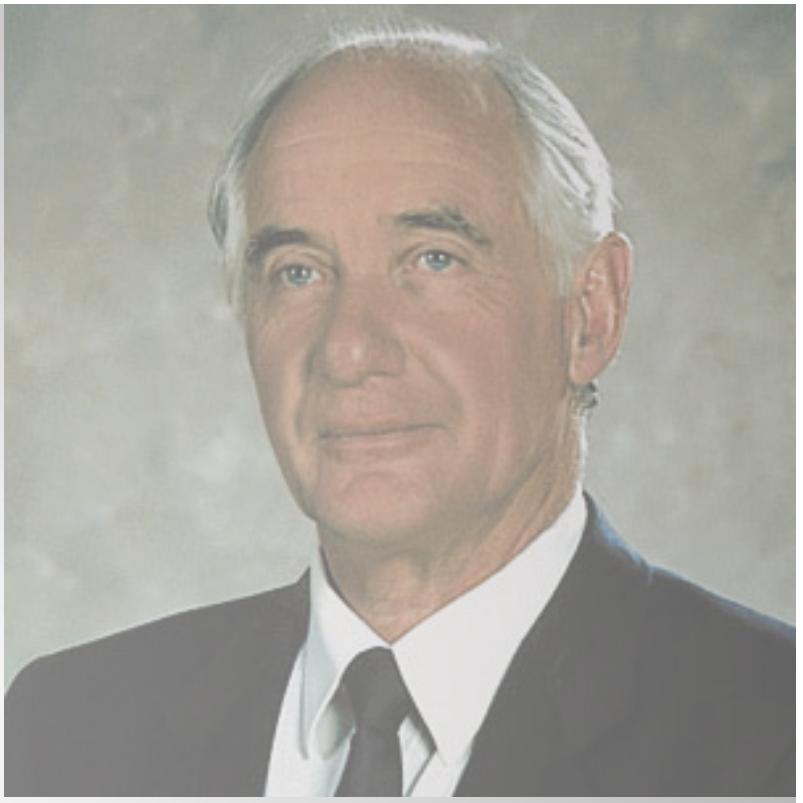
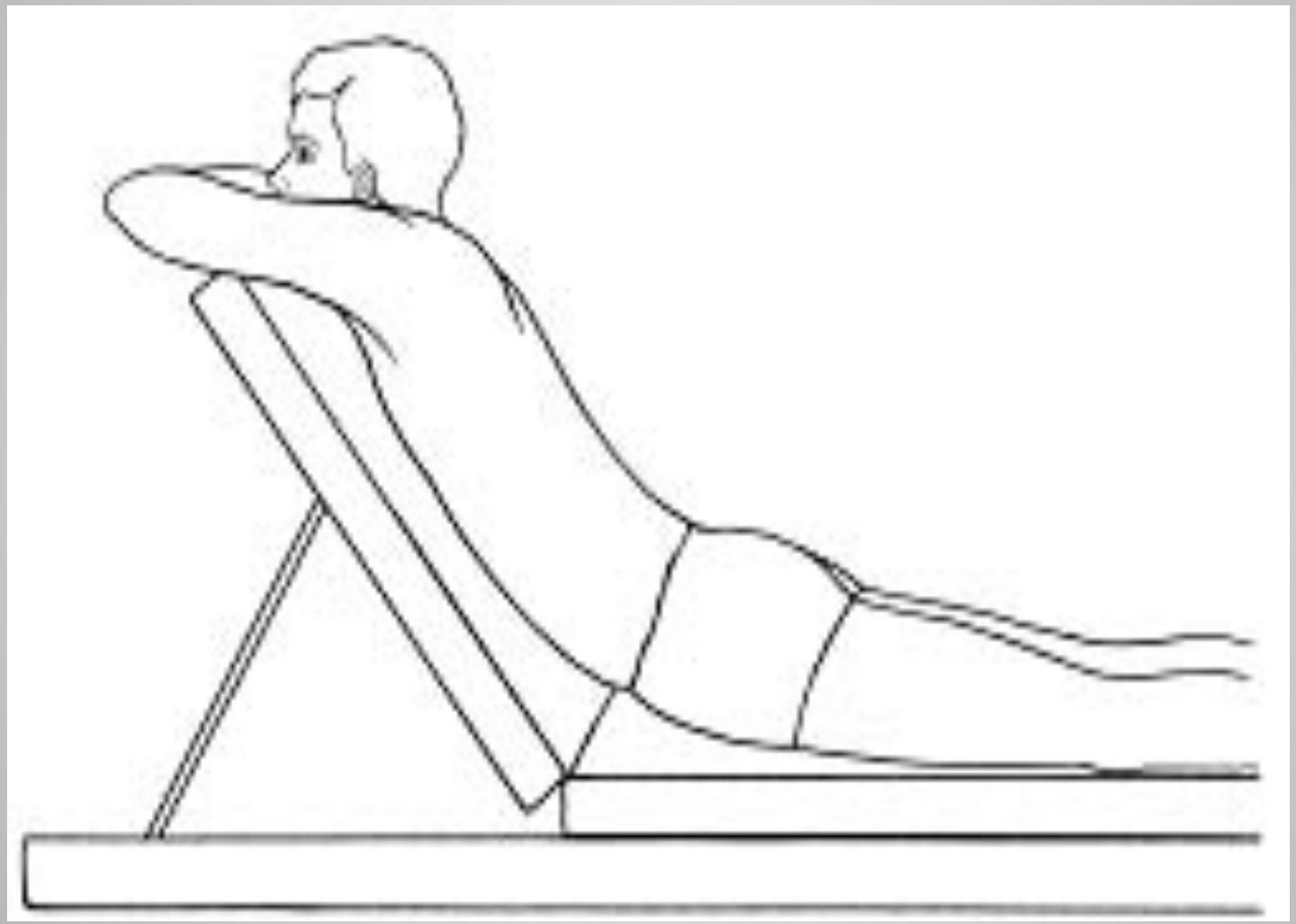


THE MCKENZIE METHOD OF MECHANICAL DIAGNOSIS AND THERAPY OF THE LUMBAR SPINE

IMAGES FROM : WWW..MCKENZIEMDT.ORG; HTTP://WWW.MCKENZIE.HR/ROBINMCKENZIE.HTML

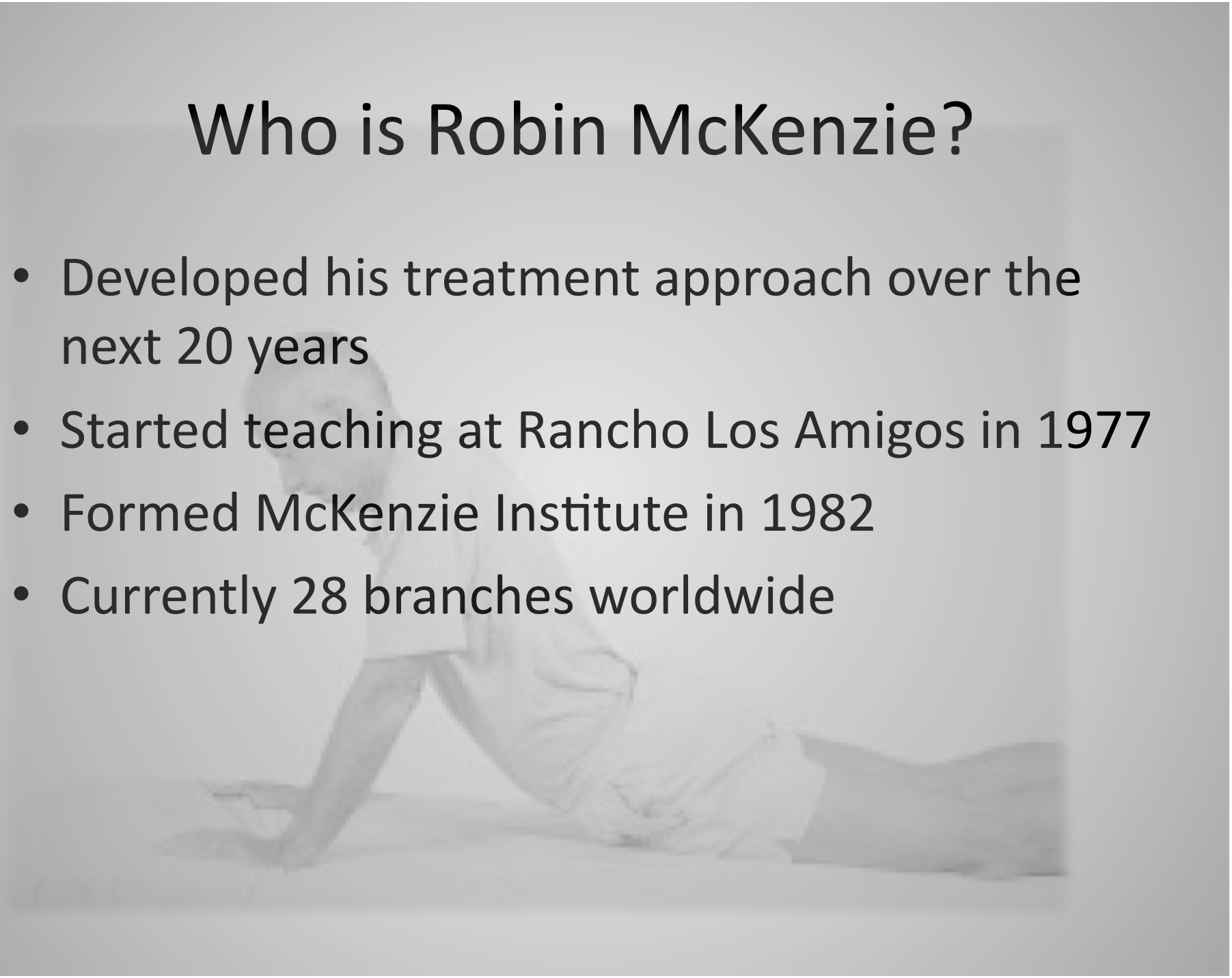
Who is Robin McKenzie?

- Physical Therapist from New Zealand
  - April 1931 – May 13th 2013
- Influenced by Dr. James Cyriax
  - Strong influence on McKenzie's early training
  - Considered the framework for MDT
- Clinical experience
  - "Mr. Smith" 1956 –> 3 weeks of radicular sx unexpectedly abolished while awaiting treatment.
  - Exploration of end range motion



Who is Robin McKenzie?

