Lumbar Spondylolysis/-listhesis Rehab Protocol

A diagnosis of lumbar spondylolysis is defined as the presence of a fracture, typically located at the pars interarticularis region of the vertebra. This diagnosis is typically found in the lumbar spine, but may also be located in the cervical spine depending on the patient's presentation. A spondylolisthesis occurs when the vertebra is displaced ("slipped"), typically in the anterior direction, leading to increased instability at the affected vertebral levels. Depending on the severity of the displacement, surgery may be required for these patients.

This injury is most commonly found in adolescent athletes and may be due to a variety of factors (overtraining/overuse, poor form with exercise, etc.) It is key that the patient follows an appropriate physical therapy/rehabilitative protocol to ensure proper recovery and return to sport/function.

The goal of the rehabilitative protocol is to improve the overall strength of the core and lower extremity musculature, improve flexibility, improve ROM and overall stability of the lumbar spine, and returning to full capacity with sports/functional activities. Initially, the focus is on flexion-based activities and limiting hyperextension of the spine which will affect the healing process.

Target patient population: Athletes recovering from spondylolysis/-listhesis surgery or with non-operative spondyloysis injury.

Rest 6 weeks following surgery

- PT to initiate at 6 weeks post-op
- Non-operative patients may initiate immediately
- Key with all exercises is correct performance/posture/form with exercises
- Main focus: early avoidance of extension-based and rotation-based activities

If there are issues with the progression of the patient through the protocol, please consult with the referring MD, as well as communicating with the physical therapist/ athletic trainer involved in the patient's recovery.

6-8 weeks

- Supine/plinth exercises: Double knee to chest (DKC)/Single knee to chest (SKC), Transverse abdominals/abdominal bracing, Posterior pelvic tilt (PPT) in hook lying position, Glut sets in prone with pillow free, Hip abduction/ adduction isometric
- Flexibility: Seated/supine hamstring stretch; ½ kneeling psoas stretch
- Bike (upright/recumbent)
- Postural re-education- sitting, standing, sleeping posture.
    - Sitting-lumbar support (pillow roll/towel) in extended sitting periods
    - Sleeping- hook lying with pillow under knees for support; side lying at 90/90 hip flexion/knee flexion with pillow between legs for neutral spine
- Manual interventions: Thoracic mobilizations as needed, soft tissue mobilization/myofascial release to lumbar musculature (paraspinals-ilicostalis, longissimus, spinalis, quadratus lumborum, and piriformis.

Week 7: Goal-progress to standing activities as tolerated by patient

- Continue with supine training with exercises above
    - Progress bridge with addition of hip adduction (ball squeeze) and hip abduction (light theraband resistance)
    - Initiate light-resistance clamshells
    - Pain-free LE strengthening (SLR-flexion, abduction, adduction; LAQ
    - Initiate quadruped activities: alternating UE vs LE, cat/camel (pain free; cautions with extension motion)
    - Prone activities: hip extension for multifidus strengthening (cueing required for correct/appropriate performance; key is pain-free)
- Standing activities
    - Double-leg balance/proprioception for training (wobble board)
    - Squats- key is appropriate form; may utilize wall for postural cueing

- Forward lung
- Seated/supine leg press-light weight

- Address any additional LE limitations (knee/ankle)

8-10 weeks

- Continue and progress table activities: TA/PPT with hip adduction; addition of marching with bridge, progress bridges with unstable surfaces (Bosu, physio-ball/swiss-ball)
- Continue/progress quadruped activities-alternating UE/LE (combined motion)
- Continue with flexibility activities-hamstring, psoas, initiate prone quadriceps stretch with lumbar support (pillow)
- Progress standing activities
    - Addition of ball toss to double-leg balance, initiate single-leg balance activities
    - Standing/resisted hip abduction (monster walk), Squats progress to unstable surfaces (foam/wobble board/ Bosu)
    - Progress condition program-may initiate elliptical if not adverse response by patient **(week 9)**
    - **Week 9**
        - Initiate lateral planks on stable surfaces
        - Forward/lateral lunges; may progress to unstable surfaces (foam/ Bosu) as tolerated by patient
        - Initiate light rotation exercises: chop/lift with theraband resistance seated on swiss-ball; Limited/pain free lower trunk rotation
    - Continue with appropriate manual interventions; initiate manual resistance activities (hip abduction, knee extension); may find soft tissue restrictions in hamstrings, ITB iliopsoas (myofasical release)
    - Continue with appropriate LE strengthening-abduction/adduction, ER/IR

10-12 weeks

- Continue with simple core activities as needed for re-education/re-training maintain flexion-based exercises (knee to chest)
- Advance LE strengthening- hip/knee/ ankle strength and stabilization
- Advance core standing/dynamic activities
    - Forward/Lateral/Diagonal Lunges with rotation; utilize unstable surfaces
    - Hamstring curl+ bridge using Swiss ball/Physio ball: with/without hip abduction
    - Advanced balance/proprioceptive training-SLB on Bosu, Lateral vectors (theraband resistance) above knee with SLB to improve hip/core activation
    - Progression of lateral plank with manual perturbations/unstable surface
    - May initiate standard plan with tactile cueing to maintain appropriate position-**KEY** must avoid moving into extension (pike position)
    - Initiate light plyometric activities (bounding, light jumping-box jumps)
- Initiate straight=-plane running **(week 11-12)** if no subjective complaints
    - If access available and cleared by MD, may initiate pool running/Alter G treadmill at earlier time
- Continue with manual interventions as needed to maintain appropriate mobility, muscle tone
- Continue with flexibility as required-Lumbar spine (double/single knee to chest), hamstrings, iliopsoas, ITB.

12-16 weeks

- Continue with core strengthening , flexibility as patient begins progression to functional-based activities (standing/sport-specific)
    - Goal is training patient to maintain core stabilization (abdominal bracing) during activities to return to sport
    - Continue with all above-listed exercise

    - Continue with manual interventions as required
    - Initiate and advance return to sport training if cleared by MD
    - Sprint training
    - Sport-specific activities (i.e. Baseball, Basketball, Football, Golf, Tennis, Track/Field
        - Initiate interval programs if needed
            - Hitting, running, throwing
        - Begin return to contact activities
- Educate patient/coaching staff/athletic trainer on importance of continuing HEP to maintain lumbar stabilization, as well as preventing re-injury
    - Provide supplemental exercises for team to avoid loaded back extension (i.e. standard squat)
        - Front squats, sumo squats, Romanian dead lift