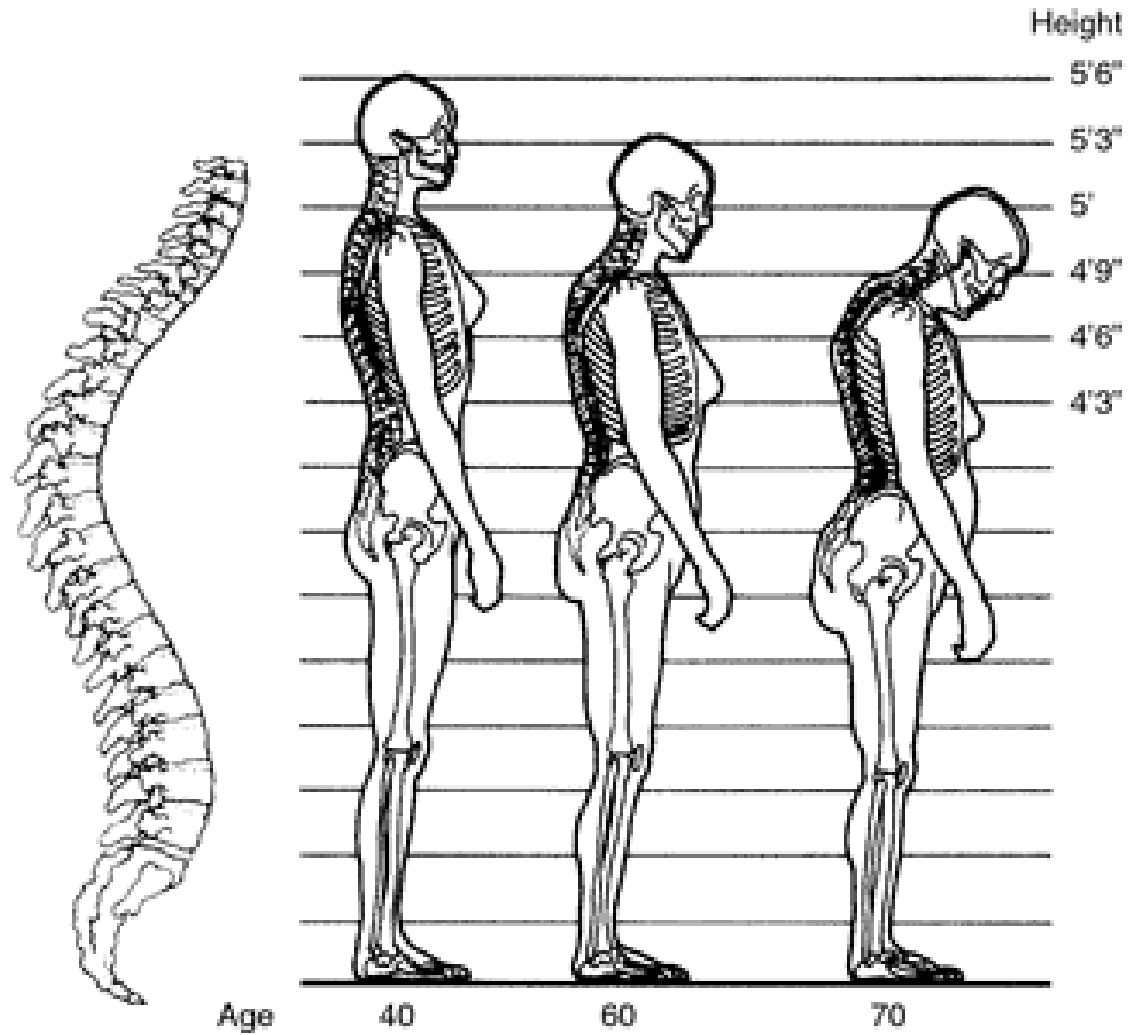


The Aging Spine



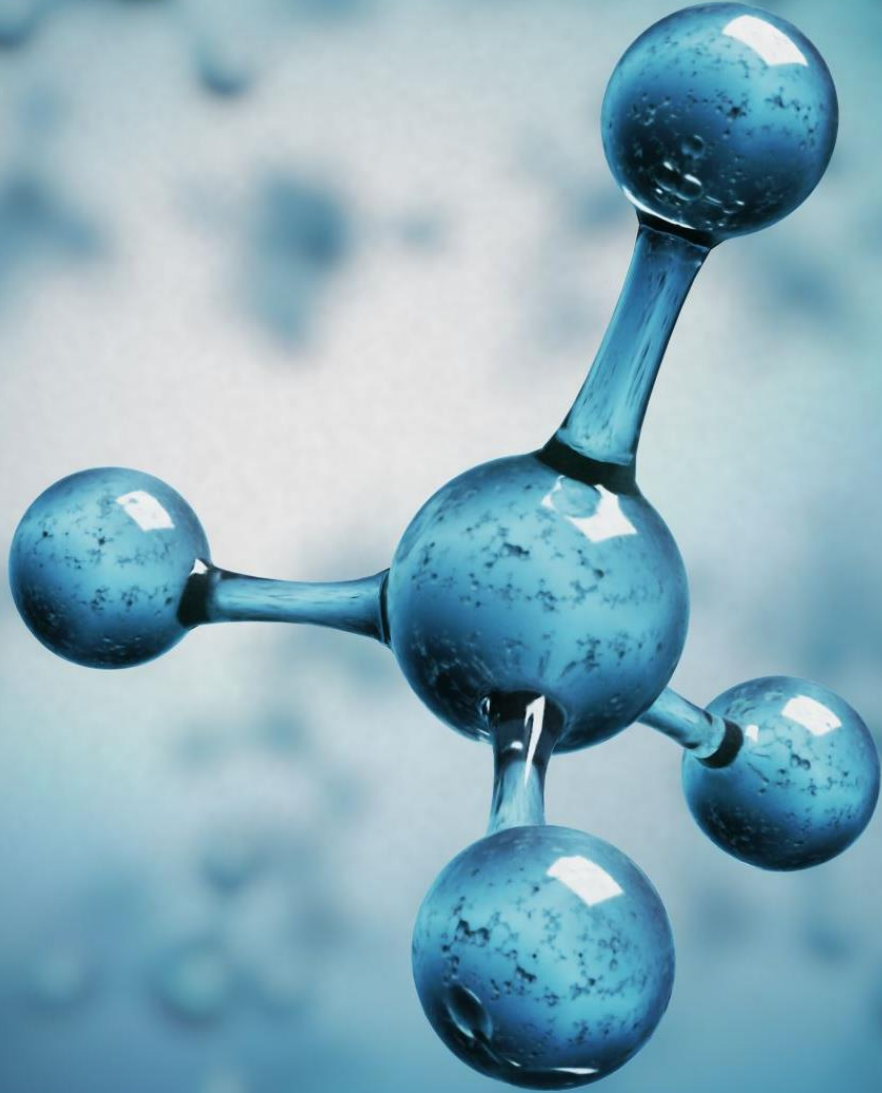
TODAY

Changes that accompany aging

Management of these changes

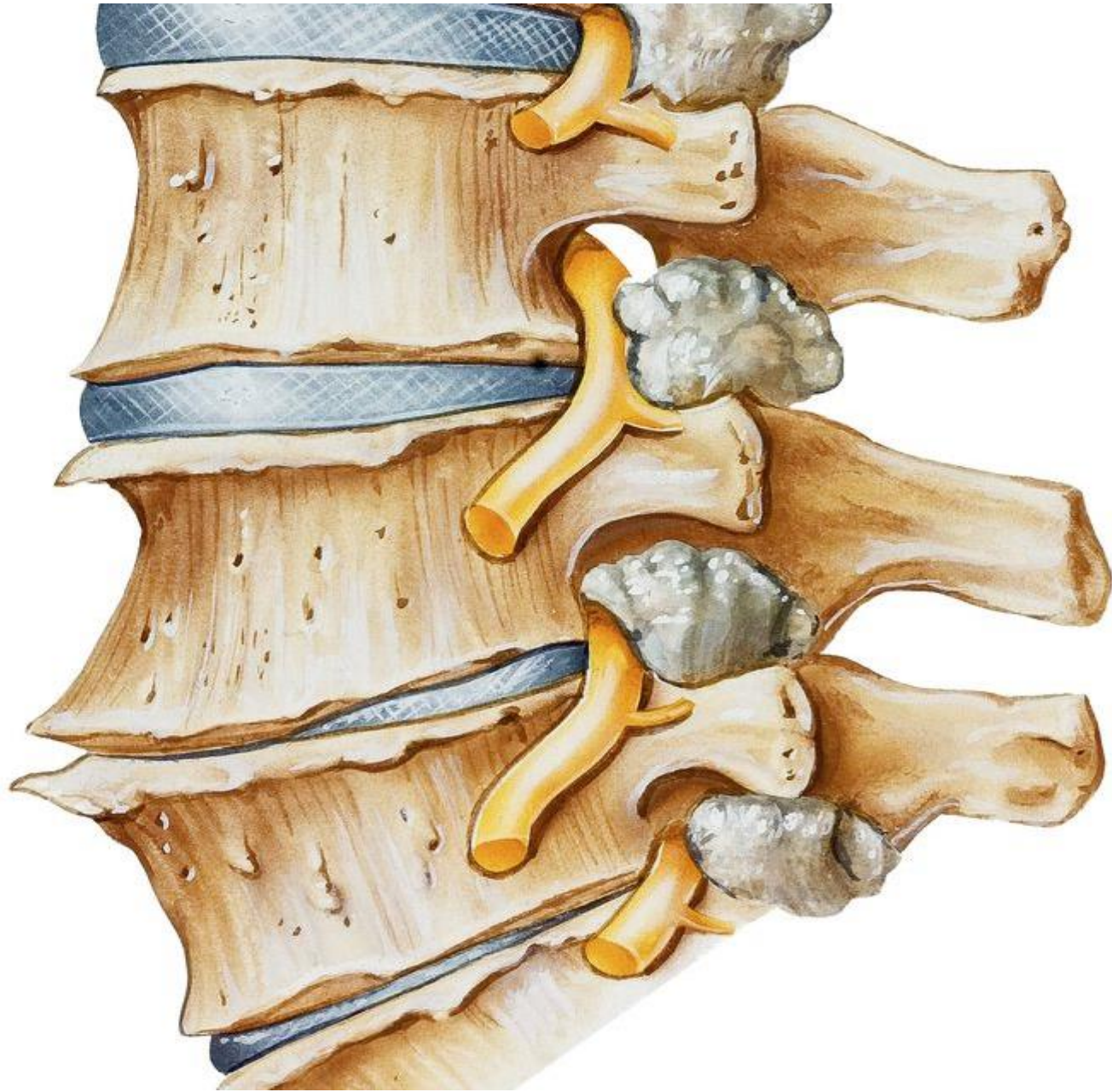
What can we do?

Treatment ideas and patient education



Changes with Aging

- Nucleus pulposus dries out the disc becomes less resilient and stiffer
- Annulus fibrosis bears more of the weight
- The disc and vertebral bodies adapt based on the nature and direction of the forces
- Excessive compression can lead to ossifications along the margins of the disc along with osteophytes



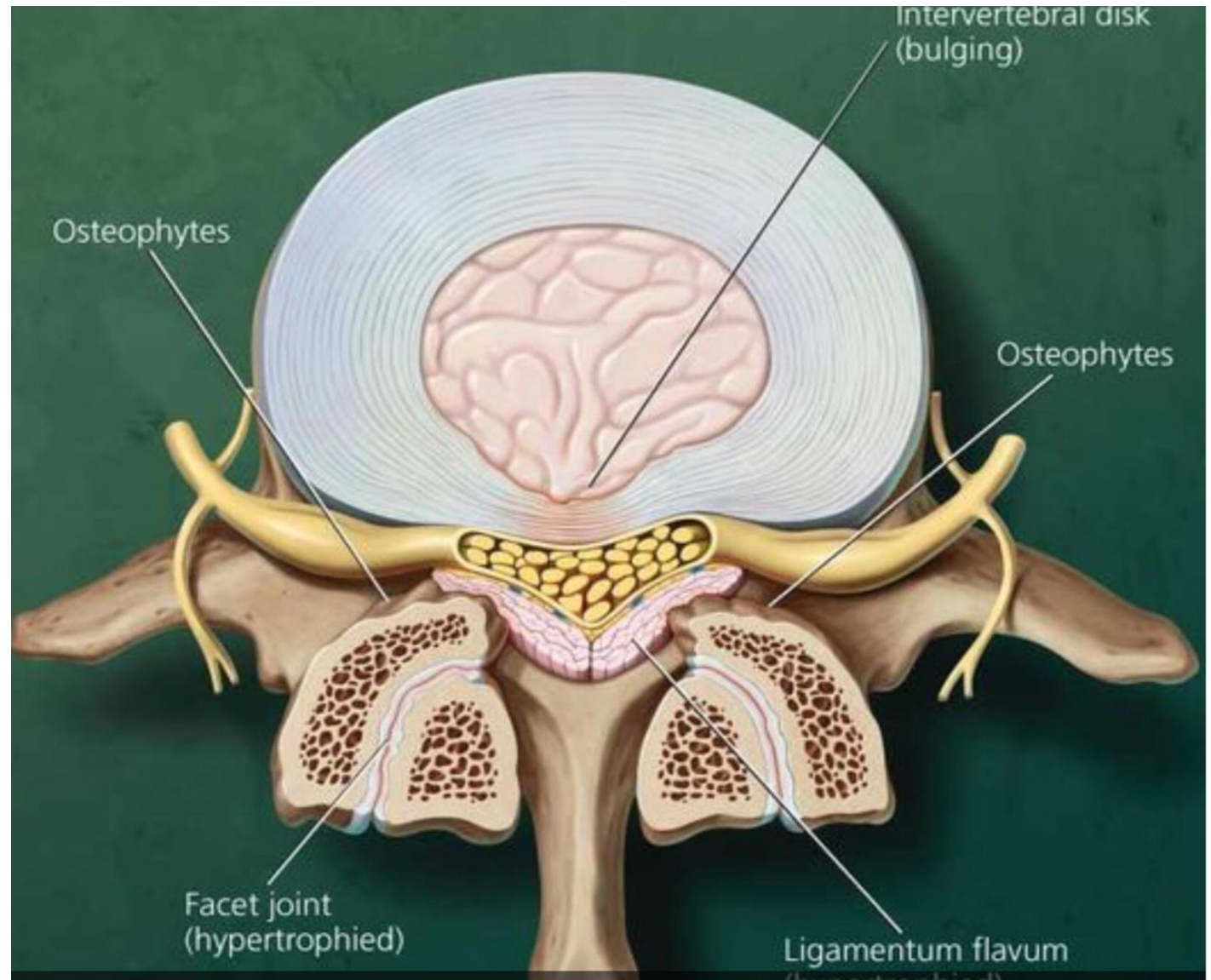
Stenosis

- 21 % of asymptomatic patients over 60 years of age were found to have central stenosis
- Natural history of spinal stenosis:
 - patients with moderate severity—symptoms remain unchanged or getting slightly better over time
 - patients with more severe stenosis get worse w/o conservative or surgical intervention

Porter Spine 1996

Matsunaga, spine 1990, Porter Spine 1984,
Johnson Acta Ortho Scan 1991

Anatomical Changes



Relationship between Degeneration and Symptoms

Multiple studies have shown that there is no relationship between clinical symptoms and radiological changes observed with lower back disorders.

