

Role of the Hip and Lower Thoracic Spine in Primary Lumbar Pain Patients

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UPSTREAM
REHABILITATION

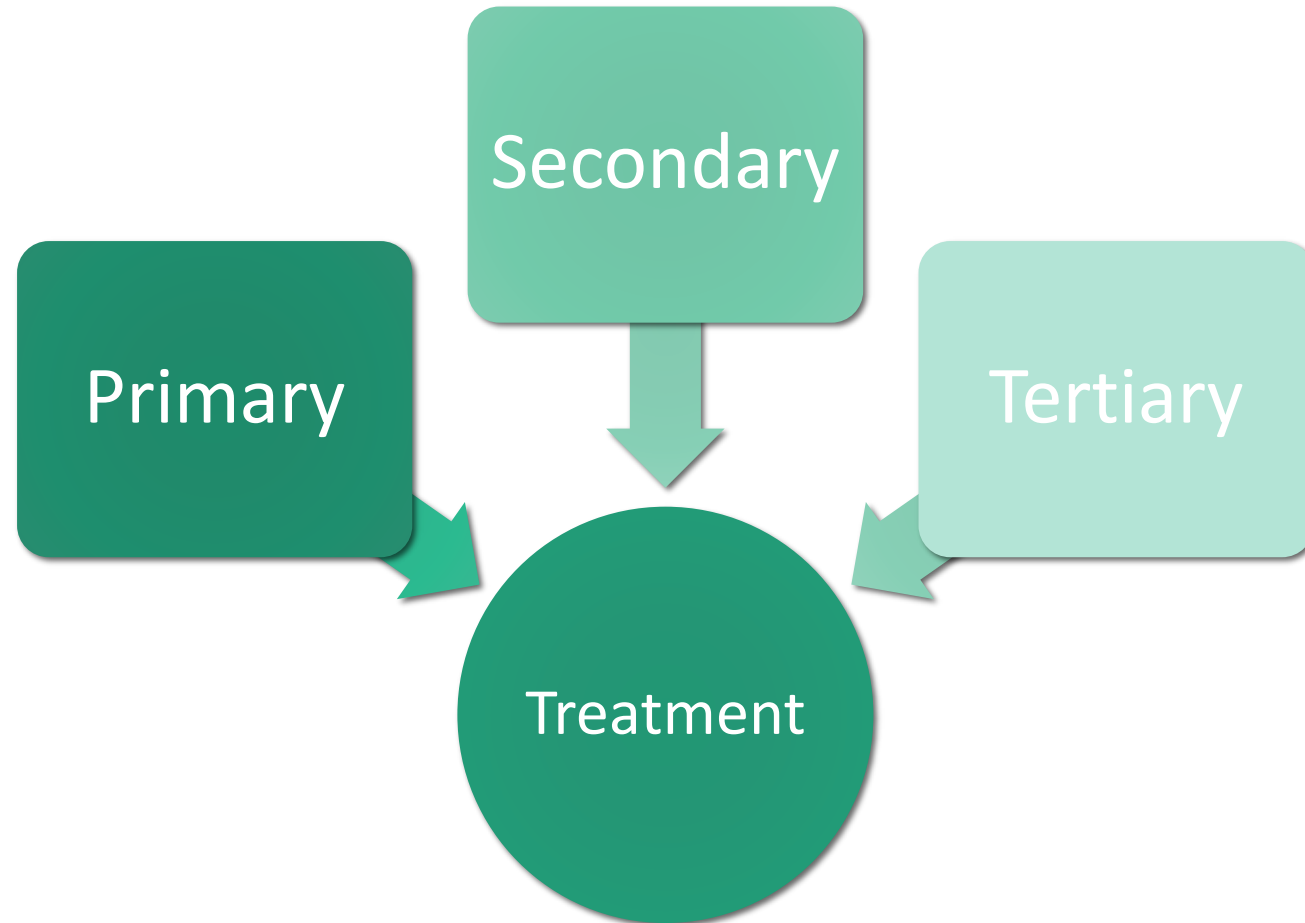


Objectives

1. Review a manual therapy approach in the clinical management of low back pain
2. Understand the concept of regional interdependence as it relates to low back pain
3. Recognize the contributions of hip and thoracic dysfunction in low back pain
4. Apply manual therapy assessment, treatment and reassessment to selected areas of hip and thoracic regions
5. Apply exercise prescription and patient education based on found impairments in the management of low back pain



Manual Therapy Model



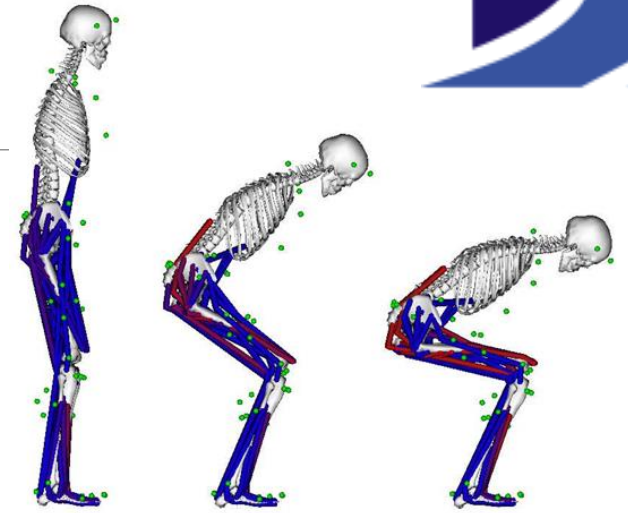


The Onion



The “Onion”

- “Layers” of problems that commonly occur in symptomatic individuals which are thought to contribute to the current development.



