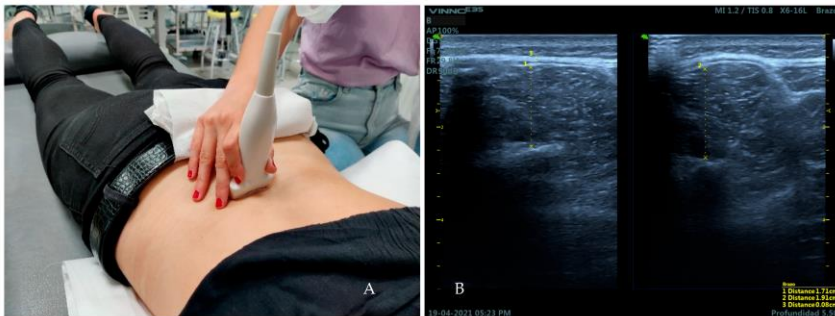
Journal of Back and Musculoskeletal Rehabilitation 26 (2013) 175–181  
DOI 10.3233/BMR-130365  
IOS Press

175

Association between radiculopathy and lumbar multifidus atrophy in magnetic resonance imaging

Ji Hye Min, Hyun Sook Choi, Won IhI Rhee and Jong In Lee\*  
Department of Rehabilitation Medicine, College of Medicine, The Catholic University of Korea, Seoul, Korea

RESULTS: Significantly more severe and extensive **MF atrophy** was observed in the **Rad group** than in the Non-rad group ( $p < 0.01$ ).



Fat Grade 0  
(0-10%)

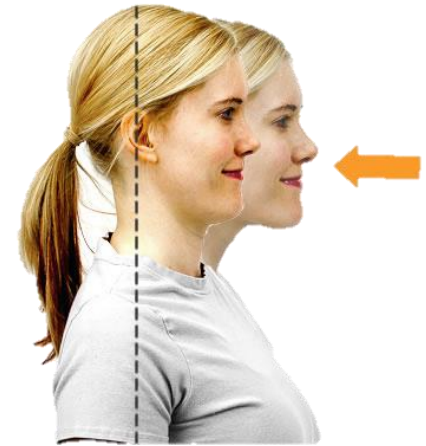
Fat Grade 1  
(10-50%)

Fat Grade 2  
(>50%)

# Correction & Prevention:

## Core Strengthening

- Learning how to engage deep local stabilizer muscles
  - Deep neck flexors
    - Longus Coli (cervical)
    - Cervical Multifidus
  - Scapular Stabilizers (thoracic)
    - Rhomboids
    - Middle Trapezius
    - Lower Trapezius
    - Thoracic Multifidus
  - Correct firing of these muscles
  - Training yourself to set these muscles before movement



# Correction & Prevention:

## Strength/Resistance Training

- Increased bone density
- Increased muscle mass
  - Protection
- Weight management
- Improved balance
- Increased postural control



Joan MacDonald (aka  
@trainwithjoan on Instagram)

# Correction & Prevention:

## Strength/Resistance Training

### Resistance Training for Chronic Low Back Pain in the Elderly: A Systematic Review Fritz et al.

#### Proceeding

*Supplementary Issue: Winter Conferences of Sports Science. Costa Blanca Sports Science Events, 22-23 March 2021. Alicante, Spain.*

#### Resistance training for chronic low back pain in the elderly: A systematic review

NICOLE FRITZ<sup>1</sup>, JAVIER GENE-MORALES<sup>2,3</sup>, ANGEL SAEZ-BERLANGA<sup>2</sup>, ALVARO JUESAS<sup>2,4</sup>, JORGE FLÁNDEZ<sup>5</sup>, JUAN C. COLADO<sup>2,4</sup>

<sup>1</sup>Health Department, University of Los Lagos, Puerto Montt, Chile

<sup>2</sup>Research Unit in Sport and Health, University of Valencia, Valencia, Spain

<sup>3</sup>Research Institute on Traffic and Road Safety (INTRAS), University of Valencia, Valencia, Spain

<sup>4</sup>Department of Physical Education and Sports, University of Valencia, Valencia, Spain

<sup>5</sup>Institute of Education Sciences, Austral University of Chile, Ciudad de Valdivia, Chile

In summary, resistance training programs have been proven useful to **significantly reduce pain and inability**. Furthermore, significant improvements in **quality of life and muscular strength** parameters are guaranteed.