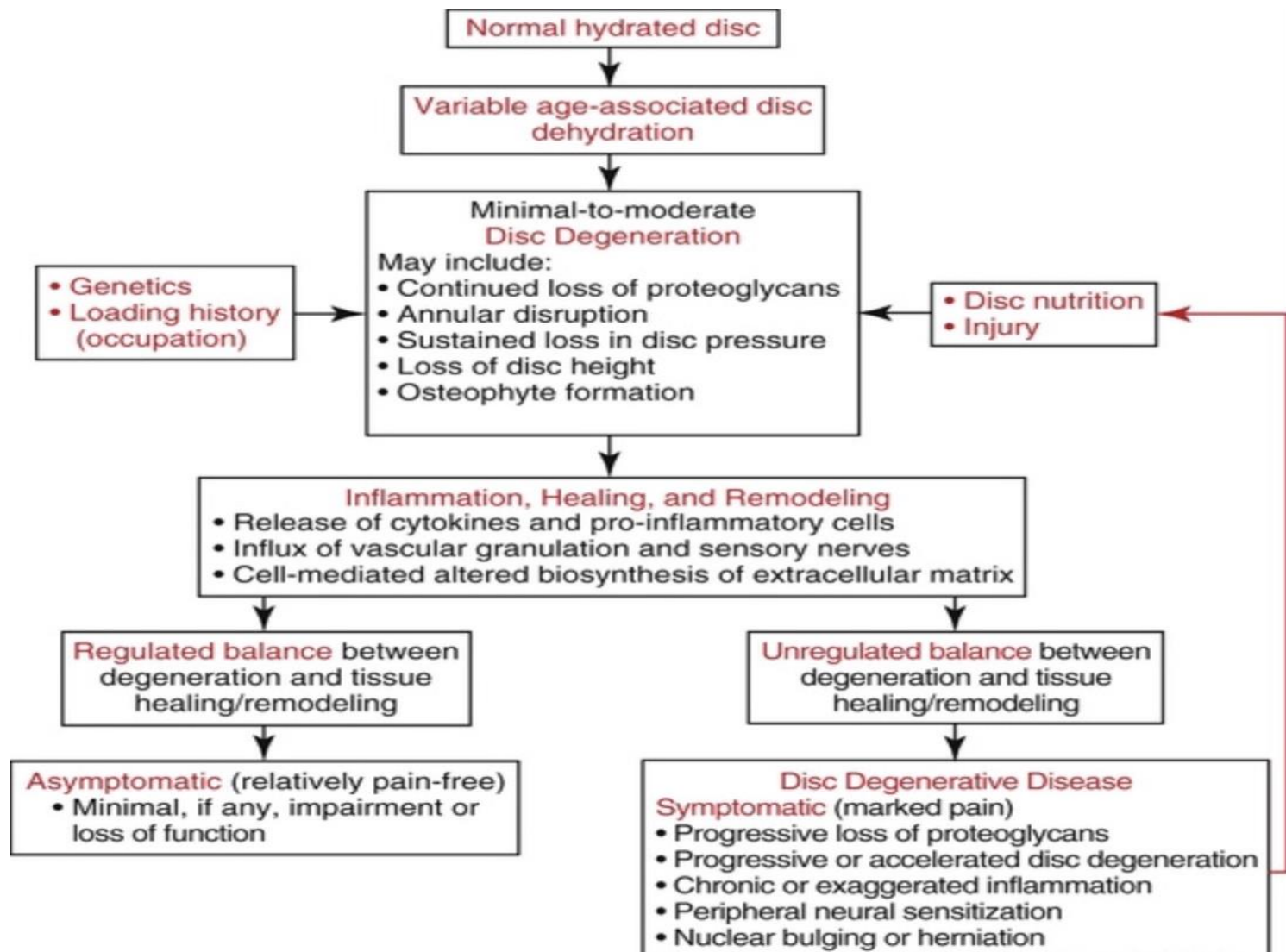


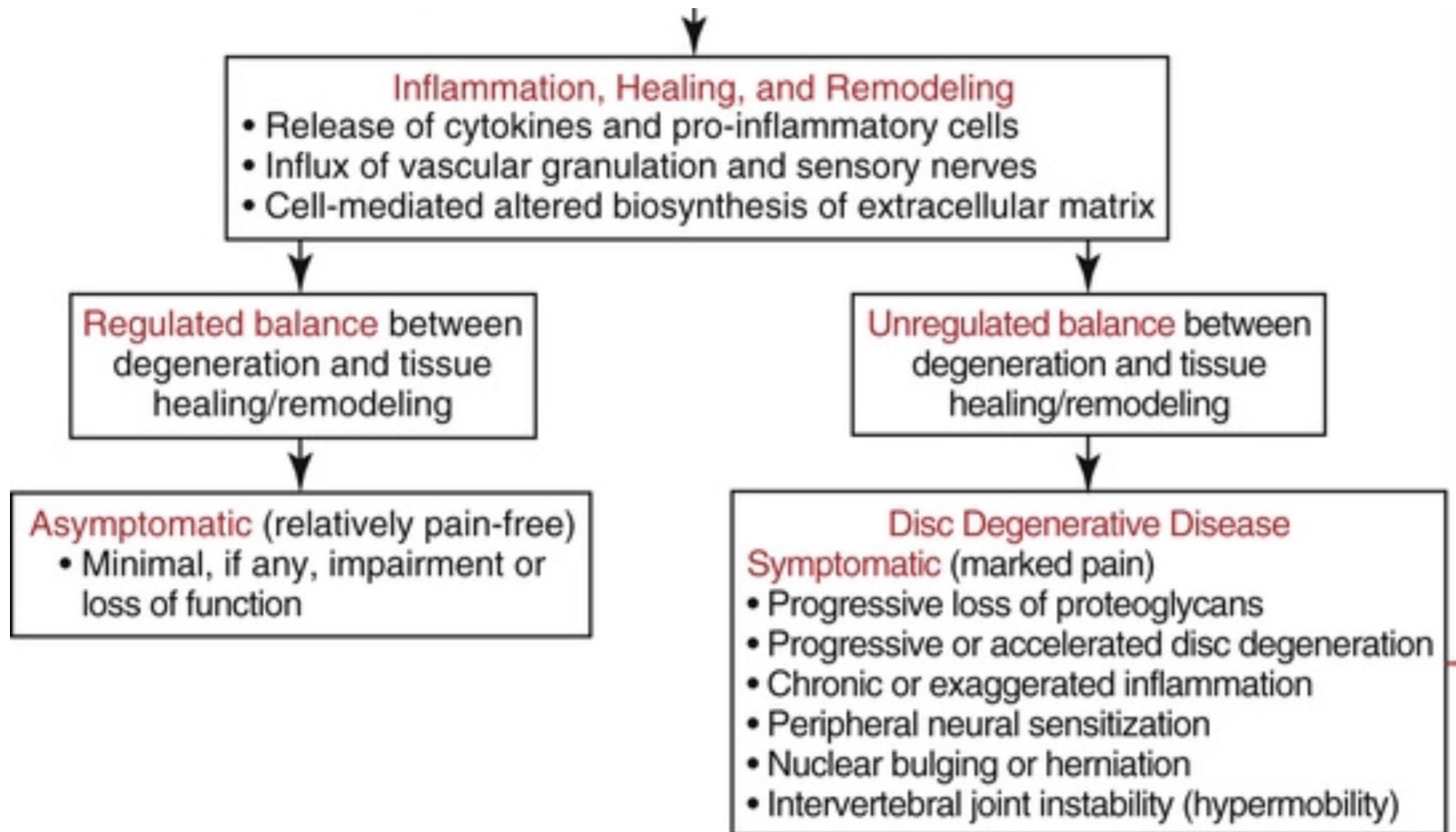
- Sanders et al (1983)
 - Compared radiological studies of 536 patients ; 270 with LBP, 266 w/o pain
 - Findings:
 - No significant difference between the two groups
 - Conclusion: radiography is a poor method to indicate past, present or future low back pain

Theory: Balance between degeneration and tissue/healing remodeling

What makes the spine symptomatic then?