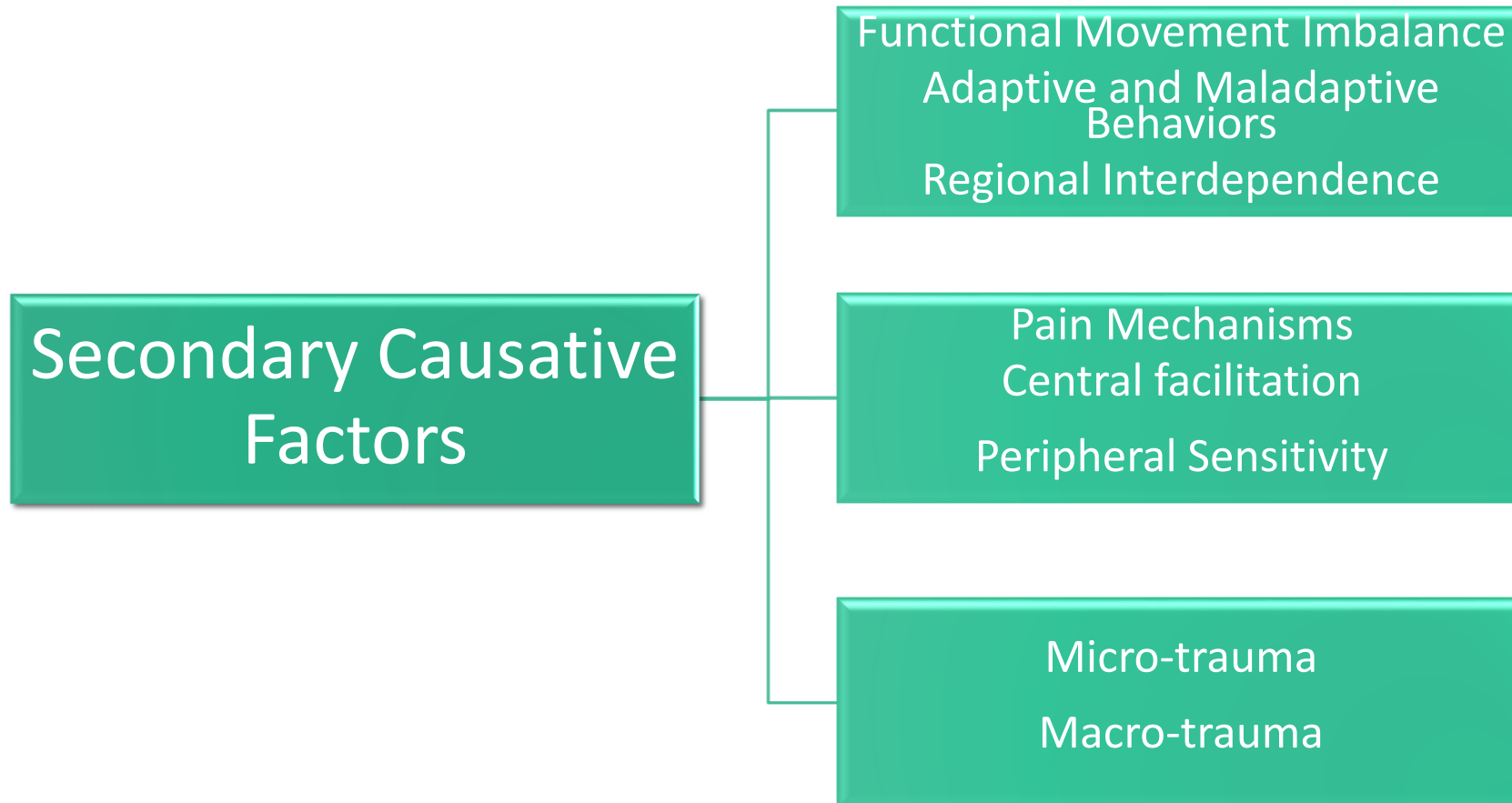
Types of problems:

- Primary: Angry bear
- Secondary: What’s poking the bear
- Tertiary: What woods does the bear live in





Secondary Factors





Regional Interdependence

Wainer¹ defines regional interdependence as:

“the concept that seemingly unrelated impairments in a remote anatomical region may contribute to, or be associated with, the patient’s primary complaint.”

Sueki² further refines regional interdependence as:

“patient’s primary musculoskeletal symptom(s) may be directly or indirectly related or influenced by impairments from various body regions and systems regardless of proximity to the primary symptoms.”



Regional Interdependence

Musculoskeletal manifestation may involve other physiologic systems:²

- Neurophysiologic
- Somatovisceral
- Biopsychosocial

Is NOT referred pain although this type of pain may be present.

Refers to treating patients not based solely on symptom location.

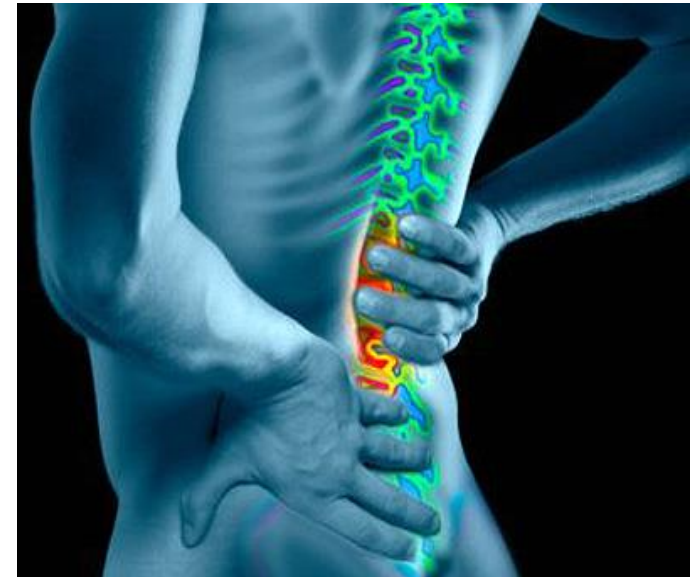
Refers to impairments present in proximal and distal structures that cause, contribute to, worsen or prevent healing of the “primary” problem.

Simply put, it means treating “why’s” rather than “what’s.”



