

## **Lumbar Spine: Movement Dysfunction: Recognize, Correct, Heal**

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A few facts about back pain:

1. According to the WHO: The lifetime **prevalence** of non-specific (common) low **back pain** is estimated at 60% to 70% in industrialized countries.
2. MRI findings do not always correlate to clinical findings in fact research has shown that MRIs do not improve the outcomes for the majority of patients.
3. We don't treat the diagnosis we address the impairments and clinical findings of each client.

As movement specialists, therapists are uniquely qualified to **recognize** movement impairments in our clients. Human movement is multi-segmental and takes place along the path of least resistance, with the greatest degree of motion occurring at the most flexible segment. Just watch your client, with limited hip extension mobility, try to take a long stride. What do you see? Most often you see the lumbar spine move into extension (the more flexible segment) to compensate for the lack of movement at the hip. This increased movement in the lumbar spine can lead to pain. There are 5 common movement impairment syndromes seen in individuals with lower back pain. (table 1)

Movement dysfunction **correction** is based on balancing key muscles and eliminating the alignment stress or movement into the symptom producing direction. With our hip extension limitation example, the treatment strategy should include techniques to improve hip extension mobility, pelvic stability control exercises to counteract the anterior rotation force on the pelvis and proprioceptive training for mindfulness in everyday activities contributing to the dysfunction.

**To begin we must start grounded when working in the water.**

Get in the water and movement will improve, right? When submerged the human body must learn to control rotational forces and upward thrust of buoyancy, overcome drag forces and orient to a different set of proprioceptive input. Additionally, after illness, injury, or disuse the body must re-learn sequencing, scaling and activation of muscles in order to achieve ideal movement patterns. The first step in this process, is to be anchored with a stable base from which to move.

The number one warm up exercise performed in the pool is walking. Falling through the water is a more accurate term when the client does not start with a stable base and sense of grounding. To gain benefits and carryover to land, walking in the water must be performed with ears, shoulders and hips aligned. Propulsion through the water relies on gluteus activation

for hip extension during mid to terminal stance and stability to maintain balance during single limb support. Rushing, falling though the water is the common mistake made.

How to facilitate stability and connection with the pool floor...

1. Verbal cues:
  - “Feel your feet, where are you putting your weight?”
  - “Your weight should be equal side to side and front to back, with pressure across the ball of your and heel of the foot. Your arch slightly lifted”. Follow this with weight shifting in all directions to integrate sensation with return to ideal position.
2. Start with deep core muscle activation and rhythmic stabilization.
  - The therapist’s hands are great tools. Having the client standing in various stances positions (parallel, staggered, tandem, narrow, single leg etc.) the therapist using their hands at the pelvis first then moving to the shoulders, applies gentle to moderate pressure laterally, cuing the client to “match the resistance maintaining their position”. Alternating from right to left with gradual build up of resistance and slow release. Progress to pressing one hand in front and one in the back of the pelvis or shoulders, attempting to rotate the client, again with isometric muscle activation as the goal. Avoid breath holding or excessive pressure leading to incorrect muscle participation.
3. Slow movements down.
  - Moving slowly requires greater stability of deep stabilizing muscles and promotes balance.
4. Utilize the heavy concept.
  - Promoting proximal muscle activation without added external resistance.
5. Add tubing, manual or drag force resistance.
  - Increase the challenge as client develops stability and quality movement. Continue to correct compensations that may return with increased resistance.

Increase the effectiveness of your aquatic program by taking a few moments at the beginning of each session or new exercise to get your patient grounded. Exercise prescription will then follow correcting the impairments based on each individual’s impairments.

Table 1.

Syndrome	Treatment Focus	Aquatic Exercise Recommendations
Rotation-Extension	Exercise focus: Control spine from excessive extension, strengthening abdominals against pull from hip flexors, TFL and lats, stretching hip flexor/ increasing hip extension ROM and thoracic spine mobility without compensatory LS extension, strengthen posterior glut medius,	<p><b>Stretch and release:</b> hip flexors, TFL, quadriceps, paraspinals, QL, thoracic spine mobility exercise</p> <p><b>AquaStretch/ Manual therapy:</b> ITB release, hip vice, hip sway and roll, QL, cops</p> <p><b>Exercise Ideas:</b></p>