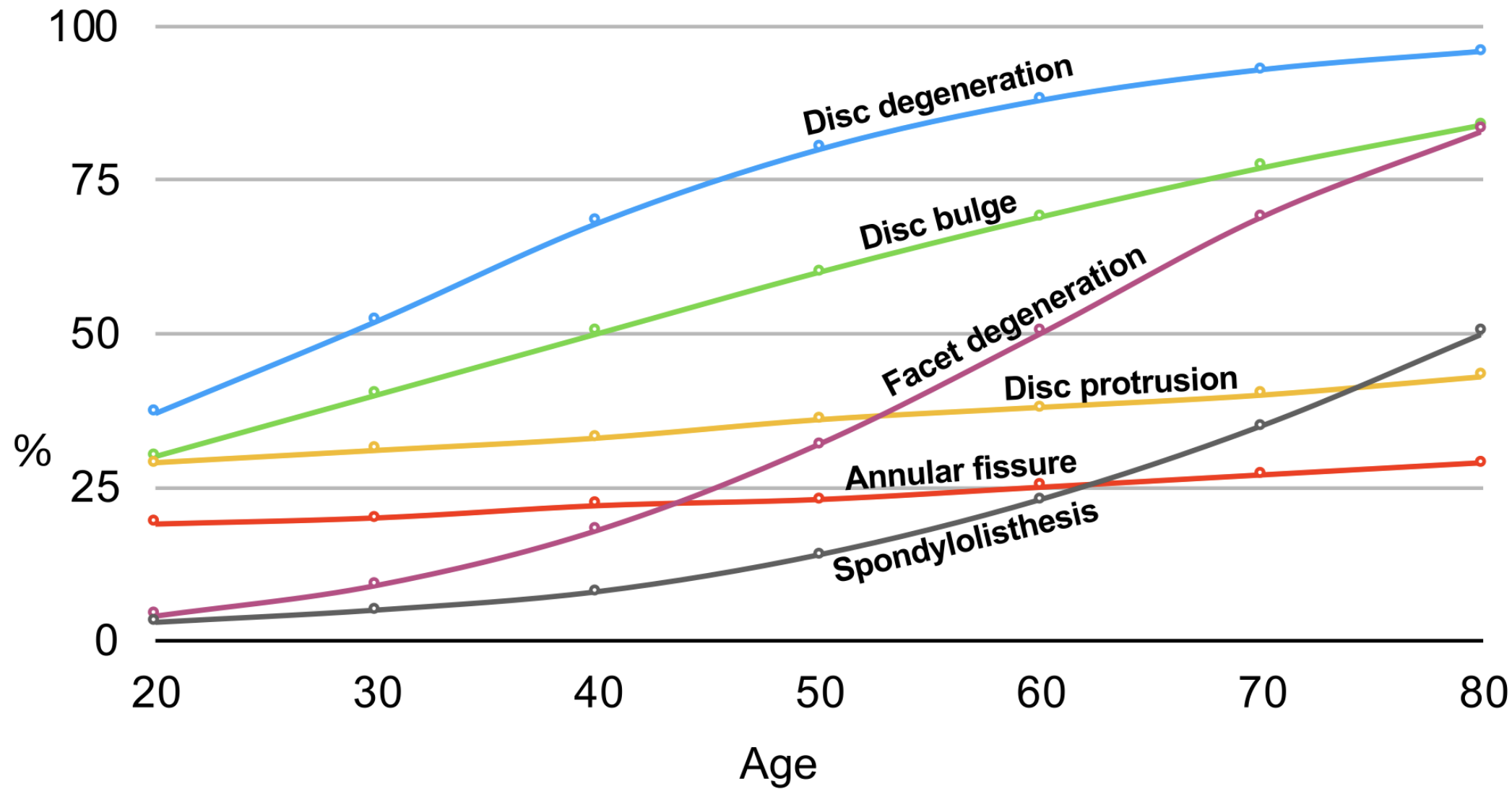


- *MRI/CT Findings in*

- *Asymptomatic Patients*

- DDD: 50 yrs old
80% and increases
to 96% by age 80
- Disk Height loss:
56% by 50
increases to 84% by
80 yrs of age





(Brinjikji 2015)

Current Trends

- MRI's have increased by 307 %
- Spinal fusion sx has increased by 204 %
- Spinal injections have increased by 629 %
- Opiate use has increased by 423 %

Journal of Manip and Physiological Therapeutics 2011

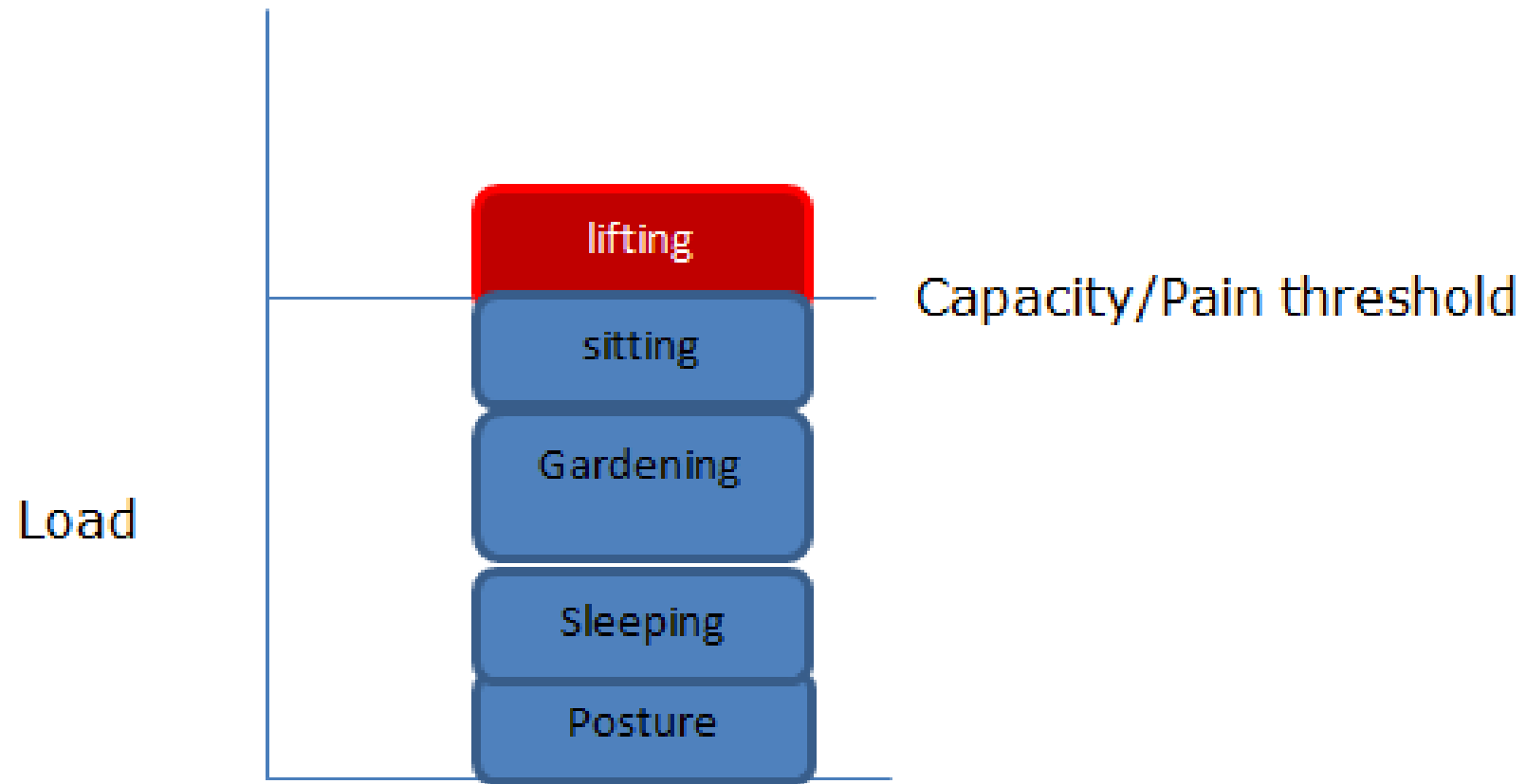
As a result outcomes have



Effect of Movement

- Beattie et al raised the hypothesis that controlled loading of the spine through therapeutic effects (traction, joint mobilization, repeated movements) may improve the hydration of moderately degenerated discs.
- May result in improved environment for healing and reduce the inflammatory effect and further degeneration

Load/Capacity



Application for patients

- Intermittent, small applied forces less than failure tolerance
- Increased prolonged periods of rest w/o load
- Improved tissue tolerance increases with increased rest periods

What can we do ?