# Correction & Prevention:

## Strength/Resistance Training

- 2-4 week familiarization phase
- 8 weeks exercise program
- 3 to 4 days/week
- Starting with Intensities of 55-60% of 1RM and then gradually reach an intensity of 70-80% of 1RM
- 8-11 exercises per session (global and then specific mm groups)
- 10 rep max per exercise
- 3-6 sets per session
- Rest of 1-2 minutes between sets and exercises



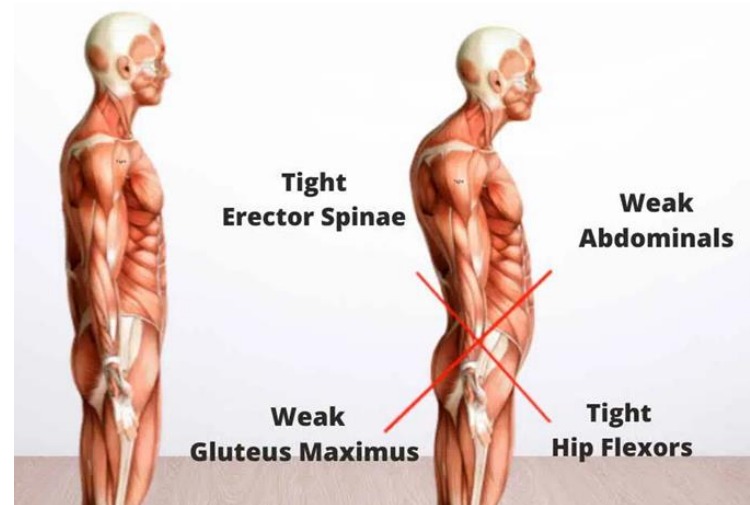
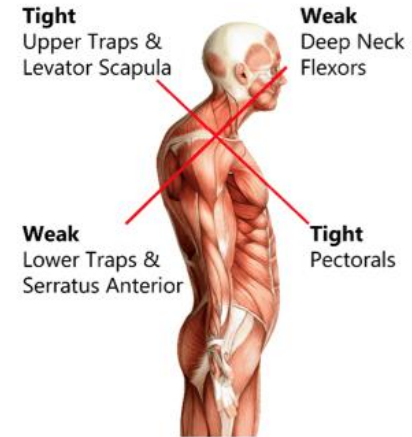
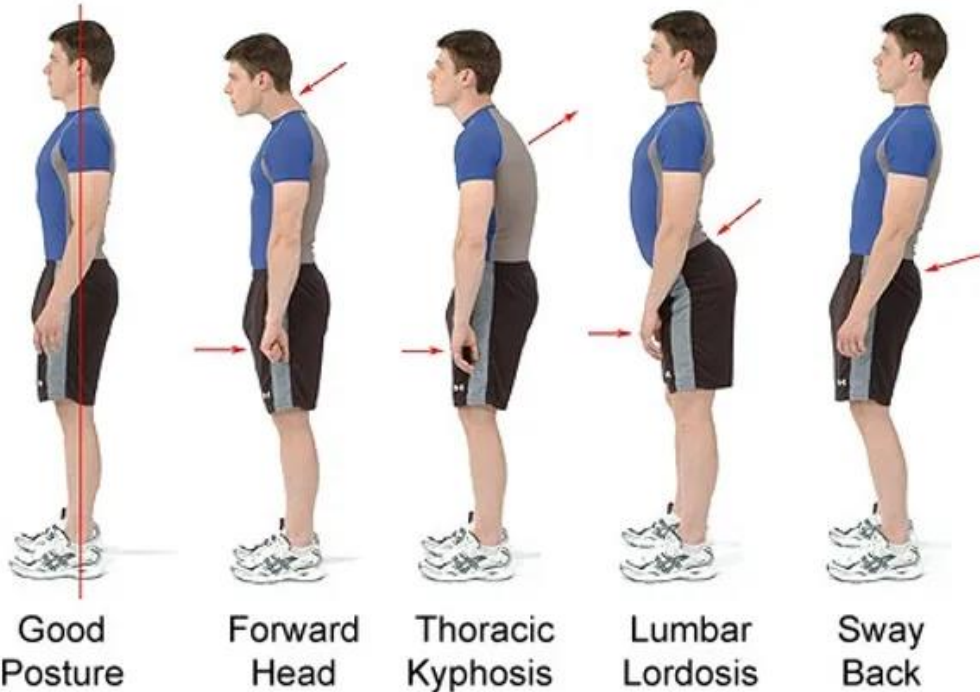
# Correction & Prevention:

## Strength/Resistance Training



# Correction & Prevention:

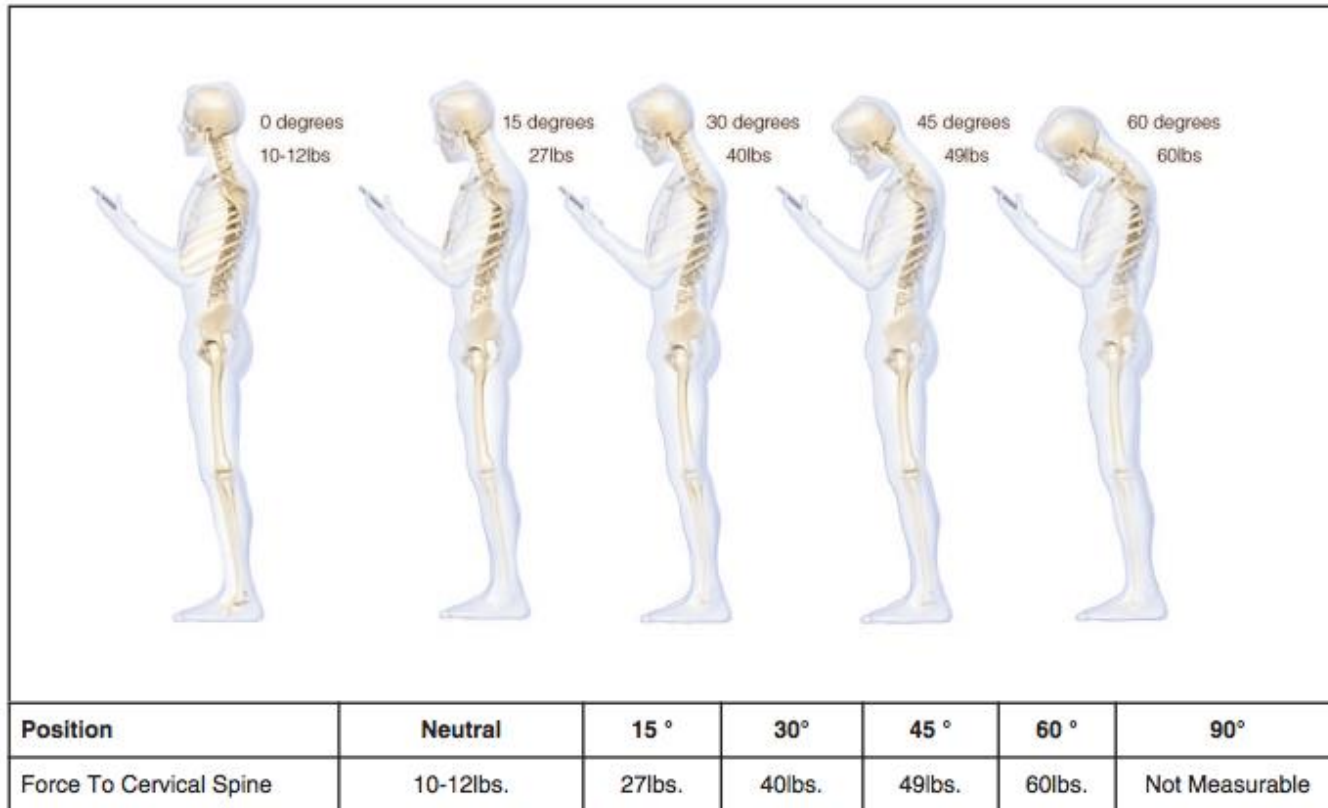
## Posture Standing



# Correction & Prevention:

## Posture Standing

### Assessment of Stresses in the Cervical Spine Caused by Posture and Position of the Head Hansrai et al.



### Efficacy of Integrating Cervical Posture Correction With Lumbar Stabilization Exercises for Mechanical Low Back Pain: A Randomized Blinded Clinical Trial Elabd et al.

*Journal of Applied Biomechanics*, 2021, 37, 43-51  
<https://doi.org/10.1123/jab.2020-0005>  
© 2021 Human Kinetics, Inc.