	external obliques and TrA and learn to control lumbo-pelvic rotation.	Abdominal strengthening: Pelvic tilt and hip roll on wall, wall posture with pelvic tilt and UE movements (bilateral at first then progress to unilateral and PNF to improve rotational stability). Plank and side plank and suspended prone progressions with control with focus on maintaining pelvic alignment. External oblique: rotational exercises and rotational control exercises and rib cage control with exercise Posterior glut Medius: hip abduction with extension exercises with control of pelvis in all 3 planes.
Extension	Exercise focus: Control spine from excessive extension, strengthening abdominals against pull from hip flexors and lats, stretching hip flexor/ increasing hip extension ROM and thoracic spine mobility without compensatory LS extension, strengthen external obliques, glut max and TrA. Decrease hip flexor dominance and improve abdominal activation.	<b>Stretch and release:</b> hip flexors, TFL, quadriceps, QL, thoracic spine mobility exercise <b>AquaStretch/ Manual therapy:</b> ITB release, hip vice <b>Exercise Ideas:</b> Abdominal strengthening: Pelvic tilt and hip roll on wall, wall posture with pelvic tilt and UE movements Plank and suspended prone with focus on maintaining pelvic alignment. External oblique: rib cage control with exercise. Glut max strengthening: hip extension without lumbar extension: glut press on wall, noodle LE press downs, squats and lunges progress to tubing resistance
Rotation	Exercise focus: dissociation of hip motions from LS in all directions and planes, strengthen external oblique, internal oblique and stretch TFL, hip abductors and possible paraspinals. Improve thoracic spine mobility. Trunk stabilization with rotation control.	<b>Stretch and release:</b> TFL, hip abductors, QL, thoracic spine mobility exercise <b>AquaStretch/ Manual therapy:</b> ITB release, hip vice (figure 8), hip rock (one leg at a time to focus on paraspinal tightness), sway and roll, QL, cops <b>Exercise Ideas:</b> Abdominal strengthening in neutral UE movements (bilateral at first then progress to unilateral and PNF to improve rotational stability). Plank and side plank progressions with control with focus on maintaining pelvic alignment. External oblique:

		<p>rotational exercises and rotational control exercises and rib cage control with exercise Posterior glut Medius: hip abduction with extension exercises with control of pelvis in all 3 planes.</p>
Rotation-Flexion	<p>Exercise focus: Abdominal control in pelvic neutral/ avoiding flexion activities. Stretch hamstrings, rectus abdominus, TFL. Improve hip flexion and rotation mobility without going into lumbar spine, strength abdominals to control lumbo-pelvic rotation and lumbar extensors</p>	<p><b>Stretch and release:</b> hamstrings, rectus abdominus, TFL, QL, thoracic spine mobility exercise. Isolated Hip flexion ROM stretching.</p> <p><b>AquaStretch/ Manual therapy:</b> ITB release (focus on posterior aspect) hip sway and roll, QL, cops</p> <p><b>Exercise Ideas:</b>  Abdominal strengthening: Pelvis in neutral UE movements (bilateral at first then progress to unilateral and PNF to improve rotational stability). Plank, prone suspended and side plank progressions with control with focus on maintaining pelvic alignment. External oblique: rotational exercises and rotational control exercises and rib cage control with exercise Posterior glut Medius: hip abduction with extension exercises with control of pelvis in all 3 planes. LE noodle press down with focus on hip flexion ROM and dissociation of pelvis during lift.</p>
Flexion	<p>Exercise Focus: Abdominal control in pelvic neutral/ avoiding flexion activities. Stretching hamstrings, strengthening lumbar extensors. Increasing hip mobility especially into flexion without going into lumbar spine.</p>	<p><b>Stretch and release:</b> hamstrings, rectus abdominus, Isolated Hip flexion ROM stretching.</p> <p><b>AquaStretch/ Manual therapy:</b> ITB release (focus on posterior aspect), one leg stand foot grip with traction, lean forward</p> <p><b>Exercise ideas:</b>  Abdominal strengthening: Pelvis in neutral UE movements (bilateral). Plank and side plank progressions with control with focus on maintaining pelvic alignment. Walking backward various arm positions and isometric holds (I, T, W) LE noodle press down with focus on hip flexion ROM and dissociation of pelvis during lift. Knee to chest to</p>

		walking knee to chest hug. Squats and suspended squats focus on hip flexion ROM and dissociation of pelvis during lift.
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