



Advanced Orthopedics and Sports Medicine Post operative Spine Rehab-Kyphoplasty/Vertebroplasty Treatment Guideline

Phase I: Immediate post Surgical Phase (IPSP) 0-2 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. Educate on body mechanics and posture for bed mobility

Precautions:

1. Prevent excessive initial mobility or stress on tissues
2. Avoid lifting, twisting and bending of the spine.

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

Phase II: Initiation of OP-PT 2-4 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.

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 neuromodulation of pain
 - Scar tissue mobilization. Educate patient on self mobilization of scar.
- 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.
- Pelvic stabilization exercises with emphasis on transverse abdominals and multifidus:
 - Neuromuscular control of lumbar spine in a neutral position (abdominal drawing in maneuver-ADIM).
 - Start in quadruped position then prone and supine.
 - 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 mmHG 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 2-3: ADIM maneuver performed with gentle arm and leg exercises: Supine heel slides, supine leg lifts, Hip horizontal abduction, heel slides. Initiate sitting and standing ADIM with arm movements. Progress to SLR flexion/extension/abduction in standing.
 - Wk 4 progress to lumbopelvic control during movements and aggravating movements and heavier external loads to lumbar spine: Sitting on unstable base of support exercises, co-contractions during normal speed walking and other activities, bridging.
- Knee strengthening exercises.
- Unloaded trunk ROM exercises: Lumbar spine flexion and extension in quadruped (cat camel) Pelvic rocks, Wig wags, Pelvic clocks.
- 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)
- Initiate acuatics (if available and indicated)
- Cardiovascular training, treadmill, UBE, stationary bike (patient must have good pelvic control)
- Initiate balance exercises sitting and standing. Progress double leg firm surface to foam surface, eyes open/closed, single leg balance, reaching outside BOS
- Gait training with or without assistive device as needed.
- 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. Cardiovascular tolerance to 30 min/day
3. Dynamic sitting and standing tolerance of 15-30 min

Phase III: Advanced PT 4-8 weeks/2-3 times per week

Goals:

1. Progress with strengthening and flexibility exercises.
2. Advanced lifting and posture training
3. Address return to work/activity of daily living concerns
4. Advanced stabilization and trunk control

Treatment Summary:

- Activity specific training
- Exercises (Advanced strengthening); (based on degree of bone loss, age and functional status of the individual)
 - Increasing complexity and load of exercises maintaining lumbar spine stability: supine SLR all directions, single leg bridging, bridging on unsteady surfaces, alternate arm and 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)

- Advanced Hip/Core strengthening exercises: Functional exercises like chops/diagonal lifts, squatting, lunging.
- Advanced cardiovascular training
- 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

Pearls of rehab:

- Exercises to avoid with Osteoporosis:
 - Dynamic abdominal exercises (eg sit ups)
 - Twisting movements (eg golf swing)
 - Trunk flexion
 - Abrupt or explosive loading
 - High impact loading.
- 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.

References:

- Huntoon EA, Schmidt CK, Sinaki M. Significantly fewer refractures after vertebroplasty in patients who engage in back-extensor-strengthening exercises. *Mayo Clin Proc.* 2008;83:54-57.
- Medical Disability Guidelines : <http://www.mdguidelines.com/osteoporosis/rehabilitation>
- Exercise recommendations for osteoporosis: *A position statement of the Australian and New Zealand Bone and Mineral Society*