#### Efficacy of Integrating Cervical Posture Correction With Lumbar Stabilization Exercises for Mechanical Low Back Pain: A Randomized Blinded Clinical Trial

Aliaa M. Elabd,<sup>1</sup> Salah-Eldin B. Rasslan,<sup>2</sup> Haytham M Elhafez,<sup>2,3</sup> Omar M. Elabd,<sup>4</sup> Mohamed A. Behiry,<sup>4</sup> and Ahmed I. Elerian<sup>2</sup>

<sup>1</sup>Pharos University; <sup>2</sup>Cairo University; <sup>3</sup>Suez University; <sup>4</sup>Delta University for Science and Technology

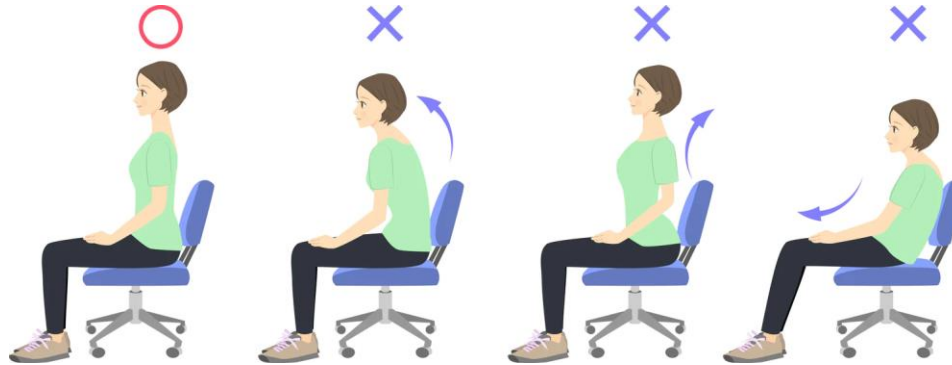
Although current lumbar stabilization exercises are beneficial for chronic mechanical low back pain, further research is recommended focusing on global spinal alignment normalization. This randomized, controlled, blinded trial was conducted to determine the effects of adding cervical posture correction to lumbar stabilization on chronic mechanical low back pain. Fifty adult patients (24 males) with chronic mechanical low back pain and forward head posture received 12 weeks treatment of either both programs (group A) or lumbar stabilization (group B). The primary outcome was back pain. The secondary outcomes included the craniovertebral angle, Oswestry Disability Index, C<sub>7</sub>-S<sub>1</sub> sagittal vertical axis, and sagittal intervertebral movements. The multivariate analysis of variance indicated a significant group-by-time interaction ( $P = .001$ , partial  $\eta^2 = .609$ ). Pain, disability, C<sub>7</sub>-S<sub>1</sub> sagittal vertical axis, and L<sub>2</sub>-L<sub>3</sub> intervertebral rotation were reduced in group A more than B ( $P = .008$ , .001, .025, and .001). Craniovertebral angle was increased in A when compared to B ( $P = .001$ ). However, there were no significant group-by-time interactions for other intervertebral movements. Within-group comparisons were significant for all outcomes except for craniovertebral angle within patients in the control group. Adding cervical posture correction with lumbar stabilization for management of chronic low back pain seemed to have better effects than the application of a stabilization program only.

**Keywords:** chronic spinal pain, forward head, sagittal posture, segmental stabilization

- Faulty cervical spinal posturing can increase loads on **lumbar** spine and spinal musculature

