Cervical Spine Stabilization Program

Stage I

The first goal of the stabilization program is to isolate the deep neck flexors and extensors. The next goal is to perform co-contraction patterns in the cervical neutral position. The following exercises can be used to achieve these goals. The exercises are described in more detail in the Impaired Muscle Performance section.

Isolation of the deep cervical flexors:
- Cervical core activation in variety of positions (Patient-Related Instruction 24-1 and Fig. 24-11)
- Autoresistance to the deep flexors

Isolation of the deep cervical extensors:
- Electrical muscle stimulation to the cervical extensors in supine
- Return to neutral from flexion (fig. 24-14)
- Autoresistance to specific multifidus or suboccipital muscles (fig. 24-15)
- Concentric extension over a foam roll (fig. 24-16)

Rotation and side flexion components:
- Supine head roll on a foam wedge, offset (Self-Management 24-1)

Co-contraction of the deep cervical flexors and extensors:
- Early co-contraction training can be accomplished in supine lying with the cervical lordosis supported over a towel roll. The extensors are recruited using the electrical muscle stimulator while the patient prevents the extension motion by simultaneously performing the head nod exercise such that the cervical spine remains in neutral.
- A more difficult co-contraction exercise positions the patient prone over an exercise ball or in four-point kneeling. These positions encourage craniovertebral extension. The patient should be taught to control the upper cervical flexion while working the middle and lower cervical spine into extension. The head nod motion is performed concurrently with lower cervical extension. If done properly, the cervical lordosis should straighten to a neutral position.

Stage II

After the patient is able to achieve co-contraction of the anterior and posterior muscles of the cervical spine in resting positions, the next goal is to be able to maintain cervical stabilization during arm motion. The exercises consist of initial co-contraction of the cervical musculature (preset nod), which is maintained while the patient performs repetitive motions of the upper extremity in various positions (i.e., supine, four-point kneeling, sitting, standing). The pattern of the arm motion, amplitude, and position of the exercise is based on what combination challenges the patient optimally while maintaining neutral position of the affected segmental level(s). The goal is to accomplish segmental cervical stability in a variety of positions with an assortment of arm movements and a range of amplitudes.
- Because the most stable position is supine, it is used as the initial starting position.
- Various movements of the upper extremity (e.g., flexion, abduction, diagonals) are performed while palpating the affected segment for unwanted translation. Only those motions in which the segment remains neutral can be performed.
- Bilateral arm motions below 90 degrees often are the least challenging. Unilateral, overhead movements place higher demands on the stabilization system (however, these effects depend on factors such as the plane or direction of the hypermobility, dural tension, and shoulder or thoracic mobility).
- Progression includes adding hand weights, which increases the resistance, or lying on a half roll, which reduces the stability of the base (Fig. 24-32).
- These same exercises can be progressed by having the patient perform them in a sitting or standing position (Fig. 24-30), because these positions are more challenging to spinal stability. To make the transition to upright less challenging, the patient can be instructed to sit with the back to the wall to provide feedback of where the head is in space (Fig. 24-33). Upper extremity motion can be altered in direction, amplitude, and pattern.
- The therapy ball can be used as another surface to promote cervical spine stability with upper extremity movements. Ball sitting and the use of pulley systems are beneficial at this stage (Fig. 24-34). Prone, progressed to supine on the ball, the patient can be taught to maintain a controlled cervical spine position while performing simple rocking motions. Increased demands can be made on the cervical spine by adding unilateral or bilateral arm motions, with or without weights. This can be progressed to more complicated arm and leg patterns (Fig. 24-35).
- The use of proprioceptive neuromuscular facilitation patterns or sport- and work-specific movements introduce a more functional approach (Fig. 24-36).
- Various wobble board systems can be used; the unstable base can further challenge the control of posture as the patient performs various upper or lower extremity movements.

![Figure 24-32. Maintaining axial extension on a half roll with unilateral overhead motion.](continued)