Rehabilitation Guidelines for Conservative Management of Spondylolysis/Spondylolisthesis in the Young Athlete

These guidelines are intended to guide clinicians through the conservative course for spondylosis/spondylolisthesis. This protocol is time based (dependent on tissue healing) as well as criterion based. Specific intervention should be based on the needs of the individual and should consider exam findings and clinical decision making. The timeframes for expected outcomes contained within this guideline may vary based on physician preference, additional procedures performed, and/or complications. If a clinician requires assistance in the progression of a patient, they should consult with the referring provider.

The interventions included within this protocol are not intended to be an inclusive list of exercises. Therapeutic interventions should be included and modified based on the progress of the patient and under the discretion of the clinician.

Considerations for the pars interarticularis stress fracture
Many different factors influence the spondylolysis/spondylolisthesis rehabilitation outcomes, including the grade of the defect/stress fracture. It is recommended that the clinician collaborates closely with the referring physician regarding progression through the phases of the program.

PHASE I: ACTIVE REST (0-6 WEEKS), 2-4 PT visits

Rehabilitation Goals	• Protect injured joint • Control pain/inflammation • Participate safely in activities of daily living • Address mobility/flexibility limitations • Promote hip and core muscle strength and stability • Maintain cardiovascular conditioning
Bracing/ Precautions	• Cessation of athletic activity is recommended for at least 3 months • Bracing may be recommended by physician to limit extension and rotation • Precautions: avoid lumbar extension

Intervention	*Education*
	• Patient education: posture, body mechanics, activity modification, bracing
	
	Pain Management
	• Modalities: heat/ice
	
	Mobility/Flexibility
	• Manual therapy
	  ○ Soft tissue mobilization: paraspinals, quadratus lumborum, gluteals, piriformis
	  ○ Hip/thoracic spine joint mobilizations
	• Thoracic spine
	  ○ Side-lying thoracic rotation with hips/knees at 90-90
	  ○ Supine thoracic extension with towel roll/foam roller
	  ○ Quadruped/modified plantigrade thoracic flexion/extension in neutral lumbar spine
	• Upper and lower extremity
	  ○ Standing stride doorway pectoral stretching
	  ○ Supine hip flexor stretching
	  ○ Supine hamstring stretching
	  ○ Supine piriformis stretching

	Stability/Strength
	• Local core muscle control (TA/MF) in low load, spine-supported positions
	  ○ Hook-lying isometric TA contraction
	  ○ Hook-lying isometric TA contraction with march
	  ○ Hook-lying isometric TA contraction with heel slides
	  ○ Hook-lying isometric TA contraction with alternate UE elevation
	  ○ Side-lying isometric multifidus contraction
	• Hip strengthening
	  ○ Hook-lying gluteal sets
	  ○ Side-lying clam shell
	  ○ Hooklying bridging progression with TA engaged/ neutral spine)
	
	Cardio
	• Walking on treadmill
	• Stationary bicycle
	• Nu-Step machine

Criteria to Progress	• Pain/inflammation controlled • Full lumbar ROM (except extension)

PHASE II: EARLY STRENGTHENING (6-9 WEEKS), 4-6 PT visits

Rehabilitation Goals	• Monitor pain/inflammation • Address mobility/flexibility limitations • Improve trunk and hip muscle strength and endurance • Progress cardiovascular endurance
Bracing/ Precautions	• Cessation of athletic activity is recommended for at least 3 months • Bracing may be discontinued if no pain with ADL

Additional Interventions *Continue with Phase I Interventions*	*Stability/Strength*
	• Neutral trunk stabilization
	  ○ Front plank stabilization
	  ○ Side plank stabilization
	  ○ Supine dead bug
	  ○ Hook-lying curl up
	  ○ Hooklying bridging progression with TA engaged/ neutral spine)
	  ○ Quadruped bird dog with variations
	• Hip strengthening
	  ○ Side-lying gluteus medius strengthening
	  ○ Prone hip extensor strengthening
	• Closed chain strengthening
	  ○ Standing side-step band walk
	  ○ Standing isometric squat with band proximal to knee
	  ○ Standing hip external rotation
	
	Cardio
	• Progress treadmill walking: time/speed
	• Progress stationary bicycle: cadence/resistance
	• Elliptical machine

Criteria to Progress	• Full spinal ROM
	  ○ Pain-free repeated lumbar flexion/extension x 10 reps without aberrant motion
	• No pain without brace for all activities, except sport
	• Normal multifidus (MT) contraction
	  ○ Prone MT lift test
	• Transverse abdominis (TA) activation is good without compensatory strategies
	  ○ Prone pressure biofeedback test >10 seconds with 4 mm Hg drop

PHASE III: ADVANCED STRENGTHENING (9-12 WEEKS), 4-6 PT visits

Rehabilitation Goals	• Address mobility/flexibility limitations • Progress trunk and lower quarter strength and endurance • Demonstrate lumbopelvic control with closed chain movement patterns • Progress cardiovascular endurance
Bracing/ Precautions	• Cessation of athletic activity is recommended for at least 3 months • Bracing may be discontinued if no pain with ADL
Additional Interventions *Continue with Phase I/II Interventions*	*Stability/Strength* • Anti-rotation trunk exercises • Supine curl up • Standing squat progression • Standing dead lift progression • Standing overhead press • Standing pull downs • Standing chest press • Standing loaded carry *Neuromuscular re-education* • Proprioceptive training on dynamic surfaces • Spiral line chopping/lifting PNF diagonals • Begin plyometric exercise program *Cardio* • Begin return to run program

Criteria to Progress	• Full uncompensated trunk active ROM in all planes
	• Pain-free end range of all lumbar motions
	• Good local/global muscle performance
	  ○ Prone DL raise >30 seconds
	  ○ Supine DL lowering <70 degrees
	• No pain with initial phases of return to running program
	• Minimal to no pain or difficulty with integrated movements with load
	• 0% score on Micheli Functional Scale, Parts B and C

PHASE IV: RETURN TO SPORT (12 WEEKS+)

Rehabilitation Goals	• Maximize sport specific strength, endurance, and motor control, increasing intensity, volume, speed • Demonstrate lumbopelvic control with dynamic sports-specific activities • Establish proper training routine and independent management plan
Additional Interventions *Continue with Phase I/II/III Interventions*	• Progress plyometric exercise program • Progress return to run program • Medicine ball toss progression • Reactive and perturbation training with dual task challenges *Education* • Monitor graded return to sport practice and competition • Patient/family/coach communication and education
Criteria to Discharge	• Proper mechanics during sports specific movement with full volume/intensity • Compete at pre-injury performance level without pain • 0% score on Micheli Functional Scale

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Contact	Please email MGHSportsPhysicalTherapy@partners.org with questions specific to this protocol

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