Low Back Pain

- Next to common cold, LBP is the most common reason for physician office visit.³
- Leading cause of disability in people < 45, 3rd in > 45.⁴
- Despite its prevalence, is generally poorly understood.⁵
 - Jenson et al⁶ found 64% of subjects without LBP had ≥ 1 disc abnormality. 38% ≥ 2 disc abnormalities.
 - + MR findings not predictive of development or duration of low back pain.⁷
- “Wrinkles on the Inside.”⁸
- Lurie: $\frac{1}{2}$ of MRI disc herniation morphology not described accurately. Agreement fair between specialists and radiologists.⁹





Low Back Pain



Clinical Prediction Rule

- Acute Low Back Pain:
+ response to manipulation^{10.11}
 - Duration of current episode < 16 days
 - No symptoms distal to knee
 - FABQW score < 19
 - ≥ 1 hypomobile segment detected
 - One or both hips with $> 35^\circ$ internal rotation
- Meeting 4 criteria \rightarrow 92-95% successful outcome
- Meeting 3 criteria \rightarrow 68%



Hip Dysfunction in LBP

Hip Dysfunction

- Numerous reports of hip involvement in patients with LBP.^{5,12-18}
- Conversely, intervention to lumbar spine can benefit 1° c/o hip pain.¹⁶
- Decreased hip joint motion will place ↑ stress on lumbar spine.^{5,14}
 - Porter et al⁵ found 2 distinct groups studying gross lumbar-hip flexion AROM in CLBP:
 - ≥ 120° flexion – large lumbar / small hip contribution
 - ≥ 120° flexion – small lumbar / large hip contribution
 - Implications: Heterogenous groups





Hip Dysfunction in LBP

Hip OA

- Characterized by:
 - Degeneration of articular cartilage^{19,20}
 - Sclerosis of the subchondral bone^{19,20}
 - Formation of osteophytes
 - ↑ Pain, ↓ mobility, ↓ muscle function, ↓ quality of life, restriction of ADLs.²¹
 - Ipsilateral gluteus maximus atrophy consistent with stage of pathology.²²
 - American College of Rheumatology Hip OA criteria:²³

This:

Or this:

Hip pain	Hip pain
< 15° Hip internal rotation	> 15° Hip internal rotation
< 115° Hip flexion	Pain with hip internal rotation
	Morning stiffness of the hip of > 60 mins.

- Can mimic or be concurrent with severe lumbar involvement²⁴



Lower Thoracic Dysfunction in LBP

- Robert Maigne first proposed existence of Thoracolumbar Joint Syndrome (TLJ) in 1972.²⁵
- Commonly presents as low back, hip, pubic pain, autonomic and/or pseudovisceral pain (gynecologic/testicular/lower GI pain).²⁶
- Pain from lower thoracic will typically not be the patient's primary c/o and radiographs will likely suggest noteworthy changes in lower lumbar.^{25,26}
- The lower thoracic serves as a transitional bridge between the mid-thoracic spine (frontal plane facets) and lumbar (coronal plane facets).²⁶⁻²⁸
- T11 and T12 ribs do not have an anterior restraint vs. cephalad ribs.²⁶⁻²⁸
- TLJ also has connections to diaphragm, lat dorsi, QL, iliopsoas, etc.²⁶⁻²⁸