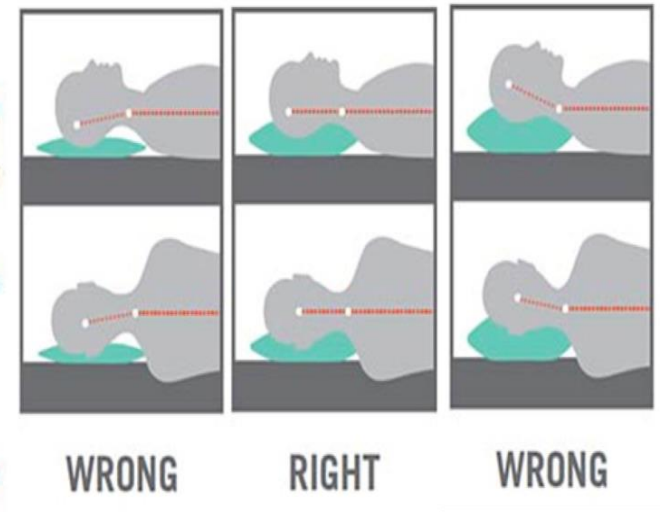
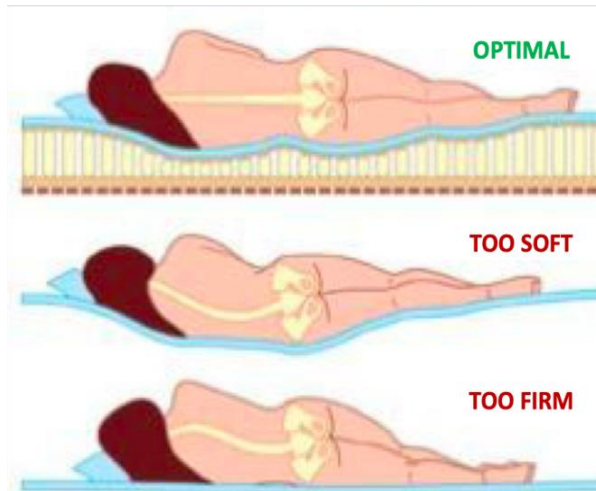
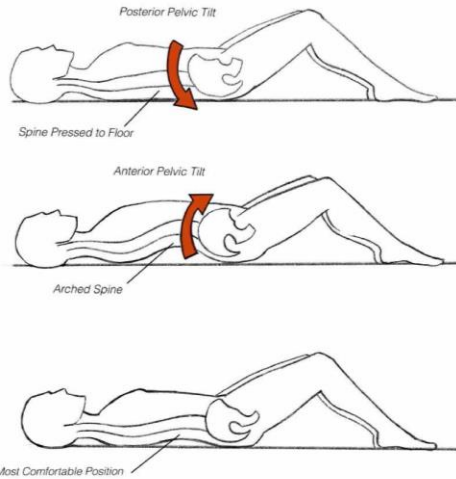
# Correction & Prevention:

## Posture Sitting & Sleeping



Mattress Firmness

Pillow Firmness



# Correction & Prevention:

## Body Mechanics

- Proper body mechanics can reduce stress and loads on the spinal anatomy

### Training The Hip Hinge



# Correction & Prevention:

## Body Mechanics

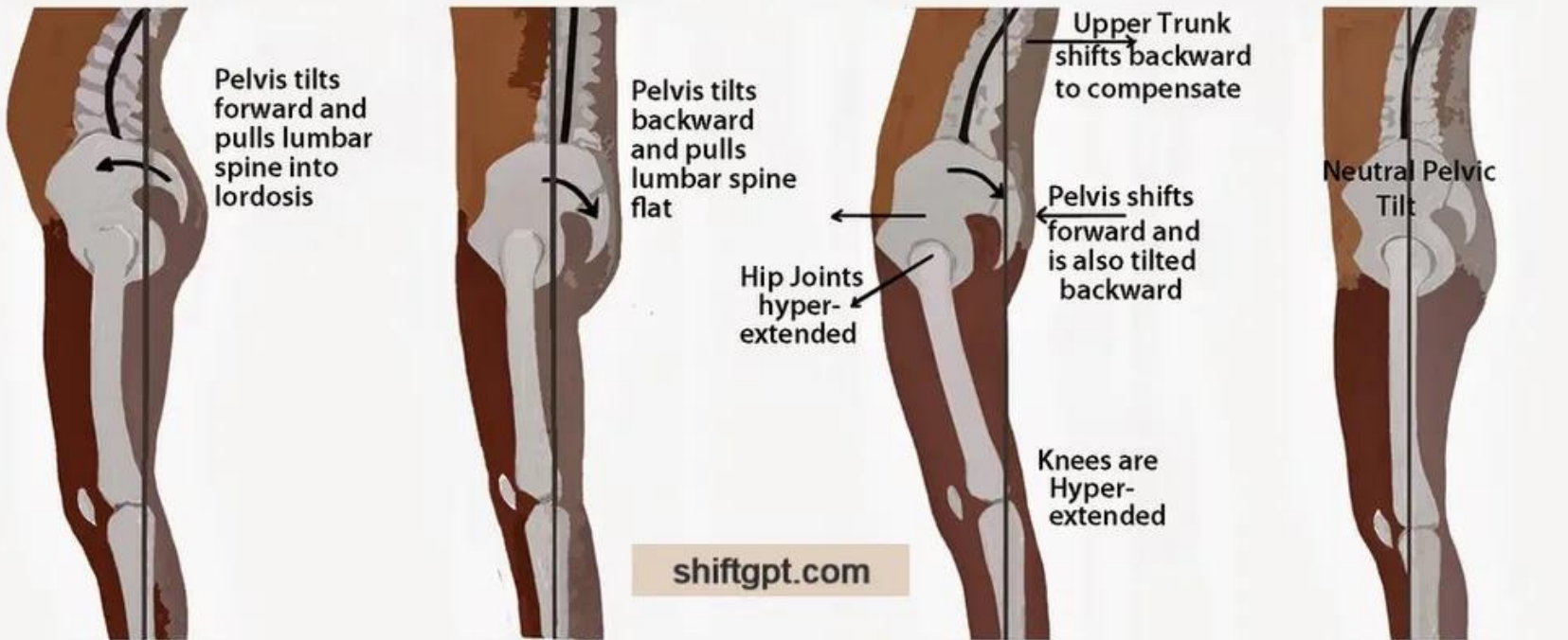
<b>LIFTING DO'S &amp; DON'TS</b>			
<p><b>DO LIFT AS A TEAM</b></p>  <p>Do lift bulky or heavy loads as a team. Doing so is smart and the safe way to work.</p>	<p><b>DO TURN WITH LEGS</b></p>  <p>Do move your legs and feet when turning or lowering the load. Avoid twisting at your waist.</p>	<p><b>DO USE YOUR LEGS</b></p>  <p>Do lift the load using your powerful leg and buttocks muscles. Your feet should be wide apart, head and back upright. Keep abdominal muscles tight and the load in close.</p>	<p><b>DO USE EQUIPMENT</b></p>  <p>Do use equipment like hand trucks, dolly's, or forklifts to do the heavy lifting. It's much less work and less risk of injury.</p>
<p><b>DON'T LIFT BULKY LOADS ALONE</b></p>  <p>Don't lift bulky or heavy loads alone. Doing so puts great stress on your low back muscles and spine.</p>	<p><b>DON'T TWIST WHEN LIFTING</b></p>  <p>Don't twist when lifting, lowering, or carrying any load as this increases your risk of back injury.</p>	<p><b>DON'T USE YOUR BACK</b></p>  <p>Don't lift the load with your rear end high and your lead low. Use your leg muscles, not your weaker low back muscles.</p>	<p><b>DON'T LIFT HEAVY LOADS</b></p>  <p>Don't lift heavy loads when you can use equipment. It is less work and less stress on your low back.</p>

