

Therapeutic Exercise in the Chiropractic Practice, Part II

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There are three major modes of dynamic muscle training: isotonic, isokinetic, and free weights.

Isotonic exercises are those in which the same force is applied throughout the dynamic range of the joint. However, there are many types of exercise equipment in use now that use cams to increase or decrease the force around the joint range-of-motion. This is an attempt to counteract the changing lever arm force from interactions of joint ranges of motion and length of muscle fibers. These machines are excellent if properly used. Many of the newer machines are adjustable to fit individual body types, a problem that plagued the older generation machines.

Isokinetic devices require a sophisticated dynamometer to limit the speed to a preset level. This maintains speed while allowing torque around a central axis, with the goal of eliminating the effects of acceleration and inertia in the dynamic process. The only real benefit of these devices is some increased safety for the patient and increased speed and agility in specific joint motions, thus some of the same principles apply to isokinetic exercise as to isometric.

Training Goals: Generally, increased functional capacity and pain free biomechanical motion are the objective and subjective goals for therapeutic exercise. The following are some guidelines for designing and prescribing a program of exercise:

1. Aerobic Conditioning in Exercise Prescription

The benefits of aerobic conditioning in relation to healing and increased functional capacity include:

-- increased blood flow to healing tissues; -- increased work capacity lost through detraining from inactivity while injured; -- endorphin release for low pain tolerant individuals; -- enhanced coordination to agonists and antagonists in injured region; and -- aerobic exercise alone has been shown to decrease low back pain.

Methods:

The type of aerobic exercises used depends upon the individual requirements of the injured worker, considering such factors as the type of job (sedentary vs. labor) and the location of the injury. The following is an example of the types of exercise available, though this is not an inclusive list.

A. Swimming -- Often the best aerobic exercise to begin with. The fluid medium allows for buoyancy and resistance as well as full range-of-motion of all joints. The type of exercise performed in the water can range from simple resistance movements of the limbs to the freestyle or crawl stroke. An individual with supraspinatus tendonitis might benefit most from a beginning program of resistive upper extremity movements in the water before being moved on to the progressive resistance exercises in the weight room. However, the patient that has undergone a discectomy

would probably benefit from a back stroke or freestyle to exercise the whole body and induce coordinative aerobic movements that involve the spinal muscles and the limbs.

B. Ergometric bicycle -- This mode of exercise is the next simplest to perform, as it involves simple rhythmic movements that involve only the lower extremity muscle groups, but that also require some minimal work of the trunk muscles. Virtually any stationary bicycle will suffice; however, one that does some type of ergometric measurement is best as exercise intensity and progress can be more accurately measured.

C. Stairmaster -- This exercise machine also measures ergometrically, but it involves considerably more intensity than the bicycle. It can be the next progression of aerobic exercise for lower extremity and trunk injuries. It involves rhythmic pumping of two pedals while in an upright position, imitating the movements involved in climbing stairs.

D. Treadmill -- This machine is similar to the stairmaster in potential aerobic workout, with the added advantage of putting the patient in a running motion if desired, as well as utilizing the upper extremities slightly more than the stairmaster. More ergometric testing has been done with the treadmill, thus there is a greater data base from which to draw anthropometric conclusions from.

II. Resistive Exercises in Exercise Prescription

The benefits of resistive training in relation to healing and restoration of functional capacity include:

-- restoration of blood flow to injured or fibrotic tissues; -- increased strength of collagen in muscles, tendons, and ligaments; and -- restoration of neural pathways lost through detraining reflex inhibition.

Methods:

Dynamic Muscle Training

Increased strength is measured in both muscle bulk (sarcomere quantity) and number of muscle fibers activated (neurologic component). In adults, the muscle cell quantity does not increase, so increased strength is dependent on the above two qualities.

An increase in strength is achieved through progressive resistance exercises, using higher weights and low repetitions with isotonic exercises pioneered by individuals such as Delorme and others. As stated previously, these exercises must work the body parts that are detrained or injured and must be somewhat job/lifestyle specific to return the patient back to preinjury status. The exercise must be pain free through all ranges of motion. A list of the exercises and machines needed is beyond the scope of this article.

Proprioceptive Exercises

These exercises usually consist of agility exercises using repetitious movements to stimulate injured or activate synergistic proprioceptive beds in the injured joints or muscles. There is also a degree of "relearning" proper movements that have been inhibited because of pain or immobilization.

This article, as stated earlier, is intended to begin some meaningful dialogue concerning acceptable standards of this important part of chiropractic care. Future articles will cover specific injury protocols. Exercise prescription is a valuable adjunct to chiropractic care, however it must

be used judiciously and with good clinical reasoning so as to benefit the patient the most. If we are to continue to gain third-party reimbursement for this service, these basic clinical reasonings should be employed. As the self-proclaimed experts in the field of musculoskeletal injuries, we as chiropractic physicians should take the helm with this most important aspect of treatment. The responsibility is ours.

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