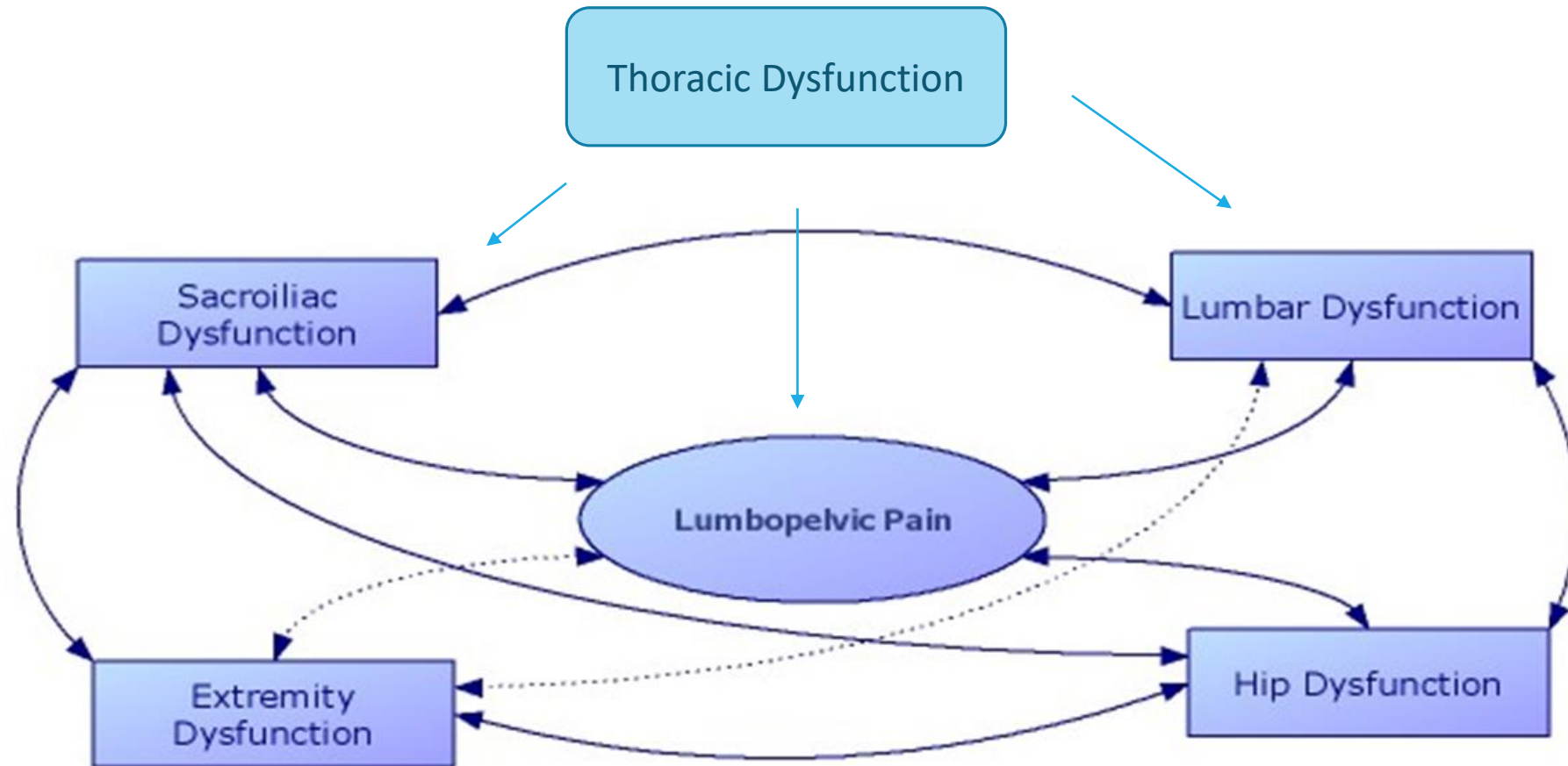


Lower Thoracic Dysfunction in LBP

- deOliveira et al²⁹ looked at 'specific' vs. 'general' manipulations in chronic low back pain. Compared pain intensity and PPT after HVLA of upper thoracic vs. clinician identified painful segment. No between group differences were found.
- Bishop et al³⁰ found that thoracic spinal manipulative therapy did not reduce pressure/thermal pain responses, but did reduce temporal sensory summation (aka increases pain modulation) caudal to application in healthy subjects.
- Babina found improvement in respiratory function and ODI in CLBP patients with addition of thoracic manual therapy over exercise and respiratory exercises combined.³¹



Hip/Thoracic Dysfunction in LBP





Low Back Pain – common patterns

ROM limitations	Inhibition	Facilitation/TTP
Ipsilateral trunk ext quadrant	Hip flexion	Iliopsoas
Ipsilateral hip internal rotation	Hip ab-/adduction	Lat Dorsi
Ipsilateral hip flex	Hip external rotation	QL
Ipsilateral ankle (df, inv, ev)	Knee flexion	Adductor
First MTP ext	Ankle df, inv, ev	IT Band
	EHL	Popliteus
	Toe flexion	Tibialis Posterior



Manual Lab

- Knee Push
- Thoracolumbar manipulation
- Thoracic Side-lying Assessment/MWM
- Lower Thoracic Manipulation
- Pubic Symphysis Assess/Treat
- Hip Distraction – Internal Rotation
- Hip Inferior Glide w/ Flexion
- Hip Medial Glide w/ Abduction
- Hip Anterior Glide with ER



Knee Push

Clinical predictors:

LBP,^{25,66} pelvic/gluteal pain,¹¹⁴ ↓ trunk ROM, ipsilateral ↓ hip ROM,^{25,66} myotomal weakness, ipsilateral hip external rotation weakness, tenderness to palpation and apparent hypertonicity: ipsilateral iliopsoas + latissimus dorsi.

Given Dx: LBP, Lumbago, SI Dysfunction, Piriformis Syndrome, Knee OA¹⁴³, CANS dysfunction

Assessment:

Assess for changes of symptoms and findings (especially for changes in tonicity, ROM deficits and strength)



Knee Push

Patient position:

Patient should be positioned in supine with a pillow under the head for comfort.

Treatment procedure:

Patient bends ipsilateral knee (per findings above) and grasps knee with interlaced fingers at arm's length as pictured. If patient not capable of reaching position or has knee discomfort with knee flexion angle, grasping behind knee or using a towel would be appropriate.

Patient pushes knee against the hands (glute contraction) with light force (without contracting the quads) for a count of 5 seconds.

Cue patient to relax while maintaining this position for a couple of seconds.

Repeat for a total of 5 repetitions.





Lumbar Gapping

Clinical predictors:

LBP,^{28,57} pelvic/gluteal pain,¹²⁴ ↓ trunk ROM, ↓ hip ROM,^{28,57} myotomal weakness

Given Dx: LBP, Lumbago, SI Dysfunction, Piriformis Syndrome, Knee OA¹⁴⁶

Assessment:

Positive with therapist perception of hypomobility and patient c/o pain.

Note: Most mobility occurs at L₄₋₅.



Lumbar Gapping

Patient position:

Patient should be positioned in side lying at lateral edge of the table with the legs bent to the same angle (90° hip flexion) and pillow under the head.

Therapist position:

Therapist will be standing against edge of table facing patient as shown.

Therapist will thread superior arm through patient's free arm as shown.

Test procedure:

Therapist will contact spinous process of inferior vertebra of motion segment with caudal hand (2nd digit) and contact spinous process of superior vertebra of motion segment with cephalad hand (thumb).

Using combination of pressure through forearms and against spinal contacts, therapist will move top vertebra down toward table and bottom vertebra away from table. Repeat at other levels.





Lumbar Manipulation

Clinical predictors:

LBP,^{28,57} pelvic/gluteal pain,¹²⁴ ↓ trunk ROM, ↓ hip ROM,^{28,57} myotomal weakness

Given Dx: LBP, Lumbago, SI Dysfunction, Piriformis Syndrome, Knee OA¹⁴⁶

Reassessment: Repeat mobility testing.



Lumbar Manipulation

Patient position:

Patient should be positioned in side lying at lateral edge of the table with both legs straight and pillow under the head. Patient should be positioned same side up as tested.

Therapist position:

Therapist will be standing against edge of table facing patient as shown. Therapist will thread cephalad arm through patient's free arm as shown.

