Lumbar Spondylolysis and Spondylolisthesis Protocol

Initial Evaluation	Evaluate
Hx: Spondylolysis – rest and protect ➢ Is it Acute traumatic vs repetitive stress spondylolysis due to hyperextension? o Can be unilateral or bilateral occurring L5 vertebrae between 85-95% of the time; L4 5-15% of the time. ➢ Most are unable to identify any particular traumatic incident ➢ Twice as common in male verse females ➢ Genetic predisposition- seen within families (1st degree relatives) Is Spondylolisthesis present? ➢ Is it from spondylolysis or degenerative spondylolisthesis? o Degenerative slippage seen at L4 o Rarely seen under age 40 o Progression of spondylolisthesis after age of 20 is much less common compared to progression during childhood and adolescence. ➢ Degree of anterolisthesis present may be of minimal clinical importance, degree of LBP experienced has good correlation with the degree of instability ➢ Prominent instability with minimal anterolisthesis is more problematic then stable segments with prominent anterolisthesis. Imaging ➢ Xrays, flexion/extension, oblique o CT/MRI ➢ Instability with segment? Pain: Chief Complaint LBP seen in 47% of adolescents who have spondylosis and 5% adults. Location: Low back pain with radiculopathy (leg pain); pain down one or both legs especially with extension positions; Gluteals and posterior aspect thighs ➢ Spondylosis: Asymptomatic in majority of people. o Active and inactive lesions: can be incidental finding ➢ Back pain in child/adolescence raise suspicion newly developed or impending spondylolysis	➢ Phase 2 static stability +1-4 weeks ➢ Review HEP o Pain management o Neutral spine with daily activities o Core bracing techniques ➢ If patient wasn't braced initially are they a candidate for bracing? o If rest and activity modification wasn't successful for pain management ➢ Re-assess neuro system o Better /worse/same? ➢ Joint mobility o Above and below site (hip and thoracic spine) ➢ Soft tissue restrictions locally or regionally due to potential compensation ➢ Range of motion o Full UE and LE range of motion w/ neutral spine

○ Especially athletes 15-47% of the population in sporting activities that involve hyperextension and rotation such as gymnastics, diving, wrestling, dancing, throwing sports, soccer and baseball. ➢ Adults: look for concurrent instability with spondylolysis ➢ Low back pain usually worse with extension; most common symptom ○ Aggravated with lifting or walking ○ Relieved with sitting Posture: ➢ Child/adolescents: visual inspection may reveal hyperlordosis ➢ Adult: Focal kyphosis at lumbosacral junction with exaggerated lumbar lordosis Palpation: ➢ Paraspinals muscle spasm ➢ Tender to palpation spinous process Flexibility: ➢ Contracture/tight hamstrings ➢ Tight hip flexors Gait: ➢ Flexed hips and knees ➢ Stiff legged, short stride, pelvic waddle ROM: ➢ Limited/restricted active and passive motion Neuro: more seen in spondylolisthesis ➢ Lumbar radiculopathy (irritation, stretching, compression of the nerve root foramen): leg Numbness, tingling, weakness. ○ Assess dermatomes, myotomes, reflexes ○ Central canal stenosis – neurogenic claudication ○ cauda equina (higher grades spondylolisthesis) • bowel and bladder changes ➢ neural tension ○ Special tests: ➢ Step off deformity (high grade spondylolisthesis) ➢ Limited SLR ➢ Pain with one legged standing lumbar extension test	
Patient Education	**Patient Education**
➢ HEP ➢ Log rolling	➢ HEP ➢ Avoiding hyperextension

