



**Rehabilitation Protocol:  
Post-Operative Cervical Spinal Fusion**

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## Phase I: Immediate Post-Surgical Phase (IPSP): 0-8 weeks Post-Op

### Goals:

- Decrease pain and inflammation
- Prevent stiffness and guarding
- Encourage wound healing
- Increase activity tolerance
- Initiate aerobic activity
- Monitor for signs of possible infection
- Educate on body mechanics and posture for bed mobility
- Re-educate movement patterns/posture education

### Precautions:

- Prevent excessive initial mobility or stress on tissues
- Limit overhead arm movements, bending and lifting
- Follow physician-guided directions regarding post-operative collar use
- Avoid extension with anterior cervical fusion
- Avoid flexion with posterior cervical fusion
- No PROM (No stretching)

### Treatment Summary:

- Education on bed mobility and transfers with proper spine positioning
- Limit cervical range of motion until 8-10 weeks; gentle flexion/extension and retraction AROM in pain-free range at 8 weeks; no cervical rotation/side bending in HEP until 10 weeks
- Reinforce basic post-op home exercise program including:
  - Diaphragmatic breathing: Proper breathing technique without the use of accessory respiratory muscles (1 hand on chest, 1 on diaphragm, only allow the abdomen to rise while inhaling, no chest movement.)
    - Supine, sitting, standing: abdominal bracing and controlled breathing
  - Pelvic tilts, TA activation with neck supported
  - Relaxation exercises
  - AROM to tolerance, scapular retraction, shoulder shrugs, biceps/triceps with light weights
  - Spinal stabilization exercises - supine neck supported (no bridging)
  - Isometric DNF 10 sec; gentle cervical retraction only after 12 weeks
  - Light stretching: only pecs (supine over towel) and seated thoracic extension
- Increase tolerance to walking (½ mile daily) or bike (15-30 min cardiovascular activity)
- Reinforce sitting, standing and ADL modifications with neutral spine and proper body mechanics - use lumbar roll or wedge cushion when sitting

**Criteria for progression:**

- Pain and swelling within tolerance
- Independent HEP
- Tolerance of 15 min of exercise and 15-30 min of cardiovascular exercise
- Functional ADLs for self-care/hygiene

## Phase II: Initiation of Outpatient PT 9-12 weeks Post-Op / 2-3 times per week

### Goals:

- Patient education/Back-neck school
- Re-establish neuromuscular recruitment of the longus colli (functional dynamic stability)
- Control cervical neutral with stabilization and strengthening exercises
- Normalize scapulo-humeral rhythm
- Return to activities of daily living
- Improve positional tolerances for return to work (sitting/standing 30-45 min)

### Precautions:

- Avoid cervical loading (overhead arm resisted movements)
- Avoid passive stretching of cervical spine

### Treatment Summary:

- Body Mechanics Education
  - Anatomy, Pathology, and Biomechanics
  - Reinforce neutral spine positioning with proper body mechanics and ADLs
- Manual Therapy
  - Grade 1 or Grade 2 joint mobilizations for neuromodulation of pain
  - Scar mobilization: educate patients in scar mobilization
  - Nerve mobilization (nerve glides). Do not reproduce symptoms (sub-threshold)
- Exercises:
  - Train upright posture
  - Cervical isometric exercises at 12 weeks
  - Initiate UE low-load strengthening, high repetition endurance exercises, and scapular-thoracic re-education (shoulder shrugs, shoulder rolls, rows, ER, diagonal patterns in supine with T-band scapular mobilization exercises)
  - Restricted to 5 lbs with arm exercises (below 90 elevation)
  - Avoid pre-loading the spine with overhead arm movement
  - Upper thoracic mobilization exercises: cat/camel exercises, upper thoracic extension, upper thoracic rotation, arm clocks; combined thoracic/cervical motions (ex: alternating single arm rows)
  - Neuromuscular re-education of longus colli with pressure biofeedback (include arm and leg movements in varying positions)
  - Abdominal exercises (monitor cervical spine position), perform basic core strengthening of lumbar spine, (front and side planks) at 10-12 weeks (may start on knees or against wall) - patient dependent
  - Cardiovascular training, treadmill, UBE, stationary bike
  - Address other mechanical restrictions as needed

- Modalities for symptom modulation if needed

**Criteria for progression:**

- Patient has working knowledge of proper body and lifting mechanics
- Able to hold chin tuck for 10 sec (raise of 10 mm Hg pressure from 20 mm HG baseline in 1 notch increments)
- Cardiovascular tolerance to 30 min/day
- Dynamic sitting and standing tolerance of 45-60 min

## Phase III: Advanced PT 13-18 weeks Post-Op / 2-3 times per week

### Goals:

- Progress with strengthening and flexibility exercises
- Advanced lifting and posture training
- Initiate balance activities
- Address return to work/recreational activity concerns
- Advanced stabilization and trunk control

### **Treatment Summary:**

- Body mechanics training
  - Posture emphasis with exercises, posture training
  - Work/activity specific training
- Manual Therapy
  - Soft tissue mobilization to decrease guarding
  - Joint mobilizations over restricted joints (above and below fusion) to increase contribution to overall movement (OA/AA and upper thoracic). Protect fusion
  - Nerve mobilization (nerve glides). Do not reproduce symptoms
- Exercises:
  - Train upright posture
  - Cervical mobility exercises (AROM is patient/physician/surgery dependent. Do not promote passive stretching)
  - Oculomotor training and proprioceptive training (laser pointer)
  - Upper extremity strengthening (rhythmic stabilization upper extremity, free weight shoulder strengthening)
  - Scapular stabilization/strengthening exercises (prone scapular series); Spinal stabilization exercises: lumbar and cervical
  - Continue upper thoracic mobilization exercises
  - Advanced balance training exercises
  - Weight restriction 10-15 lbs
  - Prone on elbows, quadruped, modified plank position
  - Swiss ball: seated, quadruped stabilization exercises
  - Cardiovascular training, treadmill, UBE, stationary bike
  - 14-18 weeks: Initiate advanced strengthening (chest press, seated rows, pull downs, incline push-ups) and functional core strengthening (overhead chops, lifts, diagonal lifts, push-ups)

### **Criteria for discharge:**

- Manual muscle testing is within functional limits
- Independent with home program
- Cervical ROM within functional limits