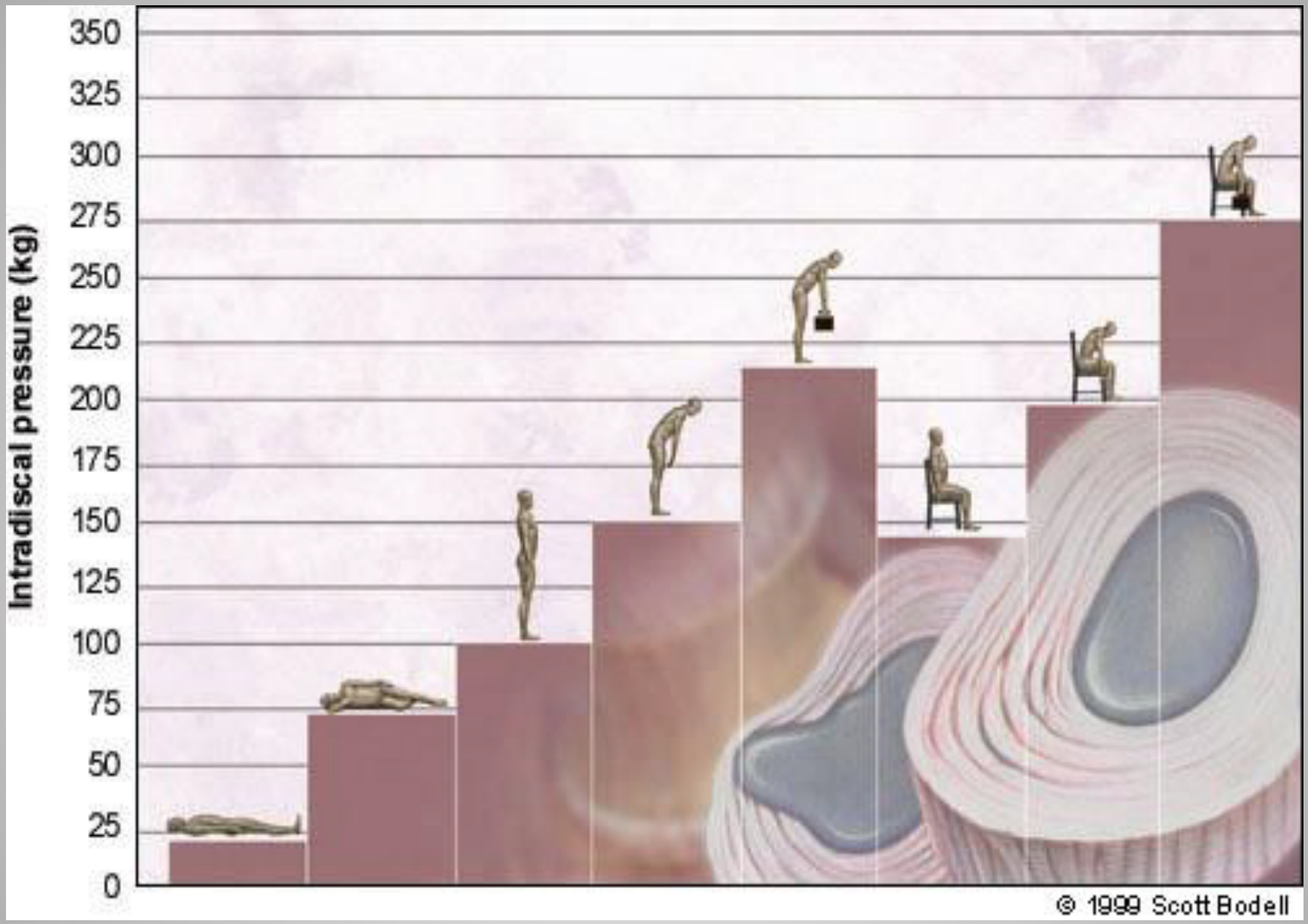
- Developed his treatment approach over the next 20 years
- Started teaching at Rancho Los Amigos in 1977
- Formed McKenzie Institute in 1982
- Currently 28 branches worldwide



Predisposing Lifestyle Factors for Developing LBP

- Bad sitting posture:
  - Slouched sitting places spine in the same amount of flexion as a fully flexed standing posture.
  - Intradiscal pressure increases in a kyphotic position and decreases the more the spine approaches a lordotic position.
  - Can overstretch posterior spinal ligamentous structures
- Frequency of flexion:
  - We flex a lot, we do not extend that much

These appear to have a close association with the development of low back pain but lack support from the literature to date.


Intradiscal pressure (kg)
350
325
300
275
250
225
200
175
150
125
100
75
50
25
0
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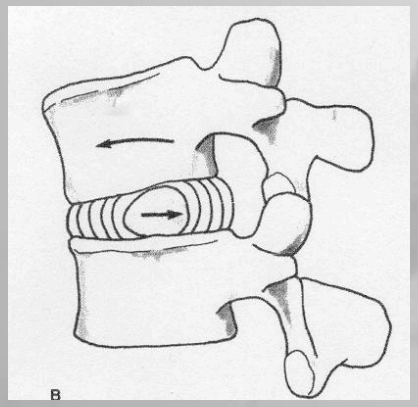
Conceptual Model-Flexion

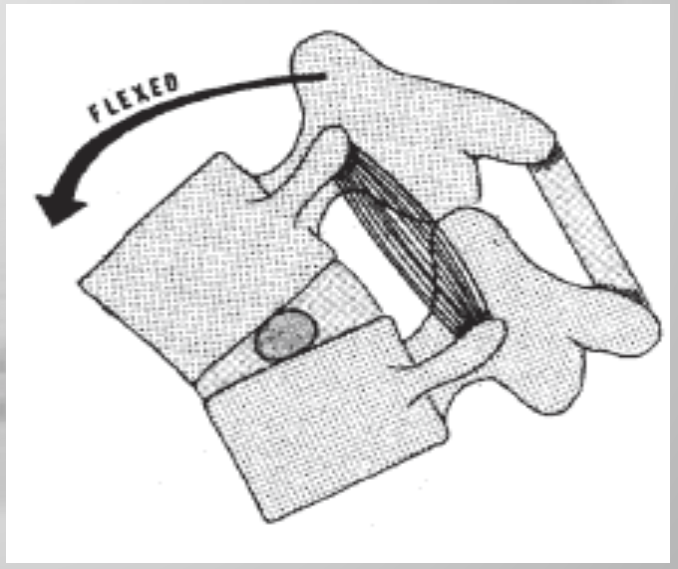
- Facet joint surfaces distract and the anterior portions of the vertebra approximate
- The vertebral canal lengthens, placing stretch on the spinal cord, dura and nerve roots.

http://ittcs.wordpress.com/2010/06/10/anatomy-and-physiology-spinal-stenosis/

Effects of Flexion on the Disc

- Anterior loading of the intervertebral disc
  - Compresses the anterior annular wall and stretches the posterior annular wall.
  - Posterior displacement of the nucleus pulposus.





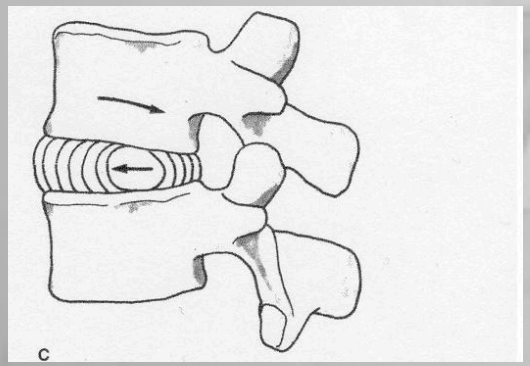
Conceptual Model-Extension

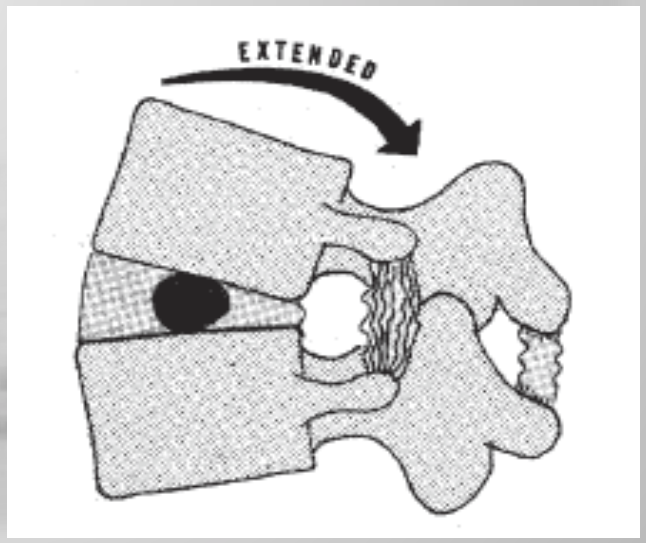
- Facet joints approximate and anterior portion of the vertebra gap.
- The vertebral canal shortens which relaxes the spinal cord, dura and nerve roots. Reduces the space in the intervetebral foramen.

http://ittcs.wordpress.com/2010/06/10/anatomy-and-physiology-spinal-stenosis/

Effects of Extension on the Disc

- Loading to the posterior aspect of the intervertebral disc
  - Compresses the posterior annular wall and stretches the anterior annular wall.
  - Anterior displacement of the nucleus pulposus.





Interview with Robin McKenzie

https://www.youtube.com/watch?v=8BXDe5fcp7I

Classification of McKenzie Syndromes

- Three Mechanical Syndromes
  1.) Postural Syndrome
  2.) Dysfunction Syndrome
  3.) Derangement Syndrome
- Other
  - Spinal stenosis, hip, SIJ, mechanically inconclusive, spondylolisthesis, chronic pain.

POSTURAL SYNDROME

The Postural Syndrome

- Pain is created from mechanical deformation of normal soft tissue or vascular insufficiency as a result of prolonged positional or postural stresses.

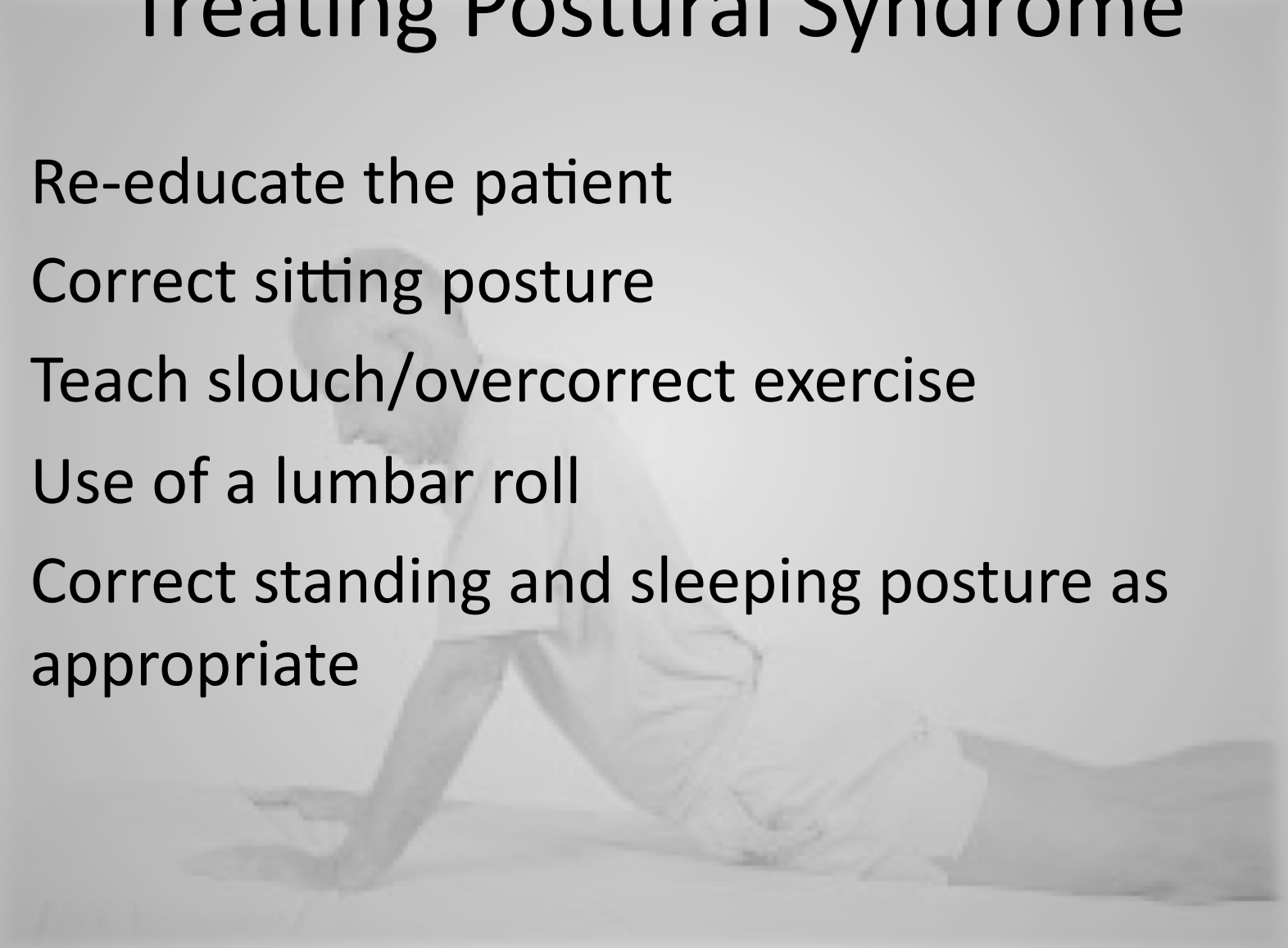
The Postural Syndrome

- Pain is intermittent and only brought on by prolonged static loading of normal tissues
  - Time is a causative factor
  - Pain relieved by change of posture/function
  - No deformity present
  - No loss of movement
- Rarely presents in the clinic

www.floota.com

Treating Postural Syndrome

- Re-educate the patient
- Correct sitting posture
- Teach slouch/overcorrect exercise
- Use of a lumbar roll
- Correct standing and sleeping posture as appropriate



DYSFUNCTION SYNDROME

The Dysfunction Syndrome

- Pain is caused by mechanical deformation of structurally impaired soft tissues.
    - May be a result of previous trauma, inflammation, repetitive microtrauma, degenerative changes, all of which can result in imperfect tissue repair.