US Department of Labor

# Correction & Prevention:

## Stretching

### Effect of Pelvic Tilt and Hip/Knee Hyperextension on Lower Body Posture



Anterior Pelvic Tilt  
Lordotic Back

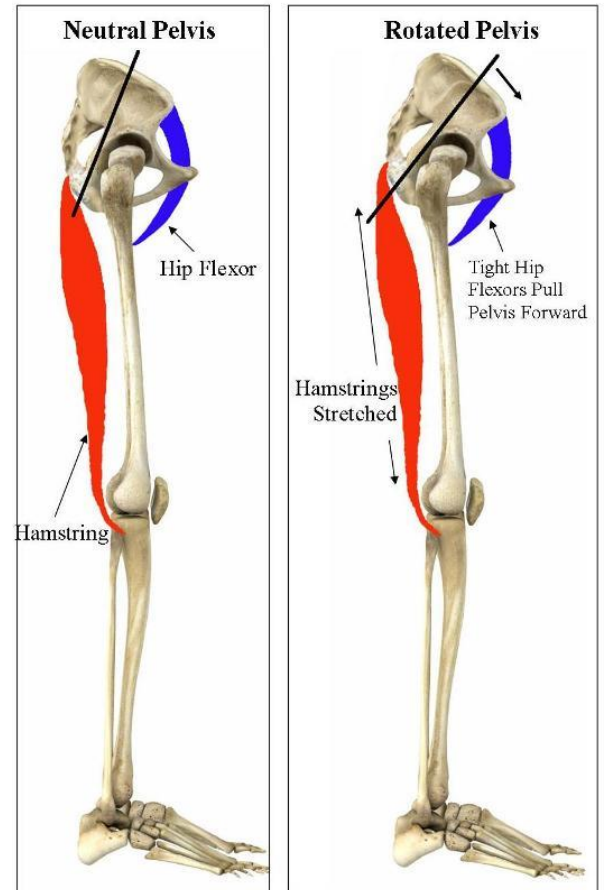
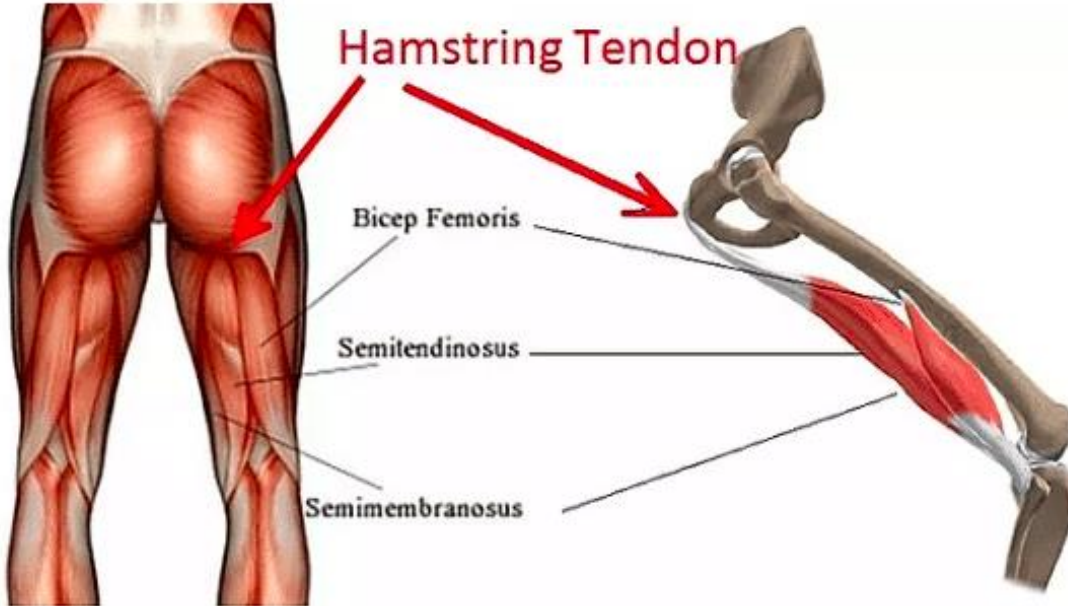
Posterior Pelvic Tilt  
Flat Back

Forward Shifted Pelvis  
Swayback

Neutral Pelvic Tilt  
Balanced Posture

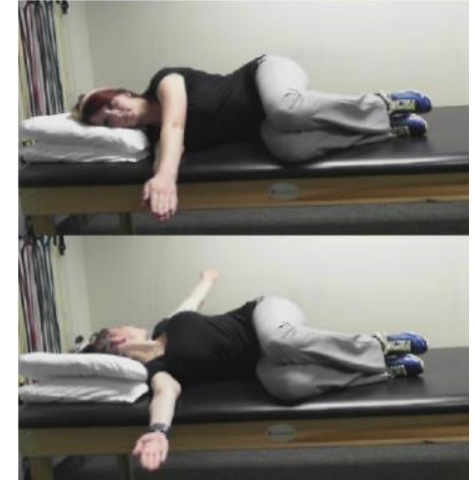
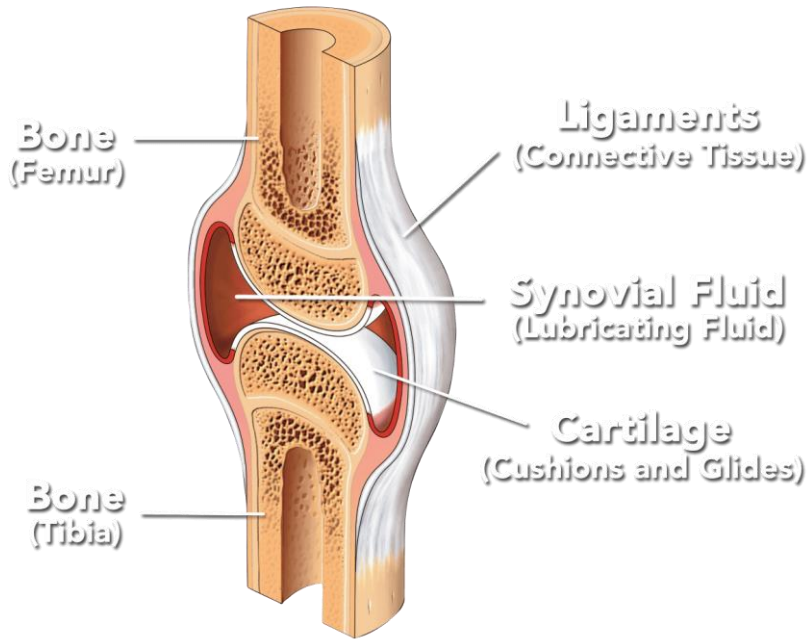
# Correction & Prevention:

