

AXIAL MOBILITY EXERCISE PROGRAM

AN EXERCISE PROGRAM TO IMPROVE FUNCTIONAL ABILITY

THERAPIST'S MANUAL

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AXIAL MOBILITY AND PHYSICAL PERFORMANCE

A major focus in physical therapy treatment is to improve physical performance. Physical performance and functional ability are influenced by a myriad of physical and non-physical factors; ranging from strength, flexibility and sensation, to cognition, motivation, social support and the home environment. Many physical impairments, such as loss of range of motion and strength, have been correlated with declining functional mobility and can be improved through appropriate exercise^{1,2}. Furthermore, Duncan et. al. reported that the decline in physical function commonly found in the elderly is better explained by an accumulation of physiological deficits than by any one specific impairment¹. Functional gain may be achieved in impaired individuals if the cumulative burden of deficits can be lessened. The role of the physical therapist is to recognize modifiable factors and to direct treatment appropriately.

One potentially modifiable factor which can influence physical performance and function is spinal range of motion. Prescott et. al. found an association between spinal flexibility and physical performance measures³. The role of the spine in functional performance can be appreciated by analyzing common tasks. For example, moving from supine to sitting may be easily accomplished by rolling to the side while simultaneously pushing up with the upper extremities. This movement requires cervical and thoracic rotation to roll, and lateral flexion to bring the trunk upright. A person with a stiff spine, however, may instead sit straight up by using the abdominal muscles to raise the trunk, and then move the lower extremities off the bed by scooting and turning the entire body. This maneuver can be very energy consuming.

The sit to stand transfer is another example of a movement which is more efficient with adequate spinal motion. A person who lacks the ability to extend the lumbar spine and anteriorly tilt the pelvis may flex the trunk excessively in order to move the center of gravity over the feet while coming to standing. Another strategy would be to generate momentum by rocking the trunk forward. A final example is the ability to turn and see behind oneself, which is most effectively accomplished with rotation of the entire spine relative to the pelvis. In standing, a person who lacks adequate spinal rotation will most likely have to take multiple steps, turning the lower extremities, pelvis and spine together in order to look behind her/himself. Because the pelvis and lower extremities are more fixed in sitting, the ability to look posteriorly can be severely limited without spinal rota-

tion. Older people often report difficulty with driving because they can not turn to look behind themselves.

The axial structures form the supportive base from which movement of the limbs and head occur. The mobility as well as the configuration of the spine can, therefore, affect the ability to move adjacent joints of the shoulder and pelvic complexes. For example, overhead activities requiring shoulder flexion can be limited in persons with severe kyphosis because scapular motion is restricted by faulty thoracic alignment. Without adequate scapular motion, shoulder flexion range of motion will be compromised. At the pelvic complex, a patient who lacks lumbo-pelvic movement may not demonstrate the lateral tilt or anterior pelvic tilt associated with normal gait. This can be observed as a lack of lateral weight shift and functional hip extension, respectively.

Loss of axial mobility can be a consequence of specific diseases, such as Parkinson's disease, as well as aging itself⁴. Many authors have described reductions in spinal flexion, extension and lateral flexion of up to 50% in subjects from the third to eighth decades⁵⁻¹⁰. Few exercises programs systematically address the motion of the axial structures and incorporate it into daily activities. The Axial Mobility Exercise Program presented in this manual provides a comprehensive set of exercises that address motion in all planes and for all regions of the spine, shoulder and pelvic complexes. From a kinesiological perspective, emphasis is placed on the mobility of these regions in a functional context. Both segmental and coordinated movements are practiced, and special consideration is given to proper positioning, alignment and range of motion. From a motor control perspective, movement patterns are improved. Relaxation is used to reduce excessive effort; awareness of body position and of the muscles and segments that are utilized in movement is used to enhance efficiency and coordination. The exercises presented have been expanded from previous work^{4,11} to include functional exercises which incorporate new movement patterns into daily activities.

A participant's manual is available that presents the exercises in a format designed for home use¹². The exercises are the same in both manuals, with several of the names changed in the participant's manual to facilitate comprehension. The goal of the program is for the patient to continue the exercises at home after learning the program under the direction of a physical therapist.