Treatment procedure:

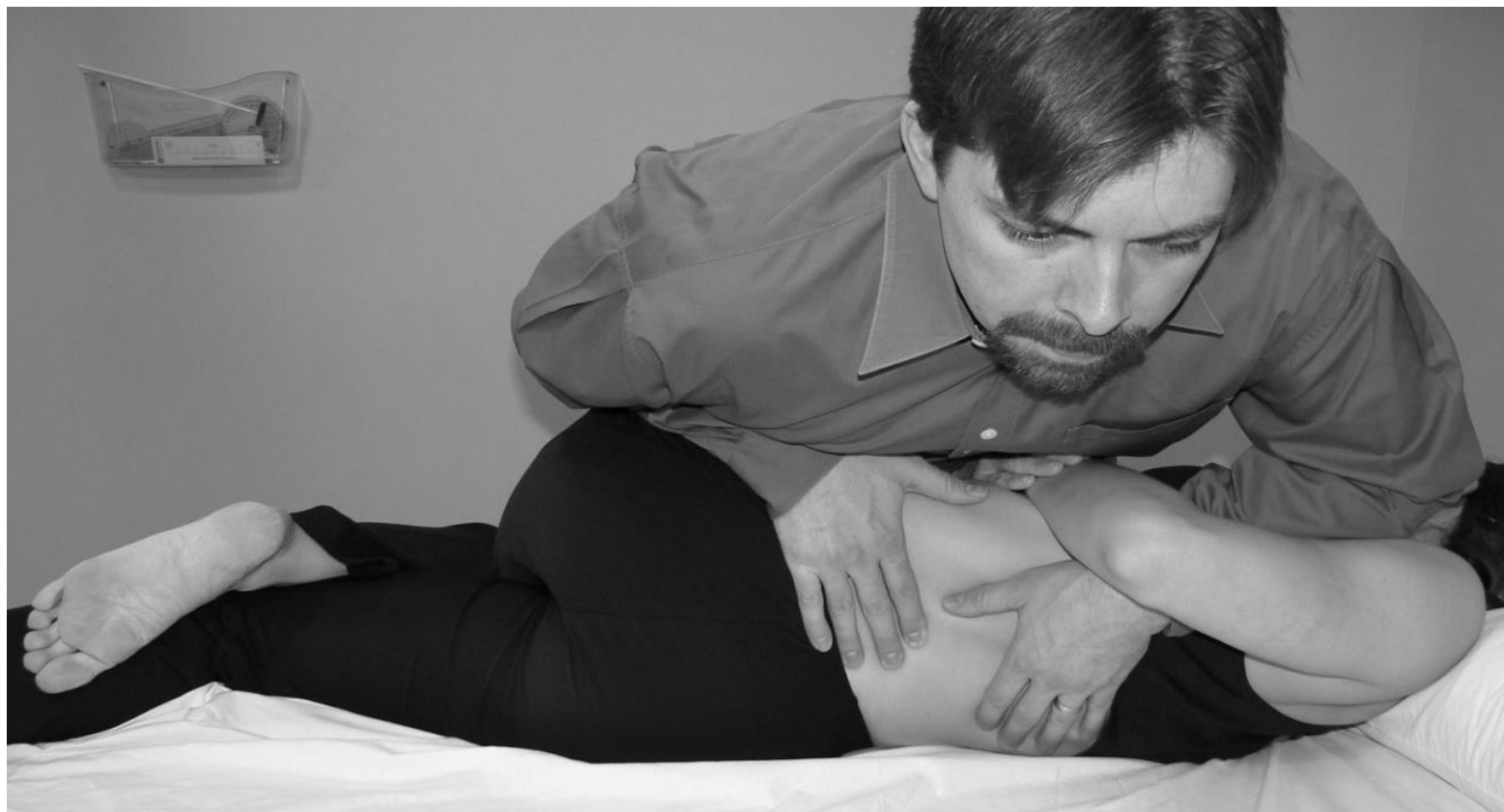
Therapist will flex top hip/knee until motion is felt at target segment.

The therapist will protract/depress the shoulder against the table to introduce side-bending toward and rotation away from the table till motion is felt at target segment. The therapist will then assume testing position.

The patient is cued to take a deep breath.

The therapist will maintain steady and moderate pressure against the pelvis and anterior shoulder and take up further rotational motion with exhalation.

At the end of the exhalation cycle, deliver a HVLA thrust (arrow) via pressure through forearms (**not spinal contacts**).





Thoracic Rotation in SL

Clinical predictors:

Neck pain,^{9,77,82} thoracic/medial scapular pain,⁹³ cervical/trunk AROM limitation,^{77,82,93} shoulder weakness/pain,^{91,92} CRPS symptoms⁹⁷

Reassessment:

Repeat original side lying assessment.



Thoracic Rotation in SL

Patient position:

Patient should be positioned in side lying near the edge of the table and with a pillow under the head as shown

Therapist position:

Therapist should be standing and facing the patient.

The therapist should flex the free shoulder to 90° and hold with the cephalad arm as shown.

The caudal hand should be palpating the same side transverse process.

Test procedure:

While keeping contact against the transverse processes of the segment to be tested, cue the patient to protract the shoulder giving manual cues as well. Give slight overpressure at end of protraction ROM. Release pressure and guide shoulder back to retracted position.

Assessment:

Positive with therapist perception of hypomobility and patient c/o pain.

Treatment procedure:

Repeat the test procedures but keep constant and more forceful overpressure against the transverse process of the segment during protraction.





Lower T/S Manipulation

Clinical Predictors:

Neck pain,^{101,182} lumbar/thoracic/medial scapular pain,¹⁹³ cervical/trunk AROM limitation,^{101,182,193} shoulder weakness/pain,¹⁹⁰⁻¹⁹² CRPS symptoms,¹⁹⁷

Reassessment:

Repeat the side lying or other thoracic assessment.

***Note:** A cavitation is not necessary for a therapeutic effect. Similarly, if a cavitation occurs, reassessment is still required



Lower T/S Manipulation

Patient Position:

Patient should be positioned in side lying (or supine) near the lateral edge of the table with the arms crossed across the shoulders. The patient's arm closest to the therapist should be underneath.

Therapist position:

Therapist should place his hand in a “pistol-grip” position as shown previously. The therapist should reach across the patient's body and place the digit III middle phalanx and thenar eminence on the transverse processes of the target segment (either superior or inferior vertebra). **This hand placement must be maintained.**

If side lying, the patient should be rolled (and slid) toward the therapist.