# Stretching



# Correction & Prevention:

## Mobility



# Correction & Prevention:

## Nutrition - Protein

- Preventing muscle atrophy and optimizing health  
1.2-1.6 g/kg/day
- Optimizing strength training goals  
1.6-2.2 g/kg/day
- Optimizing fat loss and lean muscle mass while in a caloric deficit  
2.2-3.0 g/kg/day
- Best to spread it out throughout the day

### EXAMPLE:

170 lb. Male = 77.1kg

77.1 kg x 1.2 = 92.5g of protein



# Correction & Prevention:

## Nutrition

- Vitamins and Mineral
- Carbohydrates
- Fats
- Water
- Body Mass Index

### If Not Exercising

$$\text{Body Weight (lbs)} / 2 = \text{Intake in fluid ounces}$$

*\*Multiply by 29.6 for number in millilitres*

### If Exercising

$$\text{Body Weight (lbs)} / 2 + \text{Water Lost} = \text{Intake in fluid ounces}$$

*\*To determine water lost, weigh yourself before and after exercising.  
For each pound (0.45kg) lost, drink 16-20 oz. of water.*

# Correction & Prevention:

## Sleep

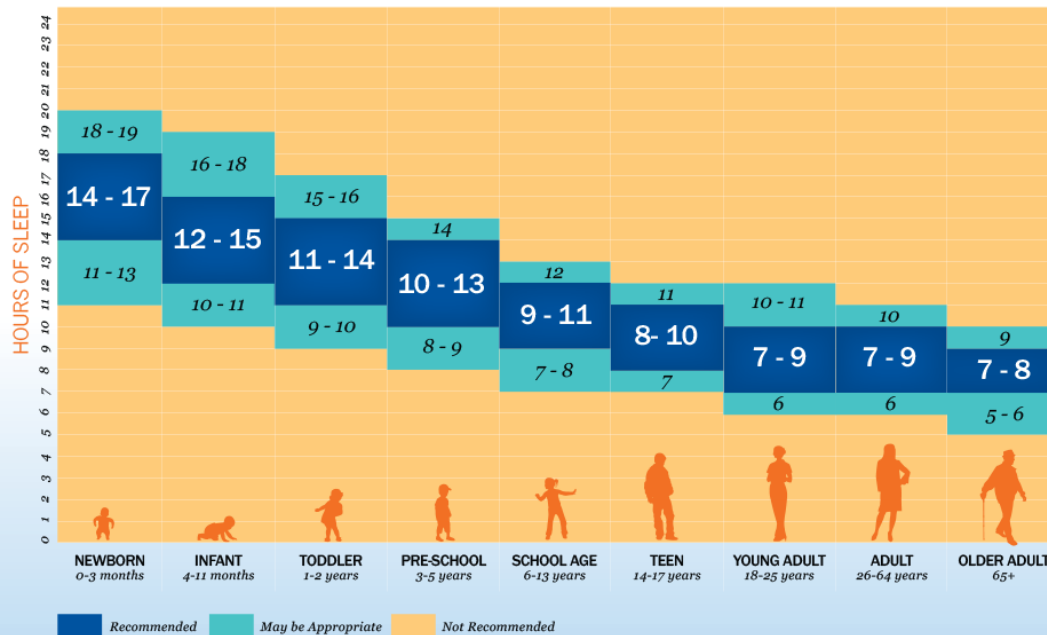
- Healing/Repair
  - White blood cells
  - Blood flow
  - Hormones
  - Reduced inflammation
- Reduced stress and Improved Mood
- Growth



# Correction & Prevention:

## Sleep

### SLEEP DURATION RECOMMENDATIONS



SLEEPFOUNDATION.ORG | SLEEP.ORG

Hirshkowitz M, The National Sleep Foundation's sleep time duration recommendations: methodology and results summary, Sleep Health (2015), <http://dx.doi.org/10.1016/j.sleh.2014.12.010>

# NOW WHAT?

## Remember...

- The body can heal
- Try something new
  - Break out of your old patterns and habits
  - Make new habits
- There's nothing to lose
  - You will end up stronger
  - You will be more mobile
  - You will be healthier



CONSULT YOUR LOCAL PT BEFORE THINGS GET WORSE

# Special Thanks

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# Questions?

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