Advanced Orthopedics and Sports Medicine
Post operative Spine Rehab-Artificial Disc Protocol
Treatment Guideline

Precautions

- Avoid Extension for 6 weeks (treat like Spondylolisthesis with flexion bias)
- Avoid Rotation for 6 weeks post-op
- Avoid active sports for 3 months post op (No contact sports)
- Avoid exercise that increases Sciatic type pain

Phase I: Immediate post Surgical Phase (IPSP) 0-6 weeks

Goals:

1. Decrease pain and inflammation.
2. Increase activity tolerance.
3. Encourage wound healing.
4. Increase aerobic tolerance (independent with home program 20 min tolerance to exercise).
5. Monitor for signs of possible infection.
6. Educate on body mechanics and posture for bed mobility

Precautions:

1. Prevent excessive initial mobility or stress on tissues
2. Avoid lifting, twisting of the lumbar spine for 6 weeks
3. Avoid rotation and extension for 6 weeks

Treatment Summary:

1. Education on bed mobility and transfers with proper spine positioning.
2. Reinforce basic post-op home exercise program including
    a. Ankle pumps
    b. Long arc and short arc quadriceps
    c. Diaphragmatic breathing
    d. Relaxation exercises
    e. Abdominal isometric exercises
3. Increase tolerance to walking to ½ mile daily (15-30 min cardiovascular activity)
4. Reinforce sitting, standing and ADL modifications with neutral spine and proper body mechanics.

Criteria for progression:

1. Pain and swelling within tolerance.
2. Independent HEP
3. Tolerance of 15 min of exercise and 15-30 min of cardiovascular exercise.
4. Functional ADL for self care/hygiene
5. Symptoms decrease by 50%.

Phase II: Initiation of OP-PT 6-9 weeks/2-3 times per week

Goals:

1. Patient education/Back school
2. Reestablish neuromuscular recruitment of the multifidus (Functional dynamic lumbar stability)
3. Normalization of flexibility deficits in extremities
4. Normalization of any gait deviations
5. Return to activities of daily living
6. Improve positional tolerances for return to work

Precautions:

1. Avoid lumbar loading
2. Avoid twisting and bending of the lumbar spine.
3. Limit lumbar extension

Treatment Summary:

- Back Education Program

- Anatomy, Pathology, & Biomechanics
- Reinforce neutral spine positioning
- Body mechanics and training: Performance of functional activities with neutral spine and protective positions

➢ Manual Therapy:
- Grade 1 or grade 2 joint mobs for neuro-modulation of pain
- Scar tissue mobilization. Educate patient on self mobilization of scar.
- Soft tissue mobilization of soft tissue restrictions.

➢ Exercises:
- Train Neutral lumbar position: Create independent movement of the pelvis and then find and maintain a neutral position of the lumbar spine.
- Diaphragmatic breathing: Proper breathing technique without the use of accessory respiratory muscles
- Neural mobilization exercises. Do not reproduce symptoms
- Pelvic stabilization exercises with emphasis on transverse abdominals and multifidus:
    - Neuromuscular control of lumbar spine in a neutral position (abdominal drawing in maneuver-ADIM).
    - Monitor with palpation or pressure biofeedback. Prone (start at 70 mm Hg and successful contraction is 6-10 mm HG decrease in pressure and hold for 10 sec), supine maintain 40 mm Hg with ADIM. Watch for inability to develop tension in multifidus or compensation with erector spinae (rapid development of tension)
    - Co-contraction of multifidus with transverse abdominals.
    - Wk 6-7: ADIM maneuver performed with gentle arm and leg exercises (back supported): Supine heel slides, supine marches, Supine hip abduction slides, Hip horizontal abduction, heel slides, leg slides from crook lying postures, clam shells
    - Wk 8-9 progress to rotatory stability of the spine, lumbopelvic control during movements and aggravating movements: Sitting on unstable base of support exercises, co-contractions during normal speed walking and other activities. Isometric co-contractions with addition of heavier external loads to lumbar spine Bridging, dead bud (cycling from supine position), leg extensions in Quadruped.
- Unloaded Pelvic and Lumbar ROM (supported): Pelvic rocks, Wig wags, Pelvic clocks. All performed in neutral and protective positions. Flexion based program including single and double knee to chest, seated or standing marches.
- Hip and knee flexibility exercises: Decreases stress on lumbar spine and makes it easier to maintain neutral spine. (hamstrings, piriformis, gluteal, quads, hip flexors, gastroc, soleus etc)
- Closed Chain exercises including wall slides, wall press (supine), squat machine
- Initiate acquatics (if available and indicated)
- Cardiovascular training, treadmill, UBE, stationary bike (patient must have good pelvic control)
- Initiate balance exercises (week 10-12)
- Address other mechanical restrictions as needed
- Modalities for symptom modulation if needed