Treatment procedure:

The patient is cued to bring their head off the table. The therapist will slide the free hand down to the upper thoracic area and cue the patient to relax. The therapist will then flex the spine till pressure is increased on the stationary hand. The patient is cued to take a deep breath.

The therapist will maintain steady and moderate pressure against rib cage (through the arms) as it depresses. At the end of the exhalation cycle, deliver a HVLA thrust toward the stationary hand on the table with a quick abdominal contraction (flexion).

Note: Bias toward flexion, extension can be changed with angle of thrust.





Pubic Symphysis Assessment/Treat

Clinical predictors:

Pelvic pain, adductor pain,

Given Dx: Groin pull, SI Dysfunction

Assessment:

The test is positive if either pube is superior or anterior and is confirmed with therapist perception of hypomobility and patient report of pain provocation.



Pubic Symphysis Assessment/Treat

Patient position:

Patient should be supine near lateral edge of table.

Therapist position:

Therapist should be standing beside the table.

The therapist should run the hand down the abdomen (patting with fingers toward umbilicus) until the pubes are palpated.

The pads of the fingers should then be hooked on the superior and then anterior border of each pube.

Test procedure:

Assess if one pube is superior and/or anterior to the other.

Then, the therapist places his or her thenar eminence (thumb extended) against the suspect pube and springs.





Pubic Symphysis Assessment/Treat

Clinical predictors:

Pelvic pain, adductor pain,

Given Dx: Groin pull, SI Dysfunction

Reassessment:

Repeat mobility/provocation assessment.



Pubic Symphysis Assessment/Treat

Patient position:

Patient should be positioned in supine at lateral edge of the table.

Therapist position:

Therapist will be standing against edge of table as pictured.

The therapist will drop the “problem” side lower extremity off the lateral edge of the table till the ipsilateral hip is extended beyond neutral.

The therapist will then flex the opposite side knee and hip into full flexion

Treatment procedure:

While maintaining pressure against both knees, the therapist will cue the patient to bring both knees together for 6-10 seconds.

This will be repeated for 3-5 repetitions.





Hip Lateral Distraction with IR

Clinical predictors:

LBP,^{66,85,112,113} Knee pain,¹³⁰ decreased hip internal rotation AROM^{25,66}
Given Dx: Trochanteric bursitis, Hip OA,^{122,125} Knee OA,^{130,142} PFPS.¹⁵⁷

Reassessment:

Assess for changes in hip AROM



Hip Lateral Distraction with IR

Patient position:

Patient should be positioned in supine at lateral edge of the table.

Therapist position:

Therapist will be standing against edge of table as pictured. The therapist will flex the hip and place a padded mobilization belt against the proximal medial thigh as pictured.

Hand contact will be maintained against the lateral portion of the knee and over the distal calf

Treatment procedure:

The hip will be internally rotated fully.

With proper tension in the belt, the therapist will lean back (bold arrow) while placing moderate pressure medially (thin arrow) against the knee.

This will be repeated for 3-5 repetitions.





Hip Inferior Glide with Flexion

Clinical predictors:

LBP,^{66,85,112,113} Knee pain,¹³⁰ decreased hip flexion AROM

Given Dx: Hip OA,^{122,125} SI Dysfunction, Piriformis Syndrome, Knee OA,^{130,142} PFPS.

Reassessment:

Assess for changes in hip AROM



Hip Inferior Glide with Flexion

Patient position:

Patient should be positioned in supine at lateral edge of the table.

Therapist position:

Therapist will be standing against edge of table as pictured. The therapist will flex the hip and place a padded mobilization belt against the anterior medial thigh as pictured. Hand contact will be maintained against the heel and superolateral knee as pictured to dissuade the hip from abducting / externally rotating.

Treatment procedure:

With proper tension in the belt, the therapist will lean back (bold arrow) while flexing the hip by moderate pressure superiorly (thin arrow) against the foot. This will be repeated for 3-5 repetitions.





Hip Medial Glide with Abduction

Clinical predictors:

LBP,^{66,85,112,113} Knee pain,¹³⁰ decreased hip abduction AROM , decreased hip abduction strength⁵¹
Given Dx: Hip OA,¹²² SI Dysfunction, Piriformis Syndrome, Knee OA,^{130,142} PFPS, IT Band Syndrome.

Reassessment:

Assess for changes in hip AROM and hip abduction strength.



Hip Medial Glide with Abduction

Patient position:

Patient should be positioned in sidelying at lateral edge of the table with bottom limb flexed at hip and knee as pictured.

Therapist position:

Therapist will be standing against edge of table as pictured.

The therapist will grasp below the knee with caudal hand and maintain patient in neutral hip rotation and slight hip extension.

The therapist will maintain patient's pelvic position in sidelying and with cephalad hand at the greater trochanteric area.

Treatment procedure:

Therapist will abduct thigh till pelvic motion is detected. Maintaining this position, therapist will medial glide hip (arrow) for 5-8 repetitions.

Afterward, therapist will attempt to abduct lower extremity till motion is again felt.

Repeat for 2-3 cycles.





Hip Anterior Glide with ER

Clinical predictors:

LBP, ^{67,85,112,113} Knee pain, ¹³⁰ decreased hip external rotation AROM

Given Dx: Hip OA, ^{122,125} Knee OA, ^{130,142} SI Dysfunction, Piriformis Syndrome, PFPS, Trochanteric Bursitis

Reassessment:

Assess for changes in hip AROM

Note: The hip may be placed in additional hip abduction and external rotation and treatment repeated.



Hip Anterior Glide with ER

Patient position:

Patient should be positioned in prone in the middle of the table.

Therapist position:

Therapist will be standing against edge of table as pictured.

The therapist will abduct and externally rotate the hip to place the medial surface of the thigh and lower leg against the table.

The caudal hand will be grasping just above the ankle and will hold the leg in this position at all times.

