

Evaluation of Spinal Disorders

Postural and Balance Assessment

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Maintaining posture represents the end result of many complex interactions within the body. The ideal neutral erect posture is assumed when the earlobe, tip of the shoulder, hip joint and the malleoli (bump on the side of the ankle) all line up on a plumb line.

Regulation and Control of Posture and Balance

The musculoskeletal tissues of the body including the spine have specialized nerve endings which respond to physical stimuli such as pressure, compression, vibration and stretch. These specialized receptors facilitate the propagation of nerve signals which travel to the central nervous system including the spinal cord. The nerve signals stimulate reflex reactions including changes in the degree of muscle contraction and relaxation. The maintenance of an upright posture involves the integration of various postural reflexes.

The postural reflexes are influenced by numerous factors including sensory (afferent) information from the eyes, the middle ear vestibular apparatus, and the neurological input from specialized receptors of the musculoskeletal tissues including ligaments, tendons and muscles.

Some patients lose balance and postural control secondary to muscle weakness, a condition which occurs more common in the elderly. As an individual becomes more sedentary their muscles get smaller in size, a process referred to as muscle atrophy. Loss of muscle size and function leads to less effective postural reflexes and abnormal posture.

Proprioceptors

Muscles are controlled by proprioceptors which are specialized receptors sensitive to the position and movement of the body. They detect the stretch and tension of a muscle and send messages to the spinal cord to enable it to adjust its signals to the muscles. There are two main types of proprioceptors which are:

1. Muscle spindle: refers to a stretch receptor which lies parallel to muscle fibers. When it is stretched the muscle spindle sends a message to a motor neuron in the spinal cord which in turn reflexively sends a message to the muscle causing a contraction.

- Â· 2. Golgi tendon organ: refers to a specialized receptor located in the tendons at both ends of the muscle. It acts as a brake against excessive contractions by inhibiting the motor neurons in the spinal cord which leads to muscle relaxation or down regulation of muscle tone. .

Postural Retraining

The techniques used to help improve posture often include exercise, stretching, massage and other soft tissues techniques, modalities such as heat, ice and ultrasound, and re-education of movement patterns and positions during activities

Prolonged positioning in a "poor" posture can lead to stress upon the supportive and weightbearing tissues of the spine. Deviations from a normal posture can be one of the earliest indications of a neurological and/or orthopedic disorder. The most common cause for abnormal posture is habit. The chronic maintenance of a position causes the sensory systems of the body to reset postural reflexes to adapt to the posture even if it is inefficient and potentially harmful to the tissues. The restoration of good posture is a frequent goal of physical or spinal rehabilitation.