The Dysfunction Syndrome

- Pain occurs when end range stress is applied to adaptively shortened structures.
- May be discogenic, facet joint, ligamentous, muscular, tendinous
- Pain is never referred, except for in the presence of an ANR (a subgroup of dysfunction syndrome).

The Dysfunction Syndrome

- History of trauma, degenerative changes or years of poor posture
- Symptoms must have been present for at least 6 to 8 weeks
- Pain is always intermittent
- Pain is always local (except with an ANR)
- A limitation of ROM is present
- No deformity is present

Treatment for Dysfunction Syndrome

- Goal: Increase ROM by remodeling tissue (takes 4-6 weeks!)
- Teach posture correction
- Pain should stop shortly after exercises are completed
- Pain should never peripheralize
- Frequency: 10-12 repetitions every 2 hours of the day; 5-6 repetitions every 4 hours for older people.

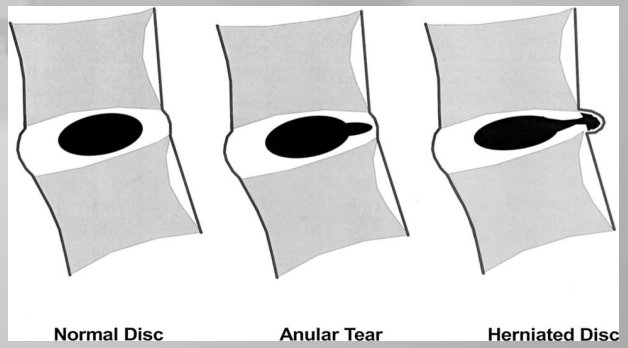
THE DERANGEMENT SYNDROME

The Derangement Syndrome

- Disturbance in the normal resting position of the joint surface that causes pain and obstructs movement.
- The most common mechanical spinal disorder
  - 60-78% of patients fall into this category (May and Aina 2012).

Conceptual Model

- Annulus fibrosis – no innervation to the inner portion.
- Fissures develop over years of repetitive microtrauma.
  - First circumferentially, then radially
  - Nucleus becomes compromised
- Internal disc disruption and displacement occur
  - Pt becomes symptomatic

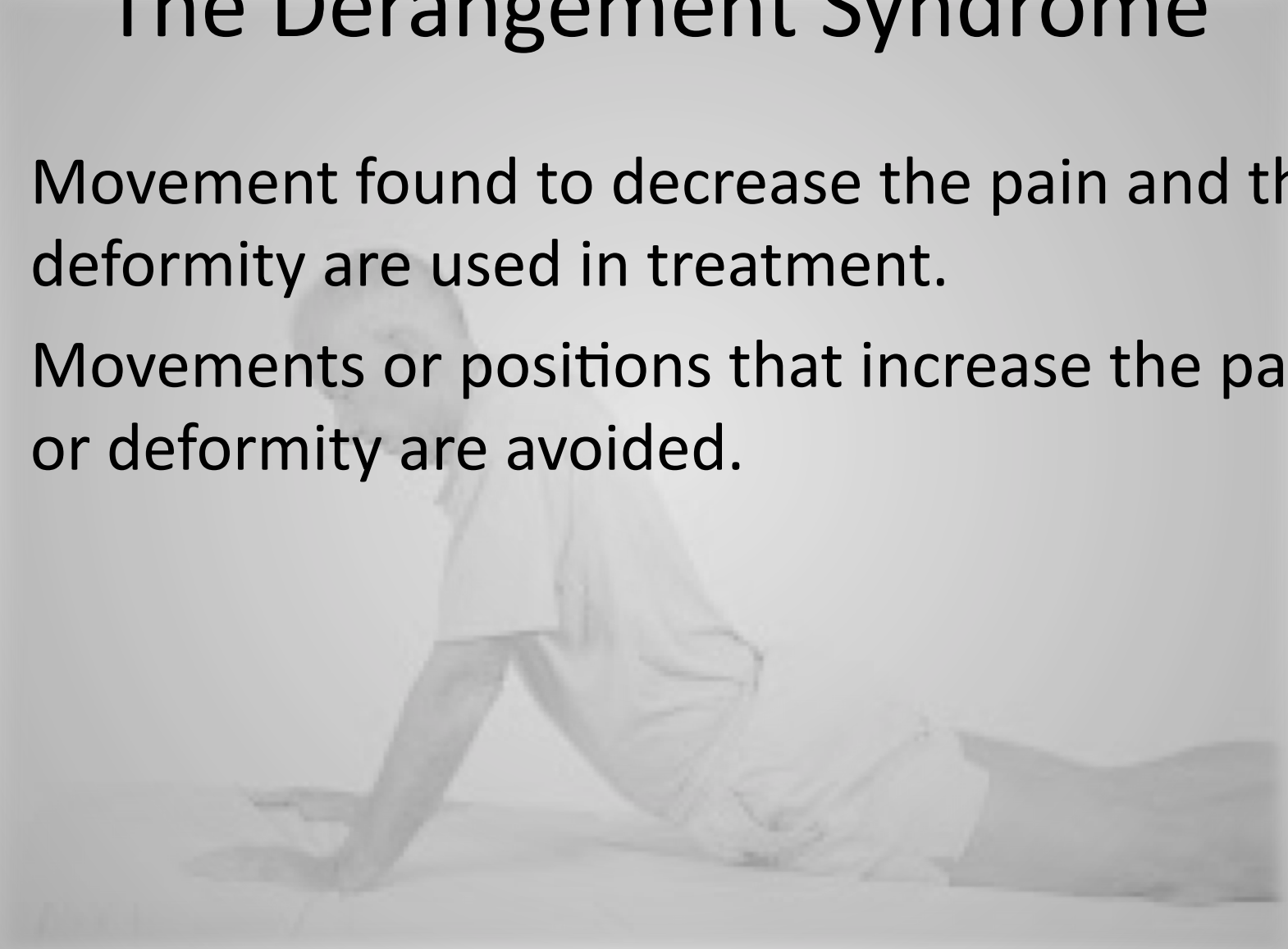


The Derangement Syndrome

- Variable symptoms, often with insidious onset
- Local or referred pain, possibly paraesthesia
- Pain can be constant or intermittent
- Aberrant motions and deformities may be present
- Always loss of movement and/or function
- High rate of recurrence

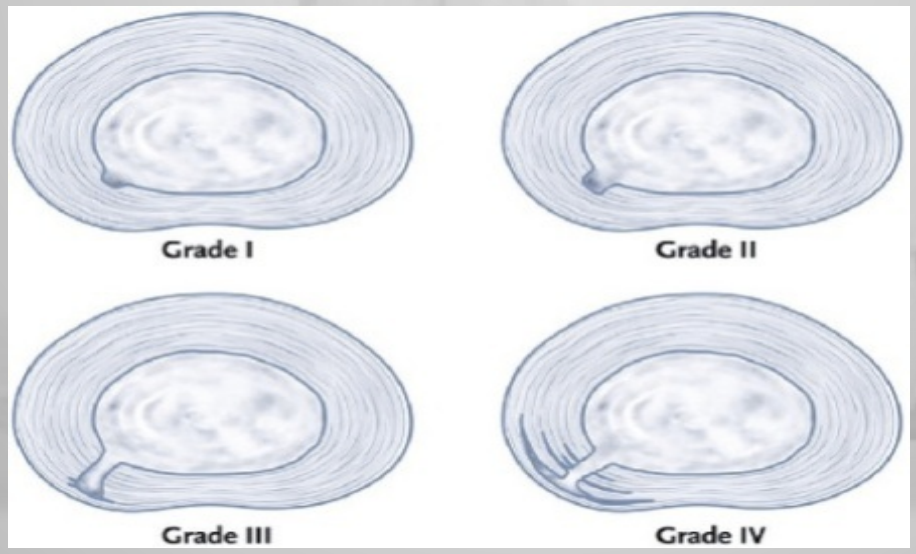
The Derangement Syndrome

- Movement found to decrease the pain and the deformity are used in treatment.
- Movements or positions that increase the pain or deformity are avoided.



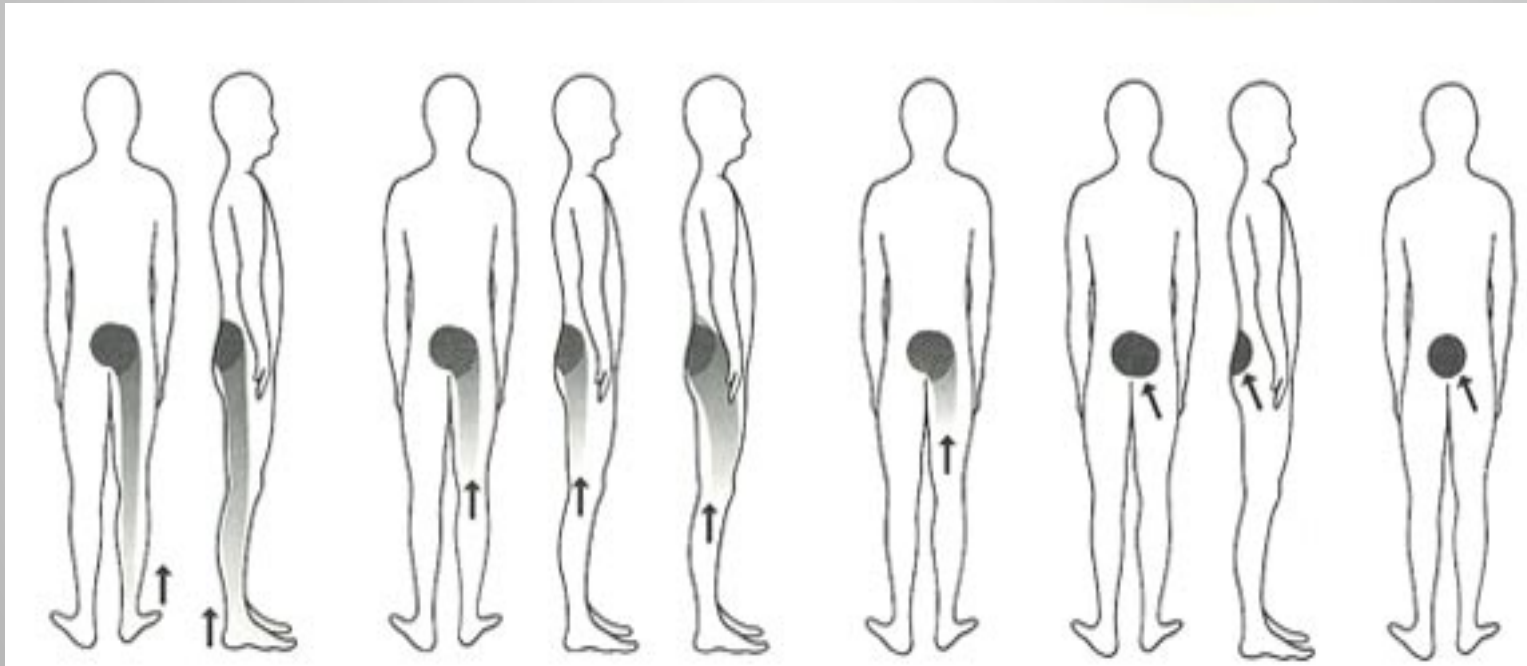
The Derangement Syndrome

- Larger derangements cause greater mechanical deformation and more signs and symptoms.
- Can result in postural deformities