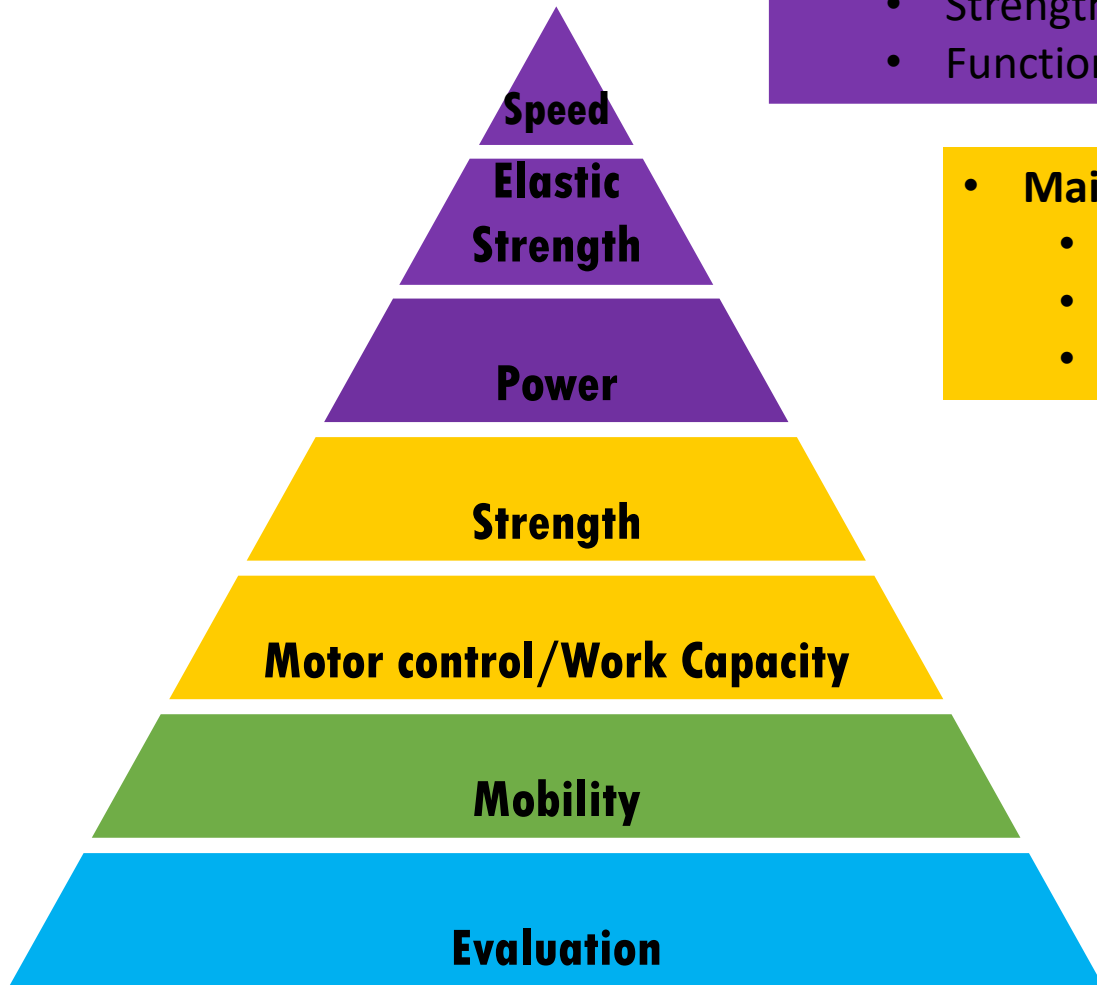
Explain	Explain the anatomy and radiological findings vs reality
Determine	Determine what ADLs are causing the condition to be aggravated
Develop	Develop strategies to centralize the pain or avoid provoking the pain
Develop	Develop a HEP for the patient

Evaluation

Normal ROM testing

Focus on alignment

Muscle testing to
get a baseline



- **Move:**
 - Assimilation of movement
 - Strength, Power, elastic strength
 - Functional movement patterns

- **Maintain:**
 - Muscle Activation
 - Motor control training
 - Strength (Acquisition)

- **Attain:**
 - Directional Preference
 - Centration
 - Mobility

- **Classification**
 - Directional Preference
 - Mobility Deficit
 - Motor control deficit
 - Power deficit

Treatment flow



Directional Preference

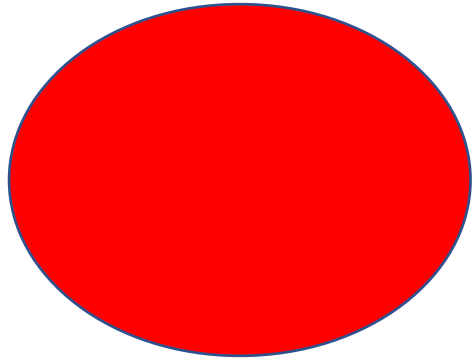


Clinical phenomenon where a specific direction of movement and/or sustained position results in a clinically relevant improvement in symptoms.

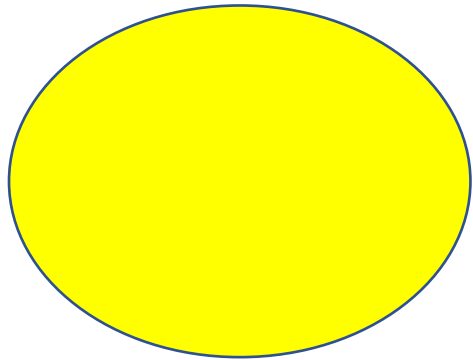
This improvement is usually accompanied by an improvement in function, or mechanics, or both.

Don't be afraid to perform lumbar extension or flexion exercises with this population ***BUT*** use the Red, Yellow, Green light system for guidance

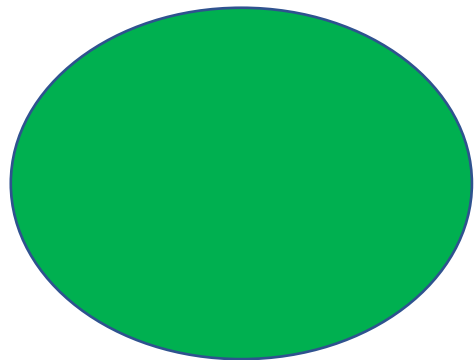




STOP!, The test motions increases or produces symptoms that weren't there before and/or result in peripheralizing symptoms that **remain worse** even after the movement is completed .



Proceed with caution. This occurs when the patient experiences an unclear response. For example, a patient's symptoms improve during a movement but **does not remain better afterwards**. Yellow light indicate a need to modify force progression.



Repeated movements in a specific direction results in the abolition of pain, decrease of pain, centralizing of peripheral symptoms. **Continue** with current regime.

If repeated movement has **NO** effect on the patients signs and symptoms move on the mobility and motor control



Interpretation

If active and passive are both limited: think **Mobility Deficit**

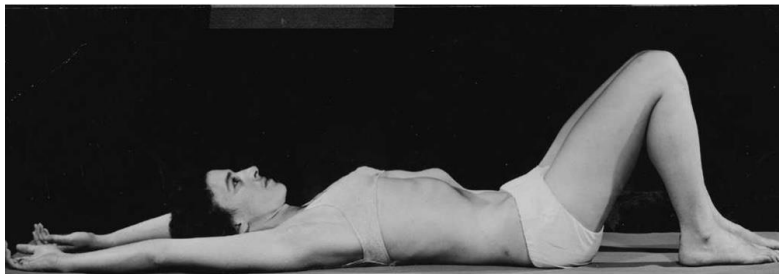
If active in a loaded position but not in stable (unloaded) position or with active stabilization think **Stability/Motor control deficit**

Muscle length tests

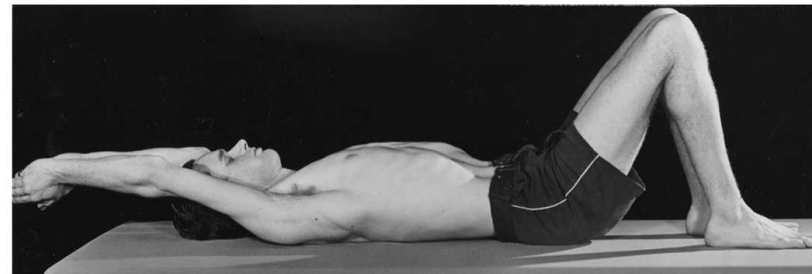
Hamstring length test



Lat length test



Normal length



Short





Ankle DF

Ankle Mobility Screen



Red: Needs
Improvement



Yellow: Needs
Improvement



Green: Maintain

Elbow Flexion test for Posture

- Elbow flexion test
- Grade 1: “take up the slack”-look for a break in the system (buckle)
- Grade 2: 20-40%
- Grade 3: 40-60%
- Grade 4: 60-80%
- Grade 5: 80-100 %





Vertical Compression Test

- Pt is standing or sitting
- Therapists applies a vertical pressure through the shoulders and feels for buckling in the spine
- Dysfunction = presence of symptoms, poor load transfer.
- Use same grading system as the Elbow flexion test