Treatment procedure:

The therapist will place the heel of the hand against the greater trochanter and glide anteromedially with progressive greater vigor.

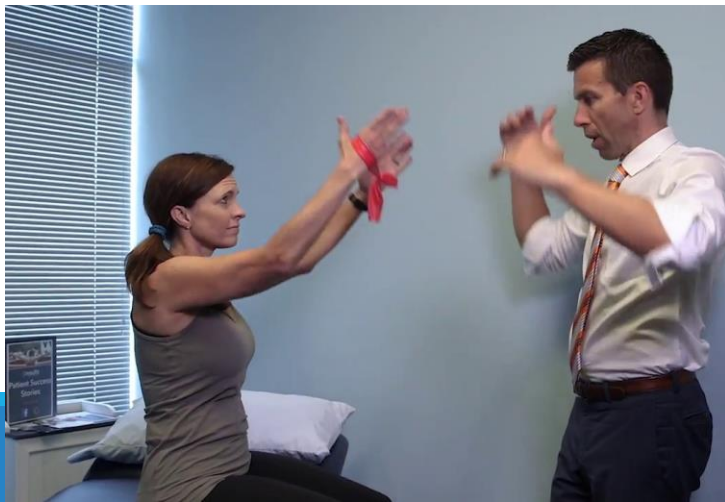
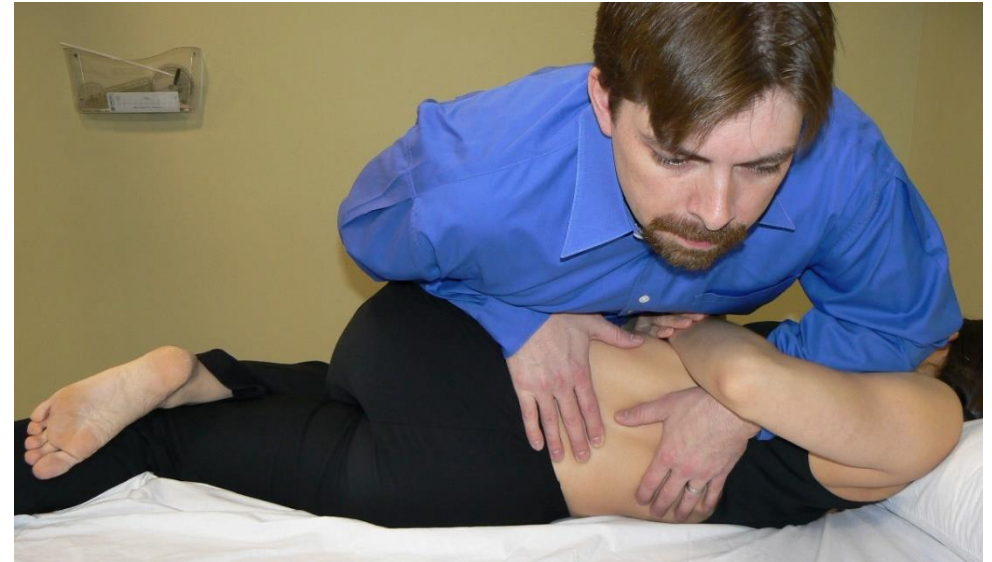
This will be repeated for 6-10 repetitions.





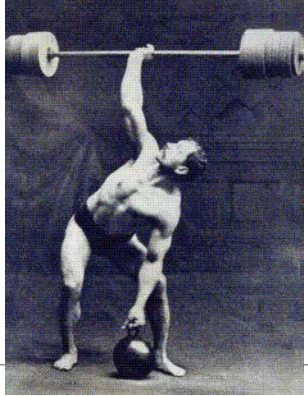
Physical

- Three broad things will occur at each physical therapy visit:
 1. “Mechanic-ing”
 2. Coaching
 3. Education





Mechanic



↓
Tension/tone

↑
Muscle
Recruitment

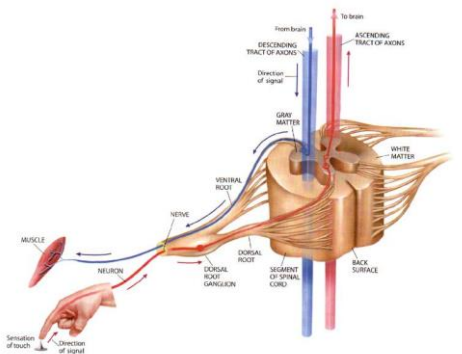
↑
Biomechanics



↓
Pain

Therapeutic
Benefit

↑
Outlook





Coaching

- Initial exercises will function to allow you to have some control over symptoms.
 - Can't train through pain!
- Progression will focus on building up your tissues while minimizing exacerbation.
 - Build you back up!
- Progression will be individualized, but focus on capability, resilience and durability

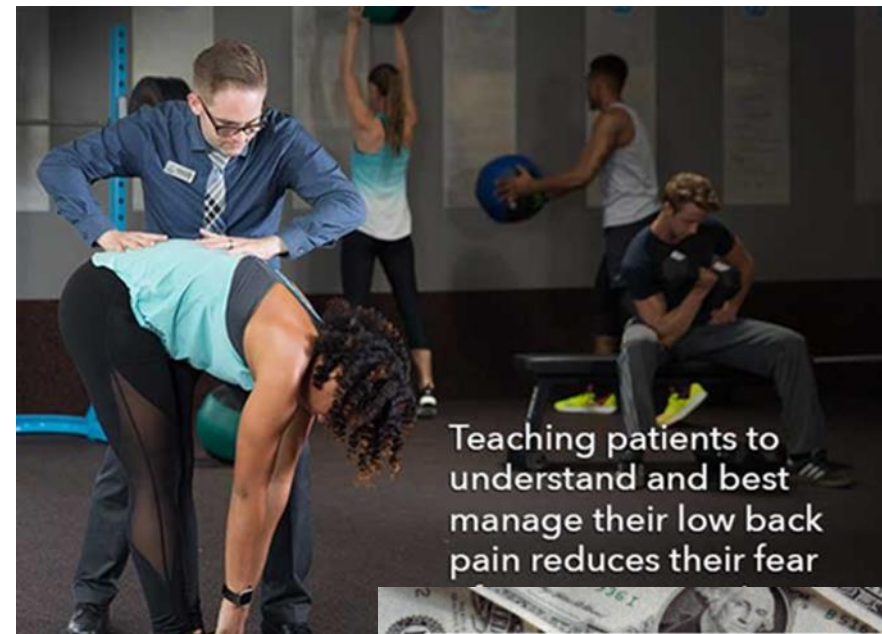




Patient Education

They want to know...