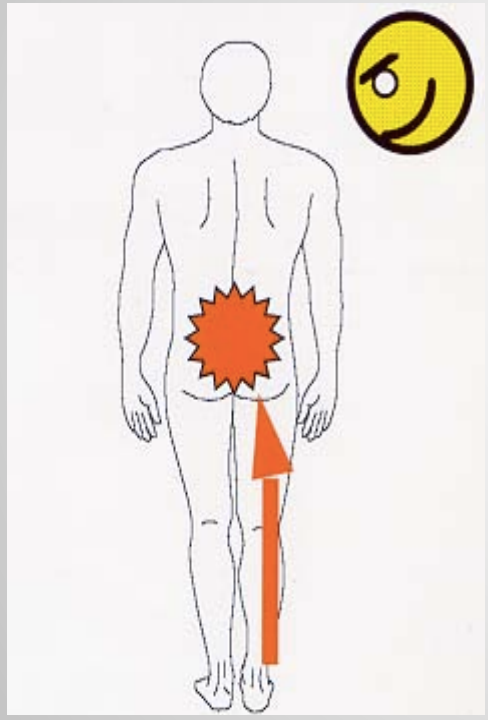
Centralization

- The approximation of symptoms TOWARDS the spine.



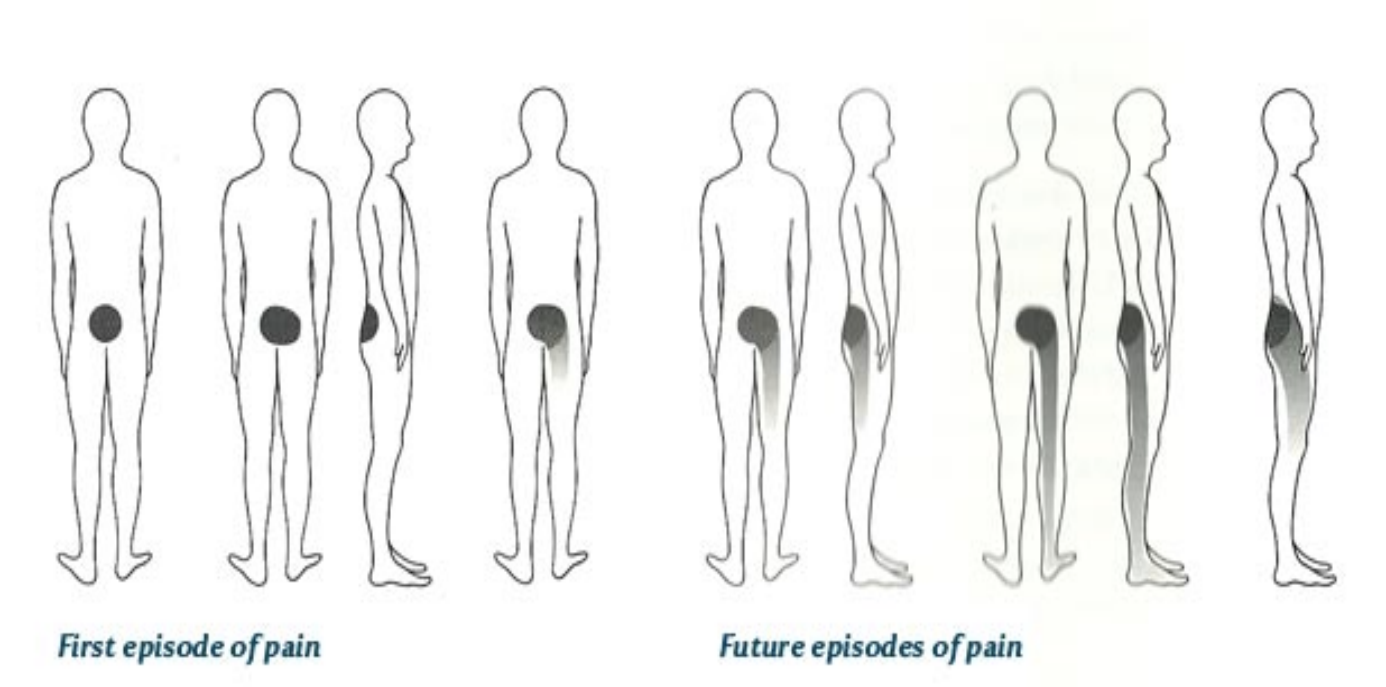
A progressive centralization process with an appropriate exercise programme

Centralization

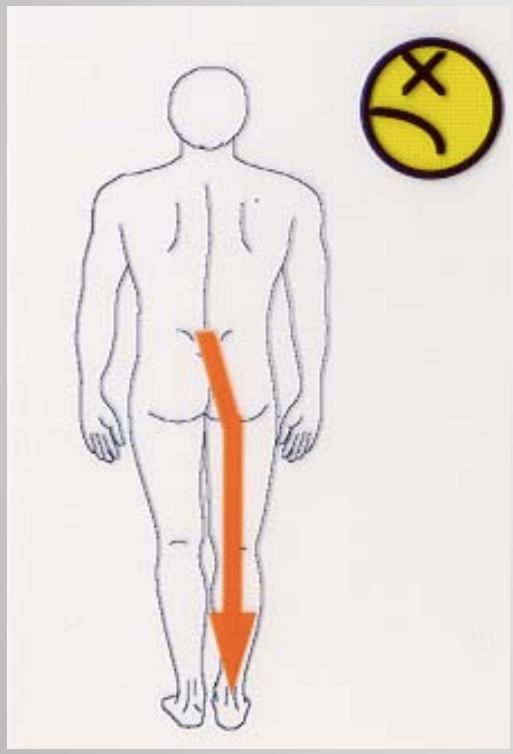


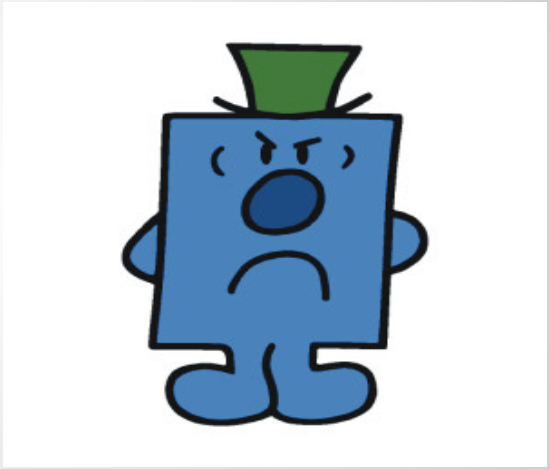
Peripheralization

- Symptoms peripheralize from the spine into the lower extremity.



Peripheralization





Treatment of Derangement Syndrome

- Reduce the derangement
- Maintain the reduction
- Recovery of function
  - Treat underlying dysfunction if present
  - Reintroduce opposite motion
- Prevention of recurrence
    - Education on posture with sitting/standing activities
    - Recurrent nature of LBP

Evaluation

- **Patient history: Primary purpose is to establish a preliminary classification!**
- Observe sitting/standing posture and its effect on pain
- Note any deformities

Gather Baselines

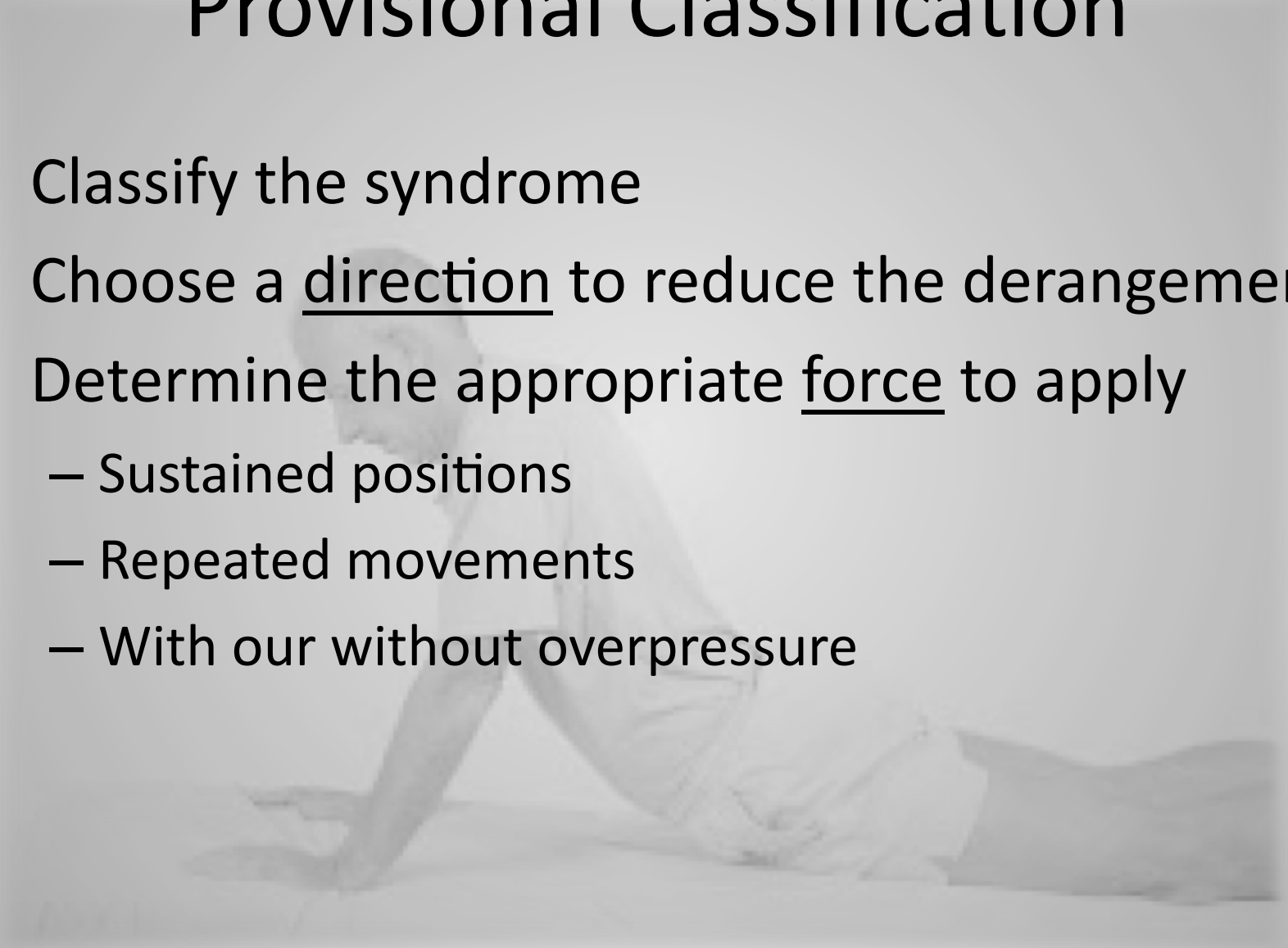
- Assess AROM in this order: flexion, extension, side-gliding R, side-gliding L.
- Record movement loss – nil/min/mod/maj
- Note pain or stiffness that is reported during ROM
- Note any aberrant movements

Gather Baselines

- Assess the effect of repeated movements on symptoms:
  - Ask about pain response. Is it pain during the movement (PDM) or is it pain at the end range (ERP)?
    - Pain during motion rules out postural syndrome and dysfunction.
- Sustained tests
  - Can be performed it the repeated movements do not provide adequate information.