Muscle tests

Hip extension

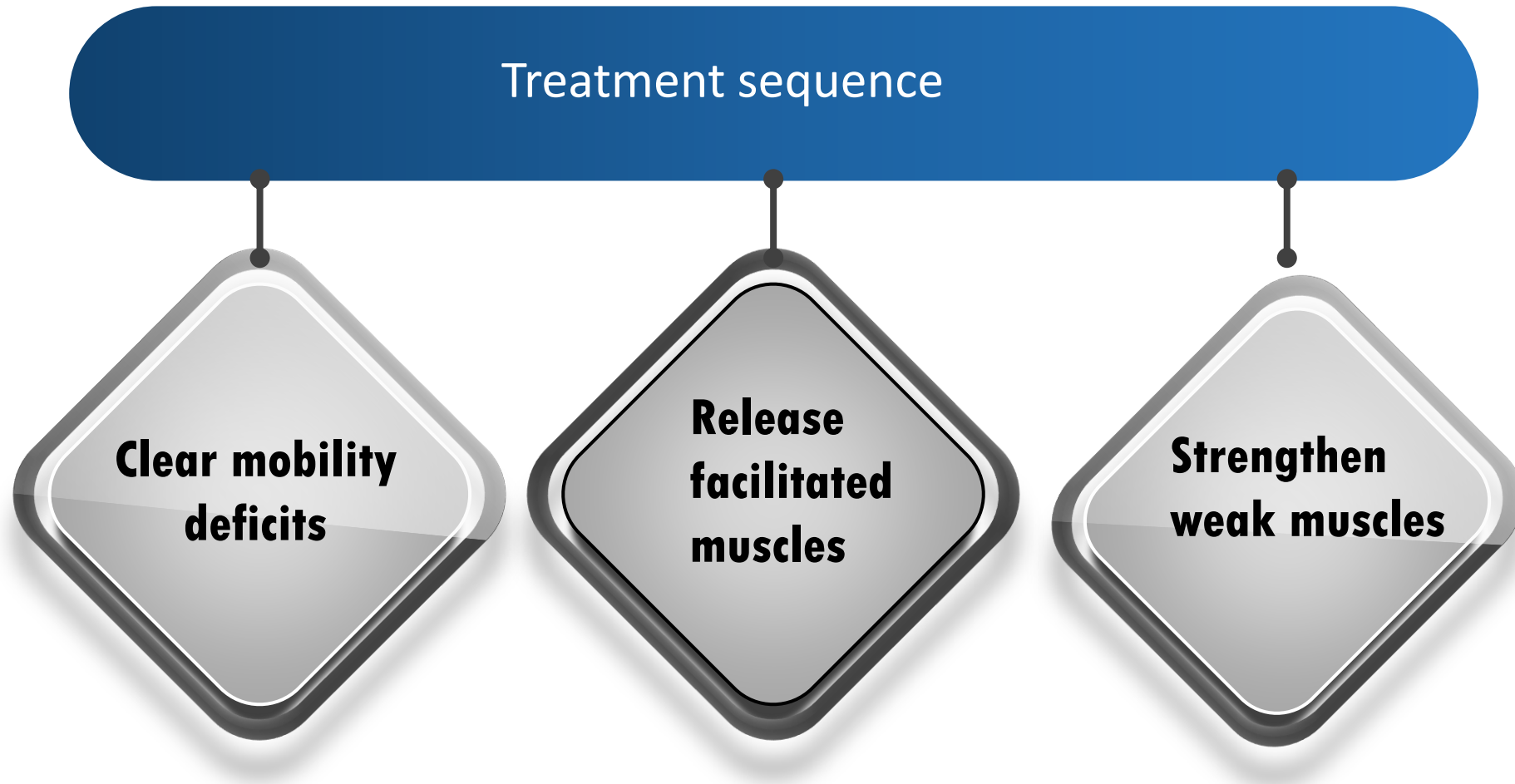
Lumbar extensors

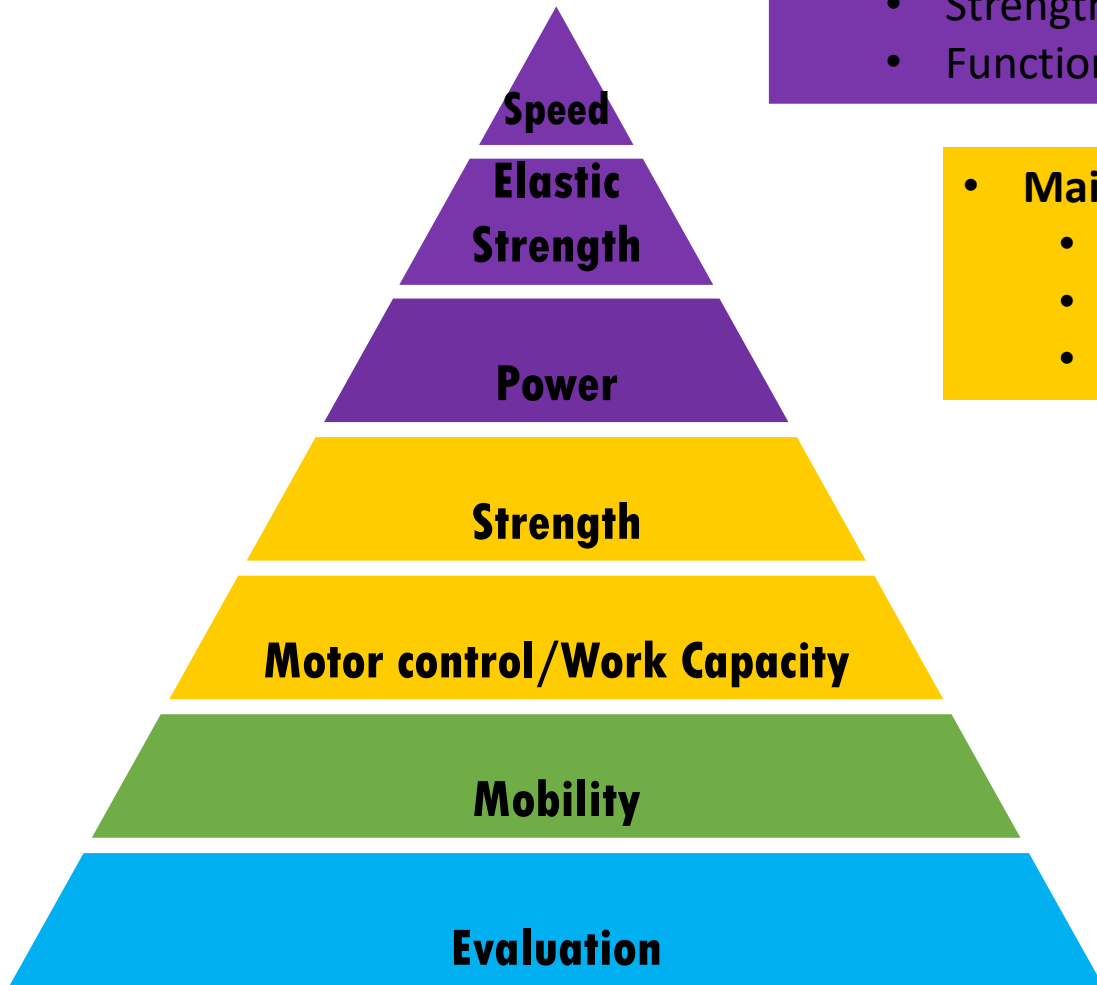
Thoracic extensors

Cervical extensors



Stability/Motor Control





- **Move:**
 - Assimilation of movement
 - Strength, Power, elastic strength
 - Functional movement patterns