➢ Abdominal bracing ➢ Activity modifications/restrictions: avoiding hyperextension and rotation o Rest 8-12 weeks – acute spondylolysis ➢ Lifting techniques ➢ If in sports no sports	➢ Good lifting mechanics
Therapeutic Exercise*	**Therapeutic Exercise***
Phase 1: rest and/or protect; first ~8-12 weeks for acute spondylolysis/spondylolisthesis, week 0 degenerative spondylolisthesis ➢ General exercise o light stationary biking, TM walking with incline, Nustep ➢ Strengthening deep abdominal muscles and back muscles (transverse abdominis and multifidi) o abdominal bracing (multiple positions)- be sure not over recruit w/ superficial abdominal muscles ➢ Stretching in neutral positions (supine 90/90 active knee extension hamstring stretch, piriformis stretch, sidelying quad/hip flexor stretch) o avoid hip flexor based strengthening ➢ Pain control o Nsaids o Analgesics o Injections-after 4-6 weeks if other conservative measures fail ➢ Bracing o Usually not needed for most people, no clinical significant differences seen with wearing o Can be used to decrease lumbar lordosis and manage pain if 2-4 weeks of rest/activity modification alone don't reduce pain. o Worn 23 hours/day for 6 months ➢ Modalities o Low intensity pulsed ultrasound (LIPUS) ➢ Early studies thus far have been promising for increasing healing times frames especially with progressive stage fractures. ➢ Heat/ice ➢ TENS	**Phase 2:** static stabilization weeks +1-4 ➢ general exercise: o light to moderate stationary biking; deep water jogging with floats ➢ bridges, sidelying hip abd, clamshells, side plank, UE/LE movements with abdominal bracing start supine/sitting and progress to standing exercises (hip abd, hip extension, marching, pull downs, rows) ➢ Progression criteria: pain free static exercises, pain free lumbar flexion or lateral flexion, maintain neutral spine with LE/UE movements.
Manual Techniques	**Manual Techniques**
➢ Stretching hip flexors/hamstring (keep hip mobility intact) ➢ Dry needling pain relief ➢ Thoracic manipulation for pain relief ➢ Gentle STM to paraspinals/other tender areas based on palpation ➢ Segmental traction for pain relief	➢ Continue stretching PRN ➢ STM any muscular restrictions/pain ➢ Joint mobilization grd 1-2 for pain alleviation thoracic spine; manipulation for global pain modulation and neuromuscaular facilitation ➢ Dry needling pain relief
Goals	**Goals**

➢ Independent with pain management strategies ○ pain free daily activities ➢ Independent with HEP (general exercise, core bracing, neutral spine, gradually increase flexibility upper and lower extremities) ➢ Understanding importance of activity restriction/modifications- avoiding hyperextension	➢ Maintain pain free (nearly) range, pain free daily activities, increase core strength, normal hip and thoracic mobility, progress flexibility and lumbar stabilization to WB postures, improve proprioception.
* Exercises within each category are to provide the clinician with examples based on evidence based research, but are not all inclusive	

Evaluate	**Evaluate**
Phase 3: dynamic stabilization; +4-6 ➢ Is patient progressing as expected? ➢ ROM spine o Progressing towards full range, no restrictions ➢ Joint mobility o Progressing towards normal mobility globally ➢ Soft tissue o Decreased protective tone, restore normal tension ➢ Neuro screening – WNL o If persistent neuro- referral out? Is Non-union/instability present? Precautions: avoid prolonged pain with initiation lumbar extension AROM Progression criteria: no increase in pain with lumbar range of motion.	**Phase 4:** coordination, athletic development; +6-8 ➢ ROM: spine/UE/Le should be WNL ➢ Joint mobility- WNL ➢ Soft tissue- no restrictions ➢ Neuro - WNL Progression criteria: pain free with all motions **Phase 5**: return to sport +3-6 months Precautions: may need to be cautious with returning to Olympic lifting (power lifting)
Patient Education	**Patient Education**
➢ Pain management with increased lumbar range of motion	➢ Importance of good mechanics with high level activities
Therapeutic Exercise*	**Therapeutic Exercise***
➢ General exercise: mod intensity stationary biking or elliptical machine, shallow water (chest deep water) ➢ Suggested exercises: single leg brides, plank, squats/hip hinge, upper body lifting w/ spine neutral, lunges, oblique rotations starting in HL/supine, OH reaching.	➢ Phase 4: Suggested exercises: chopping/lifting patterns (diagonals), body weight suspension exercises TRX, progression impact loading (sport specific), gradual exposure to sport specific activities/drills ➢ Phase 5: Suggested exercises: squats with medicine ball throw/rotations, single leg DL with weight, front squat, lunges with twist, hip sleds, plyometrics, abdominal workouts, sports specific exercises.
Manual Techniques	**Manual Techniques**
➢ Joint mobilizations/manipulation pain relief, mobility, neuromuscular facilitation ➢ Dry needling pain/neuromuscular facilitation ➢ STM ➢ Stretching PRN	➢ Joint mobilization grade 3-4 – mobility ➢ Dry needling ➢ STM ➢ Stretching PRN
Goals	**Goals**
➢ normal joint mobility in thoracic spine and hip, resume lumbar extension NWB, maintain flexibility, and continue increasing strength and coordination.	➢ Phase 4: maintain strength and flexibility, lumbar extension in WB, impact loading ➢ Phase 5 Goals: full participation in sports
* Exercises within each category are to provide the clinician with examples based on evidence based research, but are not all inclusive	

Special Considerations
➢ Conservative management: depends on the grade, high success for early and progressive spondylosis, and impact on daily life o Can take 3-6 months to heal majority of unilateral fractures and 50% bilateral ➢ Surgery o Symptoms persistent > 6months o neurological complications (persistent) o Segmental Instability o Progression slippage grade III or higher

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