Provisional Classification

- Classify the syndrome
- Choose a direction to reduce the derangement
- Determine the appropriate force to apply
  - Sustained positions
  - Repeated movements
  - With our without overpressure



Force Progression

- Only progress force when symptoms remain unchanged.
- Clinician-generated forces should never be used before patient-generated forces have been attempted.
- Remove clinician forces and return the patient to the sagittal plane as quickly as possible.

Order of Force Progression

- Static, patient generated
  - Mid range -> End range
- Dynamic, patient generated
  - Mid range -> End range -> Self OP
- Clinician generated
  - Patient takes the motion to end range and then therapist applies overpressure
  - Therapist mobilization
  - Therapist manipulation

Exercise Prescription

- Perform 10 repetitions of the motion every 2 hours of the day.
- Take the motion to end range
- Use of lumbar roll
- Postural awareness
- Follow up within the next 24 to 48 hours to assess progress.

Recovery of Function

- Taper off exercise frequency
- Create a prophylactic program of reintroducing flexion motion; this is done gradually and based on symptomatic response.
  - Flexion in lying followed by extension in lying, 10 repetitions of each 3x/day. Avoid flexion during the first 3 hours of the morning.
- Over 2-3 weeks, progress flexion forces

CLASSIFICATION OF THE DERANGEMENT

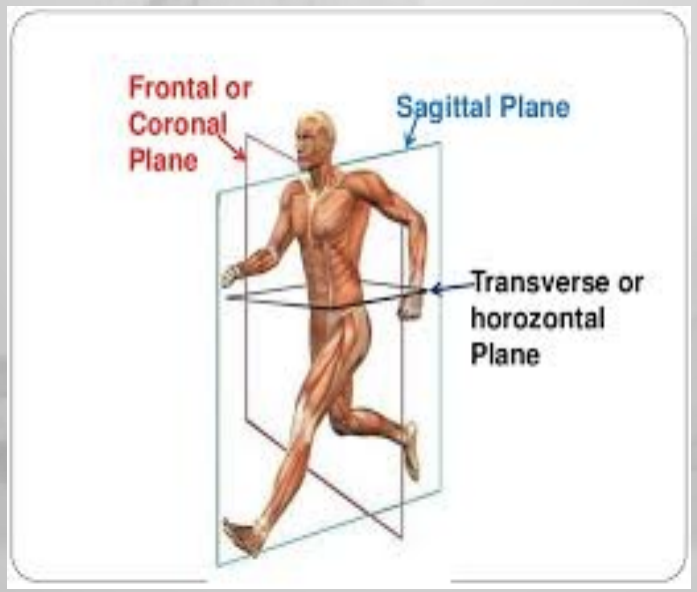
Classification of Derangements

- Central symmetrical symptoms
- Unilateral asymmetrical symptoms to knee
  - Can have a relevant or non-relevant lateral component
  - Presence of a lateral shift deformity
- Unilateral asymmetrical symptoms below knee
  - Reducible or irreducible derangement

CENTRAL SYMMETRICAL SYMPTOMS

Central Symmetrical Symptoms

- Symptoms will be central or symmetrical across the back and may include radiating symptoms bilaterally into both buttocks.
- Treat with sagittal plane forces

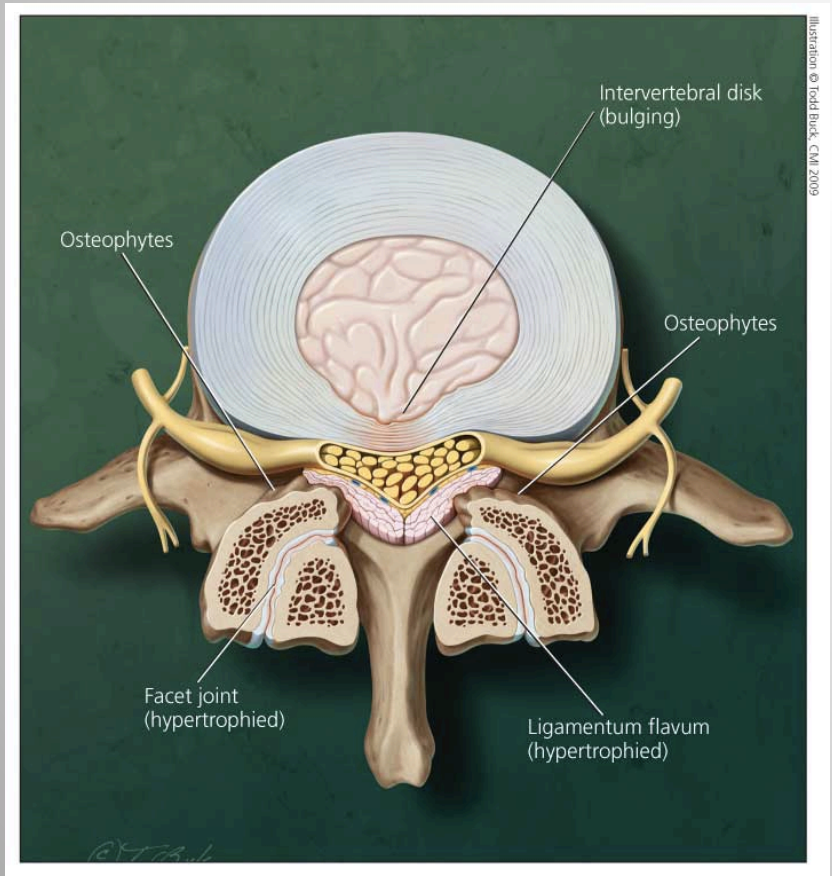


Management of Central Symmetrical Symptoms

- The Extension principle is used for the majority of patients
  - Lying prone, lying prone in extension, extension in lying, extension in standing
- Perform exercises regularly (every 2-3hrs)
- Maintain the lordosis
- Correct posture
- Avoid flexion

Posterior Derangement

- Kyphotic deformity

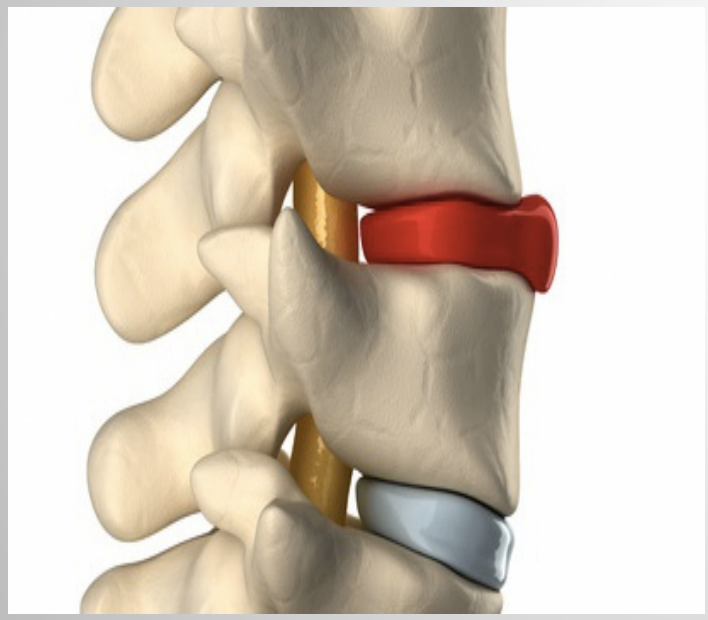


Management of Central Symmetrical Symptoms

- The flexion principle is used for a small number of patients (anterior derangement)
  - Flexion in lying, flexion in sitting
- Perform exercises regularly
- Correct posture by reducing the lordosis
- Avoid lordotic postures such as prone lying and prolonged standing

Anterior Derangement

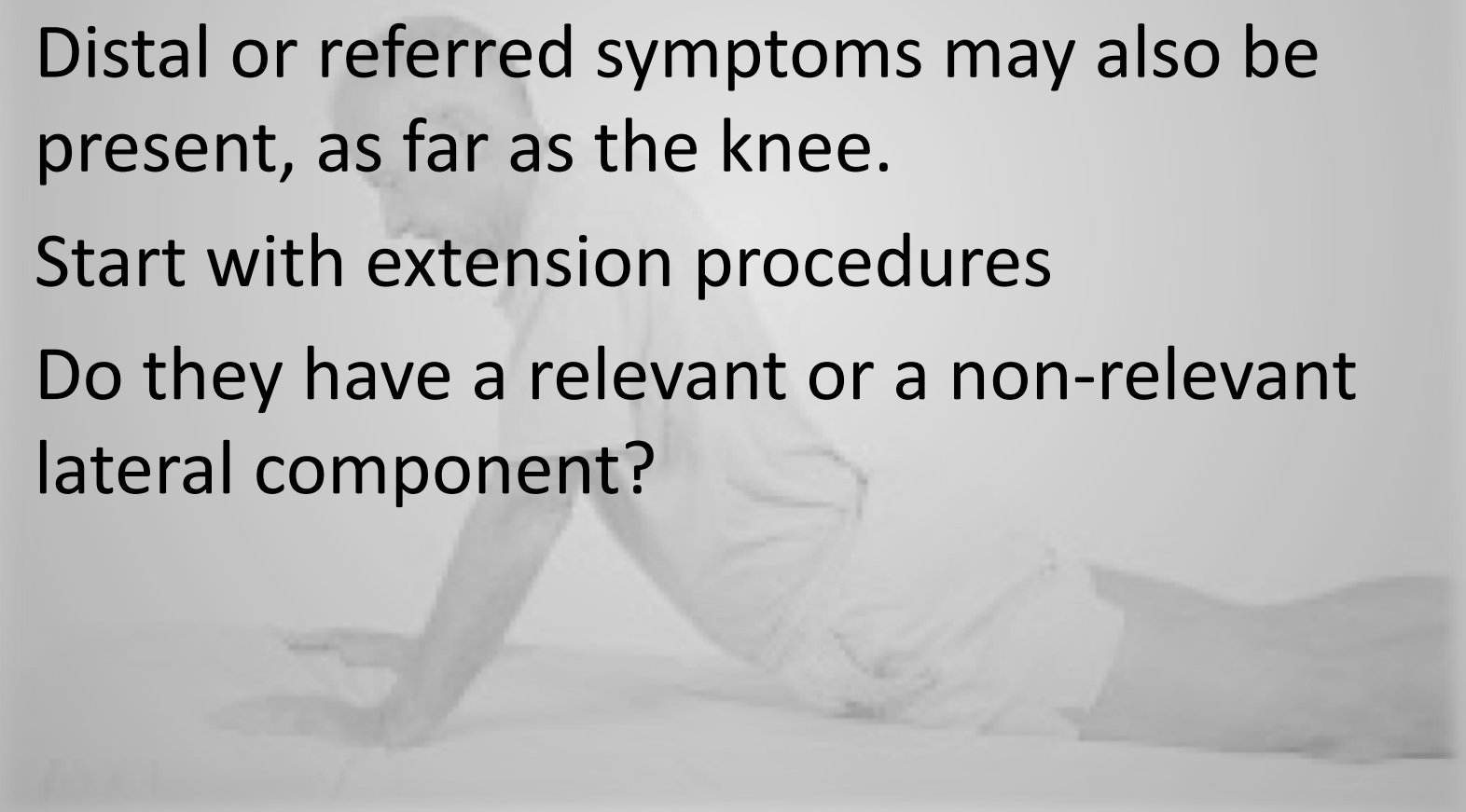
- Lordotic deformity



UNILATERAL ASYMMETRICAL SYMPTOMS TO KNEE

Unilateral Asymmetrical to Knee

- Unilateral or asymmetrical back pain
- Distal or referred symptoms may also be present, as far as the knee.
- Start with extension procedures
- Do they have a relevant or a non-relevant lateral component?