- **Maintain:**
 - Muscle Activation
 - Motor control training
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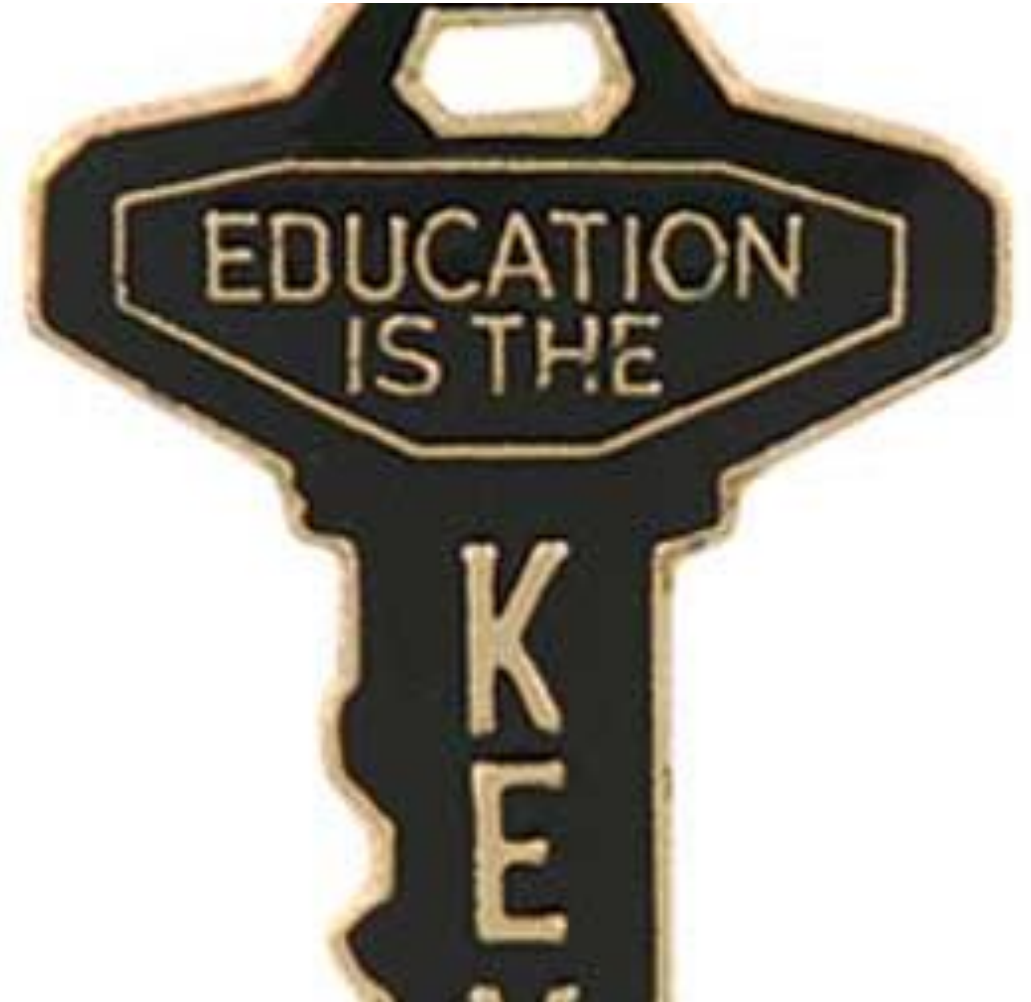
Treatment

Patient education

Functional movement training

Flexibility

Strength training



Education

walk	using a walking stick, cane or walker
stand for a long time	Tush squeezes or abdominal sets
sleep on your back	sleeping with 1 -2 pillow under your knees
Sleep on your stomach	place 1 or 2 pillows under your stomach
Reach overhead	tighten abdominals

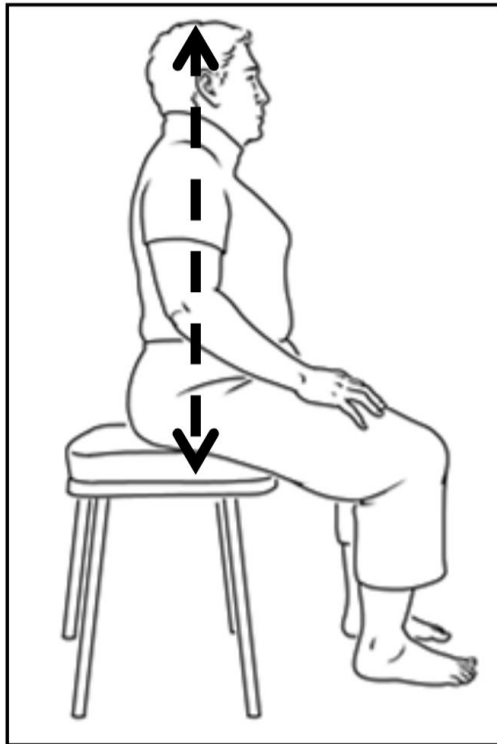
Alignment

- sitting
- Perch sitting
- stand

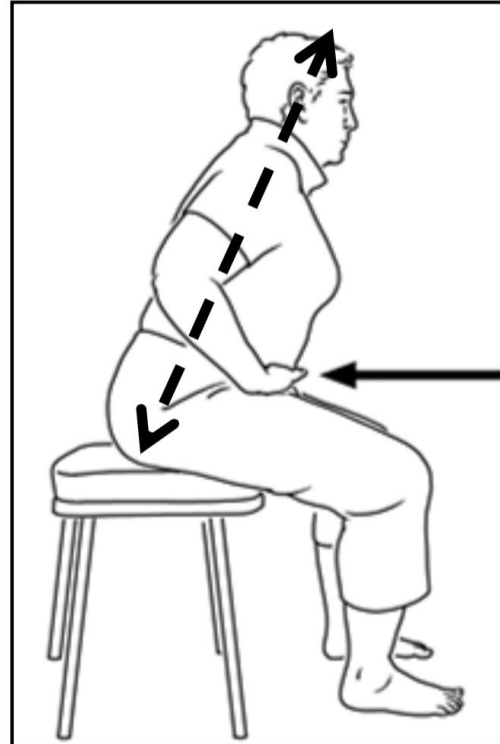


ALIGNMENT

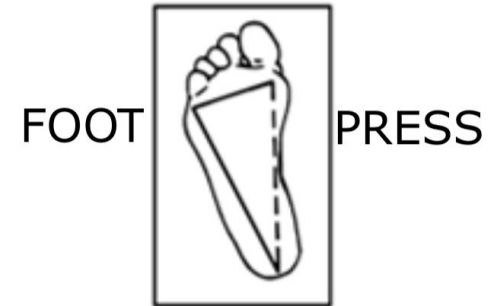
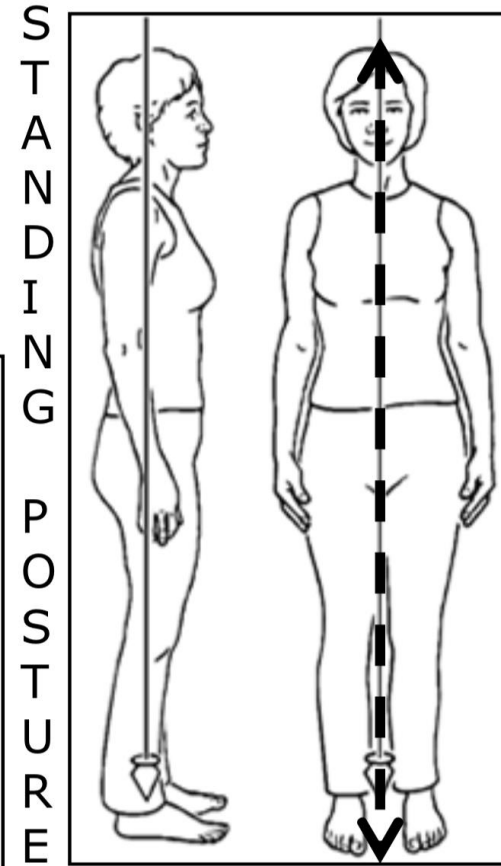
Internal Plumb Line