Criteria for progression:

1. Patient has working knowledge of body and lifting mechanics.
2. Able to hold co-contraction of multifidus/transverse abdominals for 60 sec
3. Cardiovascular tolerance to 30 min/day
4. Dynamic sitting and standing tolerance of 15-60 min

Phase III: Advanced PT 9-12 weeks/2-3 times per week.

Goals:

1. Progress with strengthening and flexibility exercises.
2. Initiate lifting and posture training

3. Progress stabilization and trunk control
4. Progress to pre-morbid activity

Treatment Summary:

- Manual Therapy:
  - Joint mobilization of adjacent restrictions of thoracic spine, hip/pelvis.
  - Soft tissue mobilization of soft tissue restrictions.
- Exercises:
  - Continue with ROM exercises for lumbar spine including cat/camel, seated and standing active rotation.
  - Advanced balance exercises
  - Neural mobilization exercises.
  - Advanced stabilization and proprioceptive training, Multi-plane stabilization/mobility
    - Wk 9-10: Increasing complexity and load of exercises maintaining lumbar spine stability:, bridging on unsteady surfaces, alternate arm an leg extensions in quadruped, prone on ball leg and arm extensions (quadruped), functional co-contractions during walking increasing speed) and other activities (kneeling, squatting, stairs etc)
    - Wk 10-12: Co-ordination exercises: High level stabilization exercises on the exercise ball, changing speeds of walking, side bridges, extension rolls, crunches, Single leg bridging Activity specific training
    - Advanced cardiovascular training
  - Advanced Hip/Core strengthening exercises: Functional exercises like chops/diagonal lifts, squatting, lunging
  - Lifting training with proper posture. (floor to waist and waist to shoulder level)
  - Body mechanics drills
  - FCE if appropriate

Criteria for discharge:

1. Manual muscle testing is within functional limits
2. Independent with gym program
3. Trunk ROM within functional limits
4. Symptoms decrease by 75%.
5. Postural tolerance to 60 min

Pearls of rehab:

- Focus on local muscle systems (tonic/postural/stabilizing) lumbar multifidus, internal oblique, transverse abdominals, psoas major, quadratus lumborum, lumbar portion of lumbar iliocostalis lumborum before global (phasic/primary movers) such as rectus abdominals, external oblique, and portion of iliocostalis lumborum. Local muscles are shorter in length and closer to axis or rotation while the global muscles have no direct attachment on the spine.
- Avoid preloading the spine in posterior pelvic tilt.
- Avoid prone upper body extensions, or prone leg extensions to avoid high compressive load of the already weakened spine)
- No-pain no gain axiom usually does not apply to the spine
- Because of diurnal variations in fluid level of the intervertebral disks (more hydrated early morning) it would be unwise to perform full range spinal motions (bending) shortly after rising from the bed
- Focus on low load high repetitions to improve endurance rather than high load low repetition for strength.
- There is some evidence that low back exercises are most beneficial when performed daily.
- Focus on pain relief with Oswestry scores of 40-60, with scores of 20-40 focus on decreasing pain, muscle re-education, gradual strengthening, flexibility and improve cardiovascular endurance, with scores less than 20 focus on work simulation and progressive strengthening.