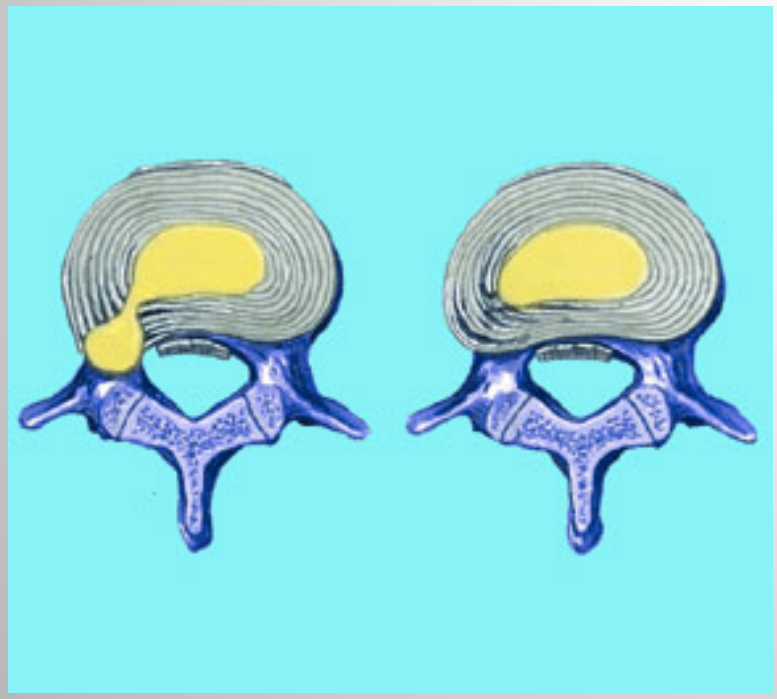


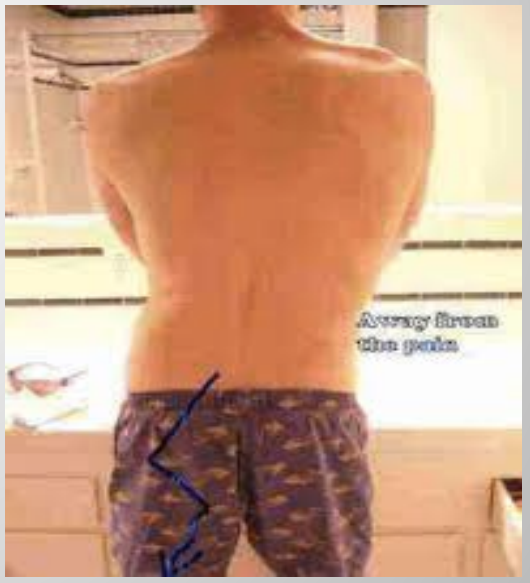
Lateral Component

- Derangements can be classified as having relevant or non-relevant lateral component
  - A non-relevant lateral component
    - Improvement with pure sagittal plane motions.
  - A relevant lateral component
    - Go into the frontal plane to resolve symptoms.
    - Can present with or without a lateral shift deformity.

Posterior-lateral Derangement

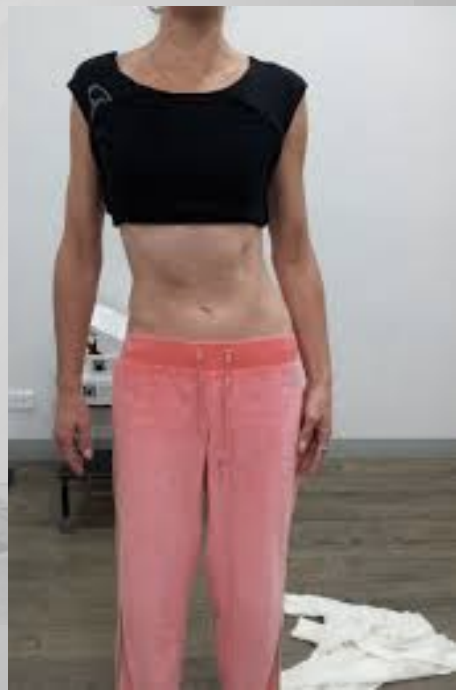
- Lateral shift deformity





The Derangement Syndrome

- Lateral Shift deformity
  - Patient's trunk is offset over the pelvis in the frontal plane.
- Two types of lateral shift deformities
  - A non-relevant or "soft" shift
  - A relevant lateral shift or "hard" shift



Relevant Lateral Shift

- Present if:
  - The upper body is visibly and unmistakably shifted to one side
  - Shift occurred with low back pain
  - They are unable to self correct the shift
  - If they can correct the shift, they are unable to maintain the correction.
  - Correction of the shift affects the intensity of the symptoms
  - Correction affects the site of the symptoms

Relevant Lateral Shift

- A *contralateral* shift:
  - Shifted away from the painful side
- An *ipsilateral* shift:
  - Shifted towards the painful side
- McKenzie (1972) found 96% of patients to have contralateral shifts.

Relevant Lateral Shift

- Lateral forces will be needed in the management of their symptoms (even if there is no shift deformity)
- Indications that lateral forces may be needed:
  - Unilateral or asymmetrical symptoms
  - Both flexion and extension aggravate symptoms
  - Side-gliding motion is asymmetrical
  - Sx do not change over several days of using extension motion

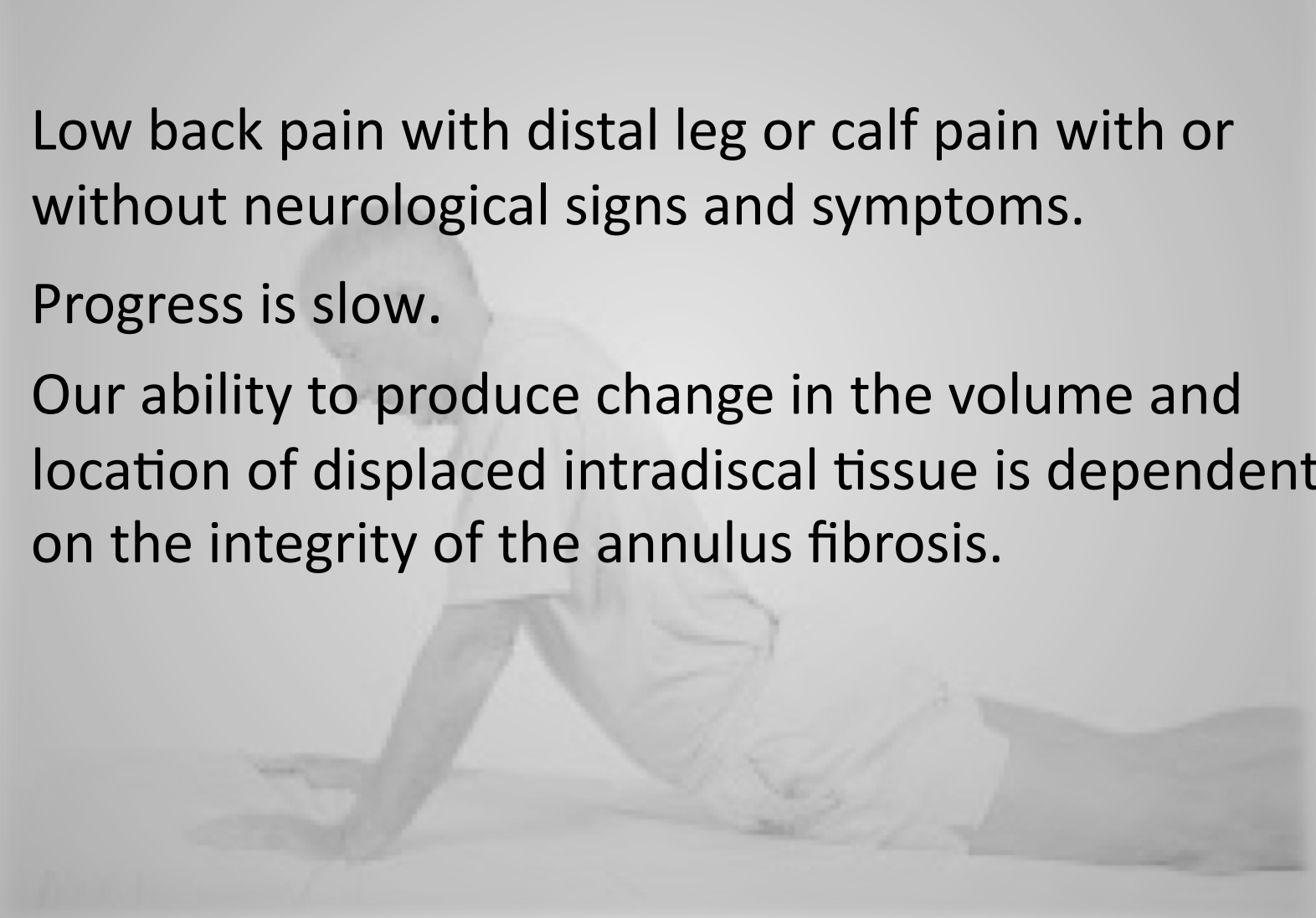
Management of Relevant Lateral

- Progressions listed in the order that most frequently generates a favorable response.
  - Extension in lying with hips off center
  - EIL with overpressure
  - EIL with hips off center, with lateral overpressure
  - Side-gliding in standing, shift hips away from pain
  - Rotation mobilization in extension
- If extension/lateral procedures or pure lateral procedures do not improve the patient, flexion/lateral procedures are considered.
  - Rotation in flexion; usually rotate legs to painful side
  - Rotation mobilization in flexion