- What is wrong with me?
- How long will it take?
- What can I (the patient) do for it?
- What can you (the clinician) do for it?
- How much will it cost?



If you hurt your low back, **starting PT within the first 14 days can save you (on average) \$2,700.**

Physical therapy = cost savings.



Exercise Prescription

Acute Low Back Pain:

Research has not supported the use of typical strengthening exercise in this population.⁵

However, low level mobility activities that do not provoke symptoms are likely of value for pain modulation, maintaining post-manipulative segmental mobility and decrease fear responses.



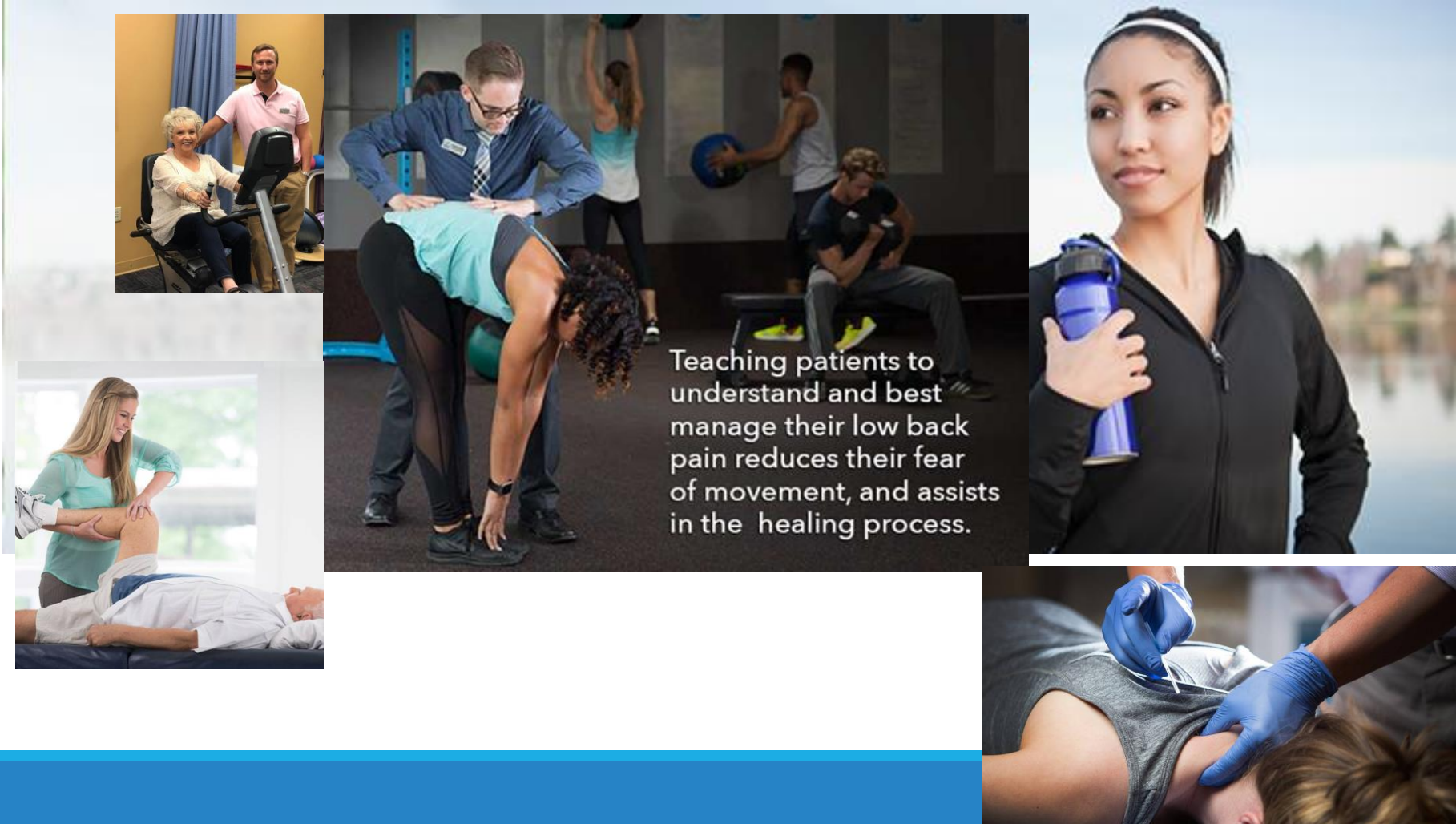
Exercise Prescription cont.

Exercise progression suggestion:

- Consider always starting with “self-correct” exercises that appear to drop down facilitation. An extensive amount of literature supports that changes in acute low back pain warrant initiation of low level stabilization exercises in this population.^{212,213}
- Both the multifidus and transversus abdominis (TA) are the first muscles to become active before a limb is moved or with subtle changes in posture (feedforward contraction) and are thought to be the prime stabilizing muscles of the lumbar spine and pelvis.^{214,215}
- Studies in acute and chronic LBP have found atrophy and delayed firing patterns in both muscle groups that were both amenable with rehabilitation vs. control.^{216,217}
- Although multifidus and TA are both critically important, nervous system control of the other associated musculature with changes in movement (perturbation) are just as vital for stabilization of the lumbopelvic complex.



Questions



Teaching patients to understand and best manage their low back pain reduces their fear of movement, and assists in the healing process.



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