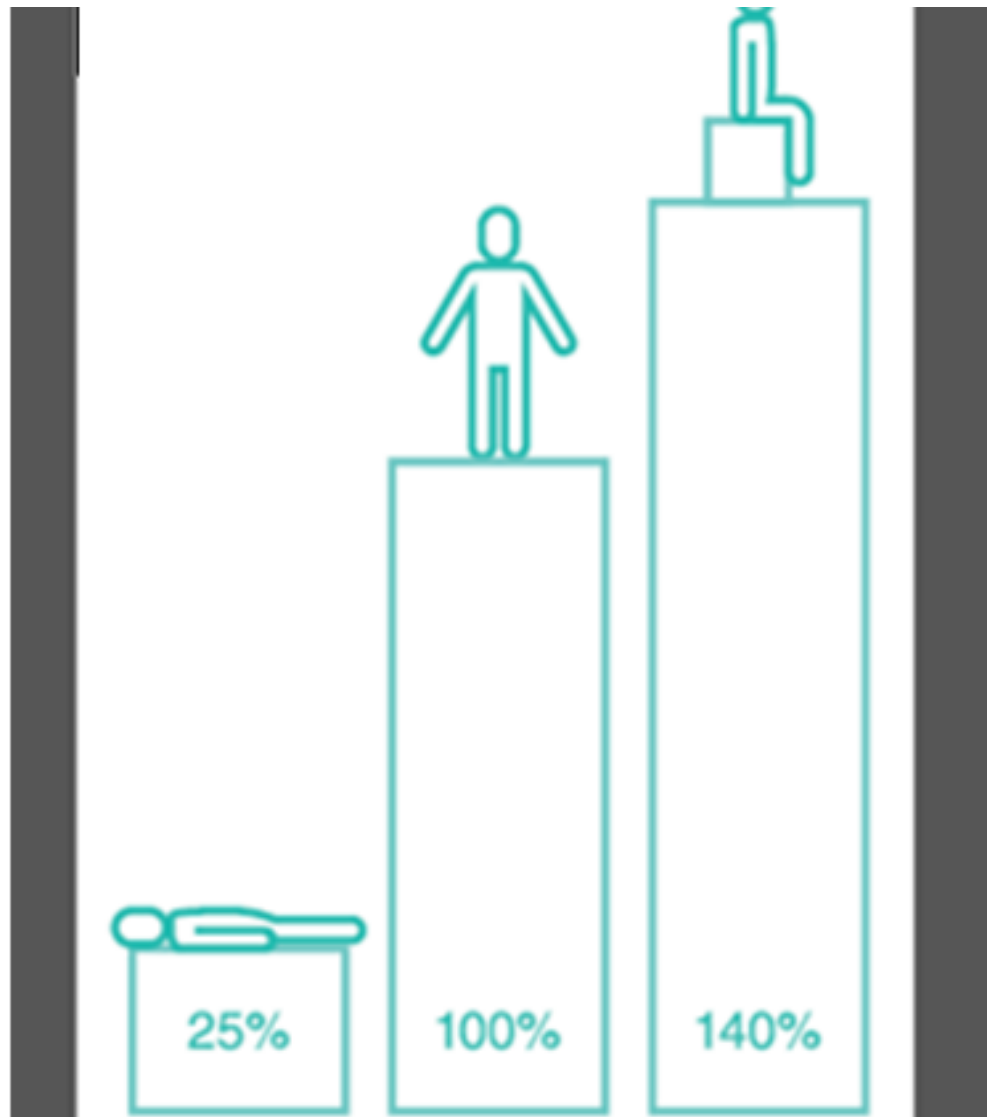


PERCH POSTURE



HIP HINGE





Sitting

- We spend a great deal of time sitting
- Greatest compression through the spine

Perch sitting Posture

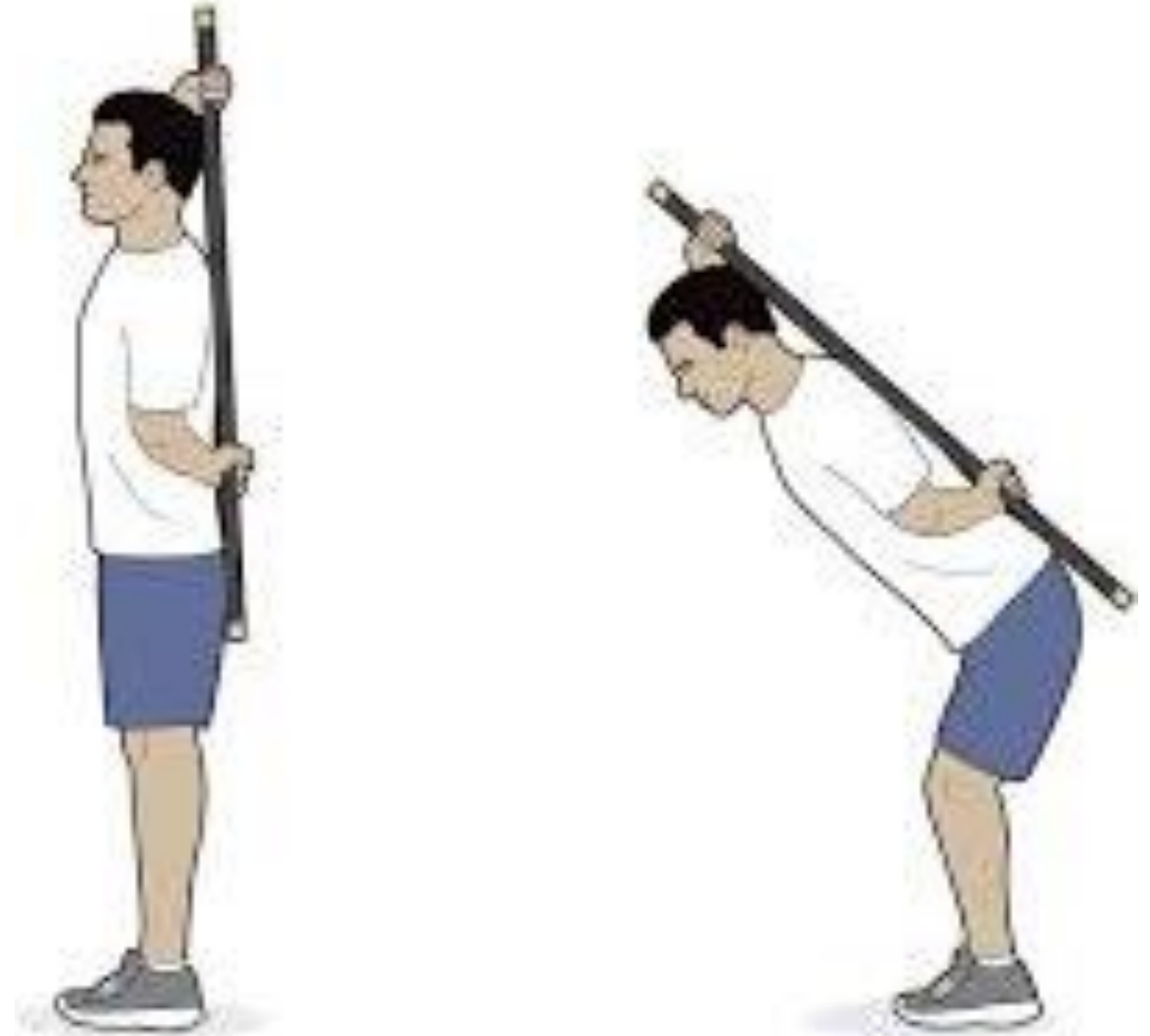


- curves in spine closely resembles natural curves
- Facilitates the use of spinal extensors
- Fatiguing at first
- weight forward towards the feet -weight is eventually distributed between the heel and the forefoot



Hip Hinging

- Teach patient how to move from their hips
- Can practice in standing and sitting
- Weight through the entire foot
- Determine if restricted and if due to muscle tightness vs motor control issues
- What muscles limit the hinge ?



Sit to stand

- Start with weight balanced through the feet
- Practice standing with hip hinge to stand while pushing weight through your feet
- Control descent to the chair
- Why is this important ?



2x likely to have a hip fracture


Key Muscles to Support the Aging Spine

- Diaphragm
- Back Extensors
- Abdominals
- Pelvic Floor
- Quadriceps
- Gluteus Maximus and Medius
- HEART

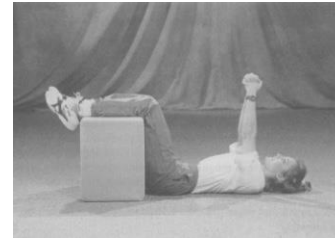


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RE-ALIGNMENT - 1A Decompression Exercise: Basic



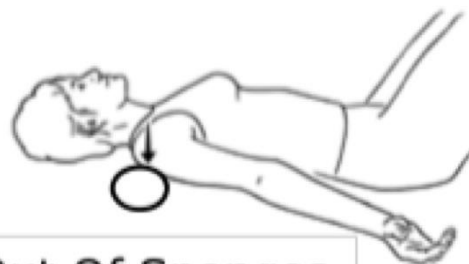
Lie on back on firm surface, knees bent, feet flat, arms turned up, out to sides, backs of hands down. Time ____ minutes.
Surface: floor



Exercise Program (Sarah Meeks)

Decompression exercises

Shoulder Press



Squeeze Water Out Of Sponges
Under Acromion Processes ○

Head Press



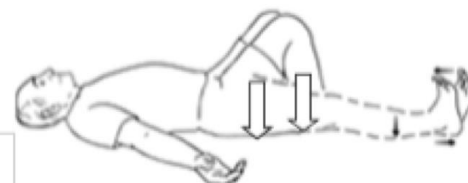
Adjust head position before press

Leg Lengthener



Leg Press

Uni- and Bi-Lateral



Core Stability

- Abdominal activation
- Xiphoid to pubic bone
- ASIS's towards each other
- Iso Abds 5 ways
- Iso glutes
- Prone head lifts



Exercise Guidance

How many reps for each exercise ?

How long should each session last ?

How many days per week

Progression

- Strength
 - If patient is lacking good control increase volume to 20-30 or 60-90 seconds)
 - To increase strength progress to 5-8 reps
 - Sets: 2-4 sets target volume of 100-150 loaded reps per week on a key muscle group
- Frequency: Neuromuscular conditioning can happen daily, strength 2-3 times per week