UNILATERAL ASYMMETRICAL TO BELOW KNEE

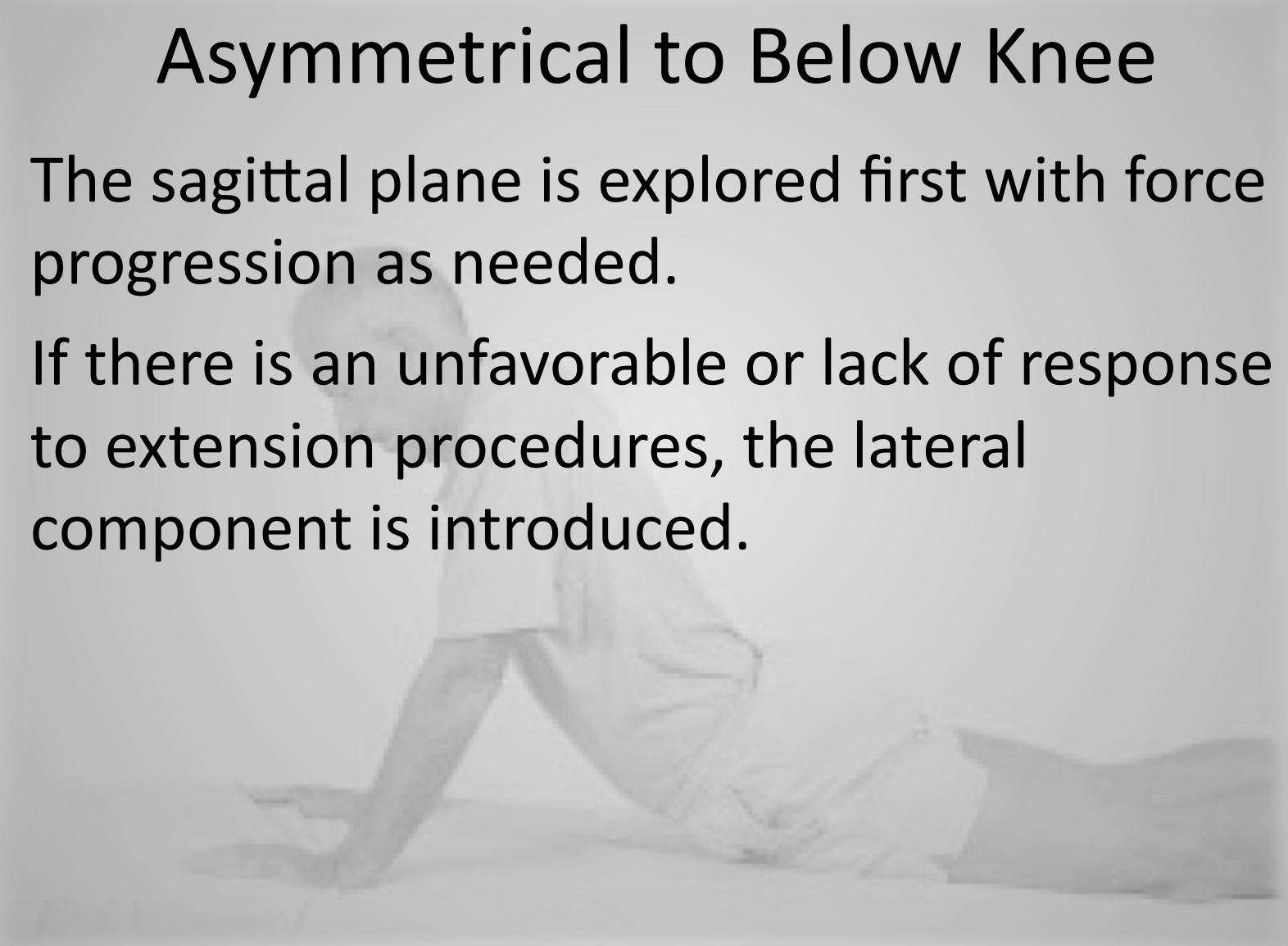
Unilateral Asymmetrical to Below Knee

- Low back pain with distal leg or calf pain with or without neurological signs and symptoms.
- Progress is slow.
- Our ability to produce change in the volume and location of displaced intradiscal tissue is dependent on the integrity of the annulus fibrosis.



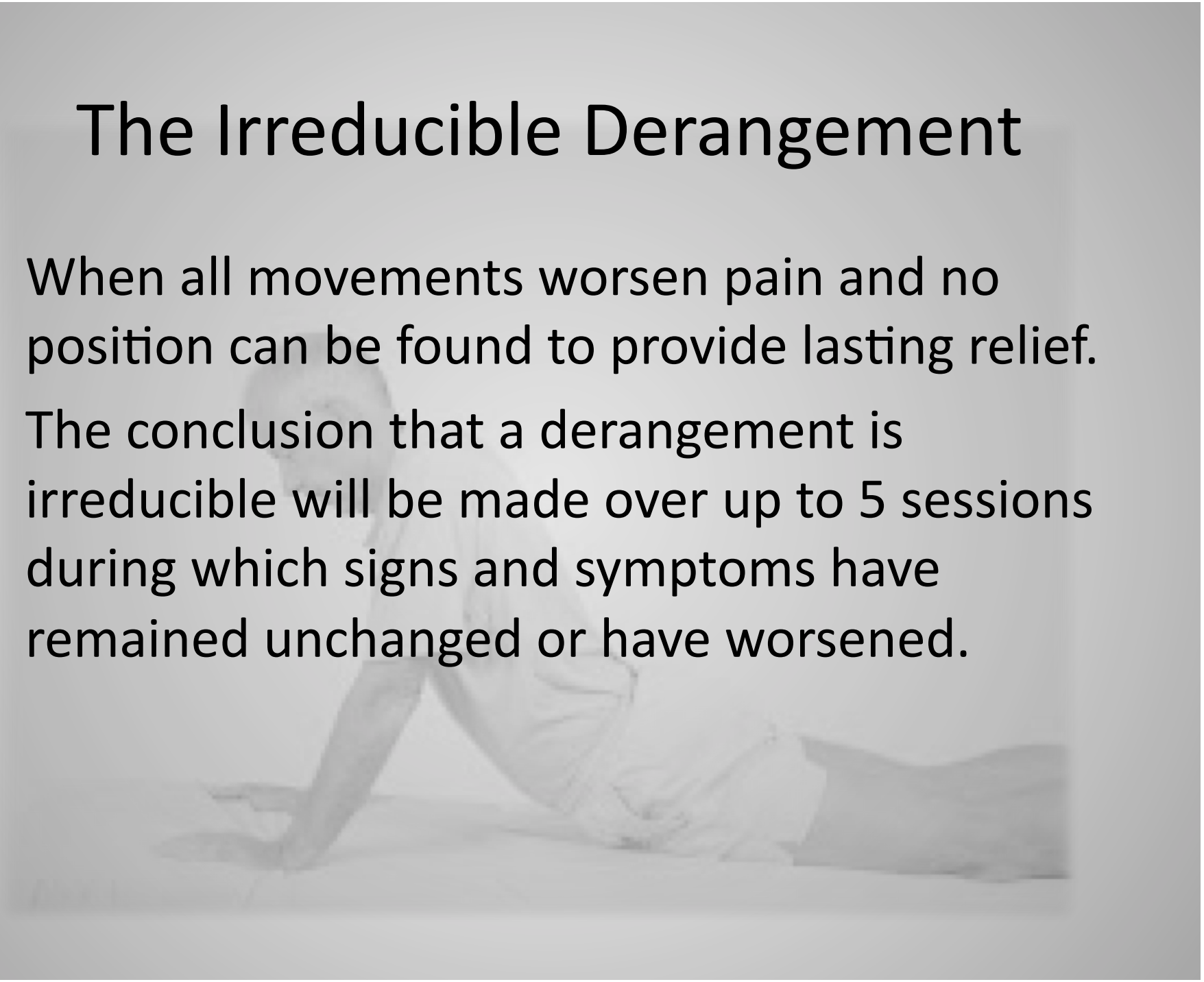
Management of Unilateral Asymmetrical to Below Knee

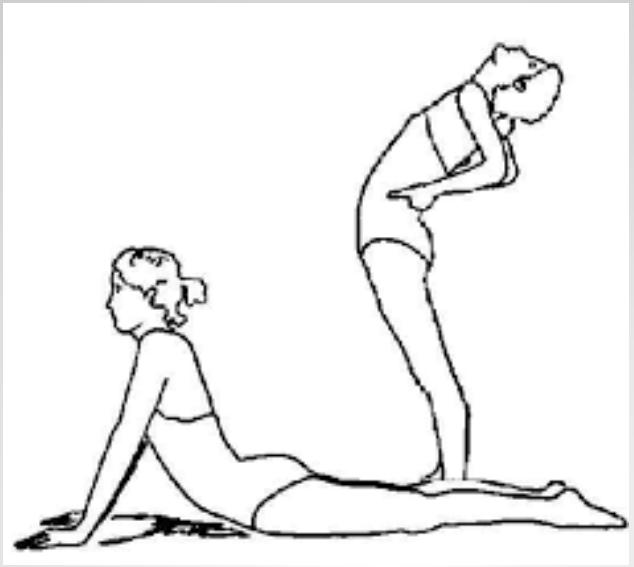
- The sagittal plane is explored first with force progression as needed.
- If there is an unfavorable or lack of response to extension procedures, the lateral component is introduced.



The Irreducible Derangement

- When all movements worsen pain and no position can be found to provide lasting relief.
- The conclusion that a derangement is irreducible will be made over up to 5 sessions during which signs and symptoms have remained unchanged or have worsened.





McKenzie Exercises

25 PROCEDURES TO TREAT LOW BACK PAIN

Procedure 1- Prone Lying

- Patient lies prone with their head turned to one side, arms by their sides, feet of the edge of the plinth or in IR.
- With an acute lumbar kyphosis, add pillows to accommodate the deformity as needed for pain.

Procedure 2- Prone Lying in Extension

- Patient lies prone on elbows, allowing the low back to be positioned in more extension.
- This position is sustained for 5 to 10 minutes.

Procedure 3- Sustained Extension

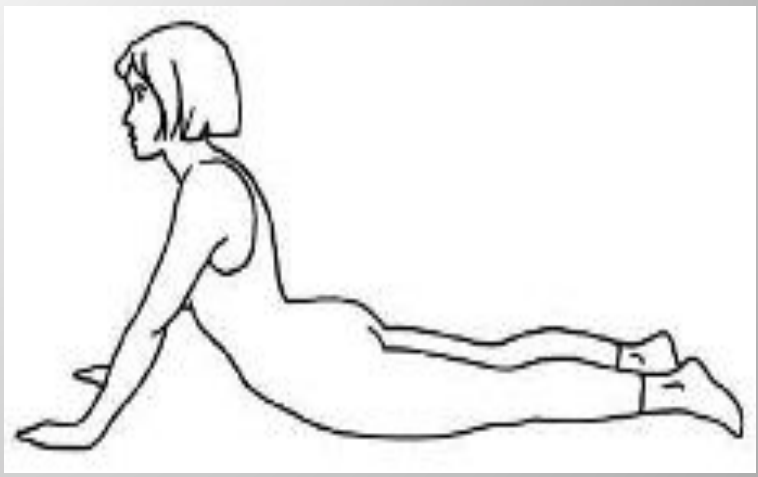
- Patient lies prone with the table positioned in extension, creating a gradual and sustained extension stress to the lumbar spine.
- Gradually lift the table up into more extension
- Use this for patients
  - kyphotic deformity - Major derangements
  - To expose an anterior derangement

Procedure 4- Posture Correction

- Educate the patient on good sitting posture.
- Guide them from a kyphotic position to an upright position by anteriorly rotating the pelvis and increasing the lumbar lordosis.
- Show patient how to maintain this position through the use of a lumbar roll.

Procedure 5 – Extension in Lying

- Progression of procedures 1 and 2
- Patient starts lying prone, hands palm down under their shoulders. Raise the top half of the body by straightening arms, return to lying prone. Repeat 10-15 times.
- Keep lower body relaxed
- Patient OP - Sag

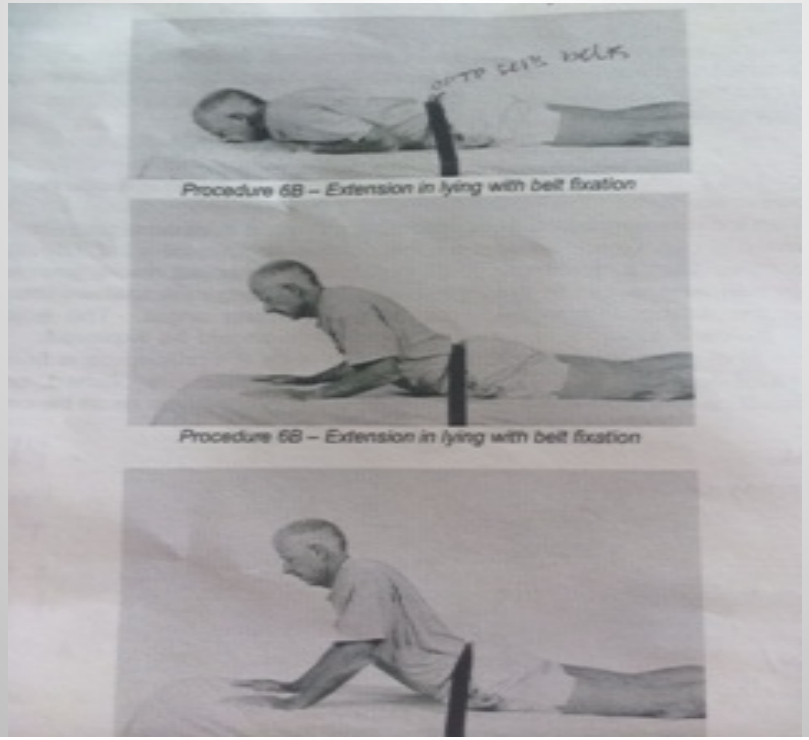


Procedure 6a – EIL with Clinician OP

- Progression of procedure 5 with the addition of clinician overpressure
- OP is applied using body weight through the arms, symmetrical pressure is applied and maintained while the patient performs EIL.

