

Atrophy

Disease/disorder

Also known as: muscle wasting

Anatomy or system affected: Musculoskeletal system, Spine, Nervous system,

Specialties and related fields:

Family medicine,

Geriatrics and gerontology

Neurology

Nursing

Orthopedics

Osteopathic medicine

Pathology

Physical therapy

Radiology

Rheumatology

Sports medicine

Definition: a wasting away or decrease in size and/or activity of a body part because of disease or other influences such as inactivity. Skeletal muscle can undergo atrophy because of disuse or neurological and musculoskeletal disease.

Key Terms

Isokinetic: refers to the resistance training that provides muscular overload at a constant preset speed.

Neuromuscular electrical stimulation (NMES): the application of electrical and current to elicit a muscle contraction.

Causes and Symptoms

Atrophy of any body organ can result from inadequate nutrition and lack of activity. However, other pathological conditions resulting in poor circulation, an interruption of nerve supply to the affected organ and disease to the organ tissue itself can be other causes of atrophy. Muscle atrophy is a common form of atrophy that can be the result of various diseases of the nervous and musculoskeletal system. The body's metabolism of protein is also directly related to the condition of muscle atrophy as research states muscle and liver protein can be used for energy. This supports the reason why muscles atrophy during periods of inactivity. Muscle weakness can also be early manifestations of thyroid and parathyroid disease. Symptoms of atrophy are dependent upon the organ affected. Muscle atrophy is most evident with loss of function and general mobility. When muscles of the lower extremities become atrophied the individual becomes easily fatigued with activity and may even be at risk for falls.

Treatment and Therapy

The organ that is affected by atrophy dictates treatment and therapy to be provided. Once any loss of circulation, nerve or hormone support is returned, the atrophy normally diminishes and is replaced by growth to aid in normal function. As a general rule, muscles worked close to full capacity will increase in strength. The overload can be applied with standard weights, pulleys, springs, or a variety of isokinetic devices. Muscular growth in response to overload training occurs primarily from an enlargement of the individual muscle fibers. Neuromuscular electrical stimulation (NMES) is the application of electrical current to elicit a muscle contraction. The use of NMES in orthopedic and neuromuscular rehabilitation has grown significantly in recent years. A nerve action potential may be elicited either by a command originating in the motor cortex of the brain or by an electrically induced stimulus at the periphery. In either case, the action potential and release of transmission substances is the same.

Perspective and Prospects

Advances in medicine and rehabilitation have helped individuals afflicted with atrophy. The development of functional electrical stimulation allows individuals to carry out tasks by artificially stimulating muscles that have become too weak to carry out normal activity. Research in the area of spinal cord injuries is ongoing and advancing which addresses the causes and results of muscle atrophy from interruption of nerve input disuse.

For Further Information:

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