Procedure 6B- EIL with Belt Fixation

- Same as procedure 6A but with belt fixation instead of clinician overpressure
- Easier way to add overpressure to EIL for HEP



Procedure 7 – Extension Mobilization

- Mobilization pressure applied to lumbar spine in neutral or with the lumbar spine in extension (prone on elbows)
- Apply 10-15 repetitions, gradually increasing force.
- Most commonly used therapist technique.

Procedure 8 – Extension Manipulation

- Set up the same as procedure 7 with an extension force applied and sustained for 5 to 10 seconds.
- The symptom response to this pre-manipulative testing must be centralization, reduction or abolition of sx during the procedure but that return once pressure is released.
- A high velocity, short amplitude thrust is applied.
- Only perform once or at the most, twice.
- Not taught until diploma level

Procedure 9 – Extension in Standing

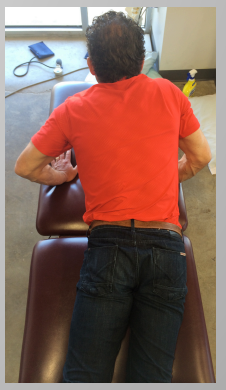
- Patient stands with feet shoulder width apart, hands placed over low back with fingers pointing down.
- Patient leans back as far as possible, repeat 10 times.
- Not as effective as EIL but a good alternative.

Procedure 10 – Slouch Overcorrect

- Use for postural education
- Instruct patient to slouch, then move to an upright sitting position with maximal lordosis, repeat this sequence 10 times.
- Back off 10% from maximal lordosis on the last repetition. This is considered optimal sitting posture.

Procedure 11- EIL with Hips Off Center

- Starting position is the same as procedure 5 but is asymmetrical with the hips off center in the prone lying position.
- Start with hips shifted AWAY from the painful side. Repeat pressups 10-15 times.
- Used in derangements with unilateral or asymmetrical symptoms that have not responded to extension.



Procedure 12- EIL with Hips Off Center with Clinician Overpressure

- 12A Sagittal Overpressure
  - Position hypothenar eminences on TPs of painful segment. Pt performs REIL.
- 12B Lateral Overpressure (more commonly used technique)
  - Pressure is applied at the ribs and iliac crest. Pt perform REIL.

Procedure 13- Extension Mobilization with Hips Off Center

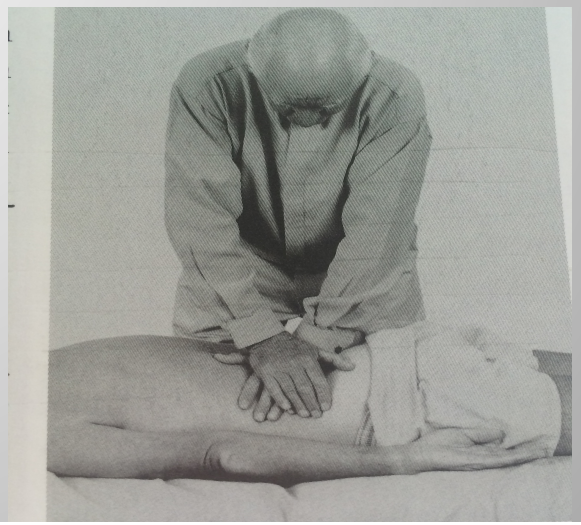
- Performed the same as procedure 7 except the hips are positioned off center, away from the painful side.
- Once in this position, the extension mobilization is performed.
- This is a force progression for a derangement with a lateral component.
- Do not perform before attempting procedures 11 and 12.

Procedure 14- Rotation Mobilization in Extension

- The position is the same as in procedure 7 but the technique is modified by applying pressure first to the TP on one side, then the other side to produce a rocking effect.
- Force is directed anterior and slightly medially. Repeat 10 times.
- Generally used to reduce derangements with unilateral or asymmetrical symptoms that have remained unchanged with previous procedures.

Procedure 15- Rotation Manipulation in Extension

- Same as procedure 14 but with a high velocity, low amplitude thrust.
- Only one manipulative thrust should be performed during a treatment session
- Pre-manipulative testing must show favorable results before performing manipulation.



Procedure 16 – Self Correction of Lateral Shift Or Side Gliding

- The direction of side-gliding is named by the direction that the shoulder moved, rather than the hips.
- Used for self-correction of lateral shift
- Is taught after manual correction of lateral shift for HEP.

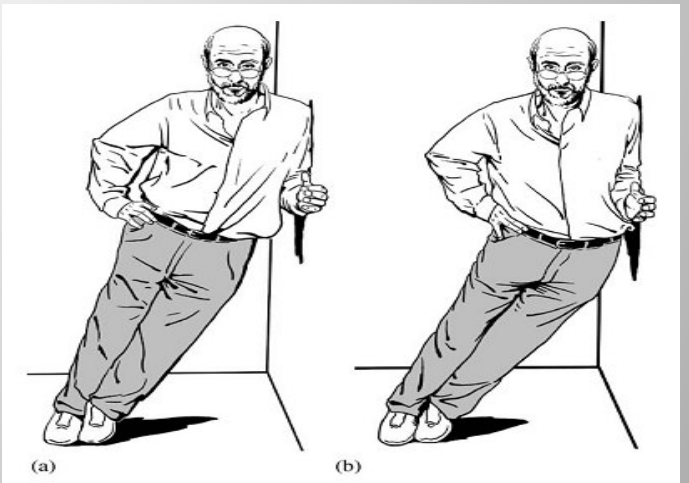
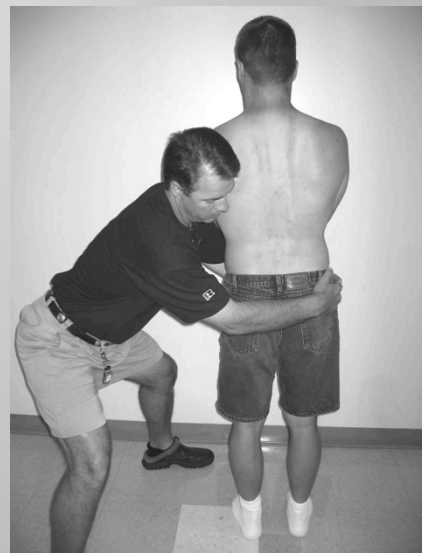


Figure 6 Pelvic side shift: (a) start position (b) end position.

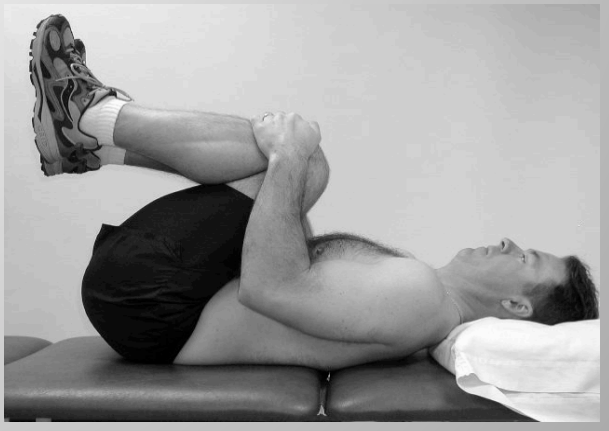
Procedure 17- Manual Correction of Lateral Shift

- This procedure is used for patients with a relevant lateral shift deformity.
- Has two parts: correct the lateral shift deformity, THEN restore full extension.
- Go slowly and listen to patient symptoms
- After manual correction, teach the patient procedure 16 for HEP.



Procedure 18 – Flexion in Lying (FIL)

- Patient supine with hips and knees flexed at 45 degree angle, bring knees to chest and apply self over pressure.
- Knees released and placed back on the mat. Repeat 10 times.
- Always perform following stabilization of a reduced posterior derangement so that no flexion loss remains.
- Treatment of choice for lordotic deformity.



Procedure 19- Flexion in Sitting

- A progression of force from procedure 18
- Sit with hips at 90deg, reach between knees
- Is a useful technique in remodeling an adherent nerve root.

Procedure 20- Flexion in Standing (FIS)

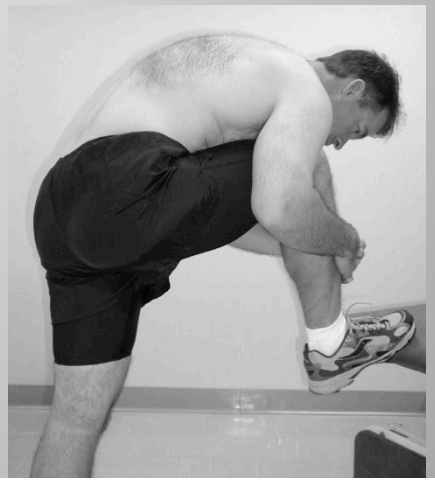
- A progression of procedure 19
- Patient stands with feet shoulder width apart, instruct them to run their hands down their thighs and reach as far as possible towards the ground. Repeat x 10.
- Necessary in remodeling an ANR

Procedure 21- FIL with Clinician OP

- Same as procedure 18 but with clinician overpressure at endrange flexion.

Procedure 22 – Flexion in Step Standing (FISS)

- This procedure creates an asymmetrical flexion stress and is applied when there is a deviation in flexion
    - Can occur in derangement (ant/lat) or dysfunction (ANR)
- Raise the leg that is OPPOSITE the side to which the deviation in flexion occurs
- Restore lordosis between each rep



Procedure 23- Rotation in Flexion

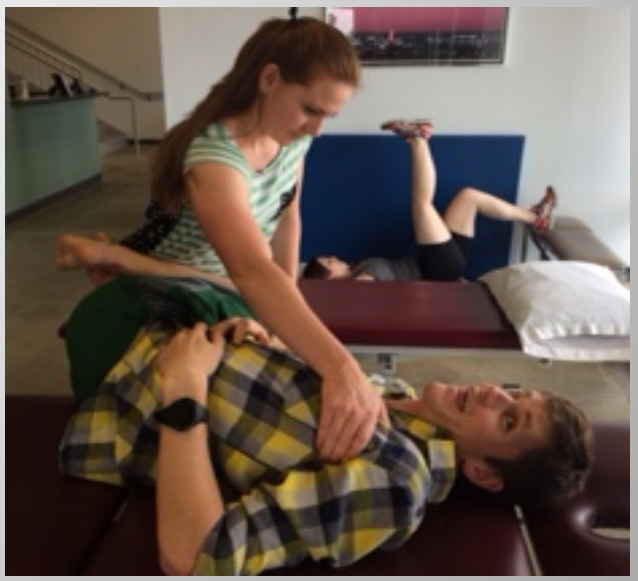
- This procedure is used in the management of derangements that have not improved or have worsened with sagittal plane movements.
- Patient lifts their pelvis off the mat, places it off center, away from the painful side.
- The knees are then raised until they are over the hips and lowered to the mat (towards the painful side).
- Hold the position 2-3 minutes.

Procedure 24 – Rotation Mobilization in Flexion

- Same as procedure 23 but with the patient's knees resting on the clinician's thighs and a mobilization pressure applied through their knees, while simultaneously anchoring their contralateral shoulder.

Procedure 25- Rotation Manipulation in Flexion

- Same set up as procedure 24 but with a high velocity, low amplitude thrust applied through the patient's knees.
- Only one manipulative procedure should be performed during a session.



Questions??

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