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Manual Therapy and Athletic Injury Rehabilitation: Benefits of a Class of Therapy

Submitted by: Jerry Holt

By definition, “manual” refers to the hands, especially work done by the hands. Within the purview of athletic training, Houglum (2000, p. 154) sets forth the following definition: “Manual therapy is the use of hands-on techniques to evaluate, treat, and improve the status of neuromusculoskeletal conditions.” In the past few decades athletic training as a profession has become enamored with the large variety and apparent effectiveness of modalities that are more technologically advanced than human hands. However, as Denegar (2000, p. 176) notes, “the hands of the athletic trainer are powerful assessment and treatment tools.” Manual therapies are time-consuming in the light of the simple task of hooking an athlete to a therapeutic machine. However, they are recognized as important techniques in controlling pain, restoring normal range of motion, and treating specialized conditions such as myofascial pain syndrome.

This discussion concerns the beneficial effects of manual therapies as they are used by athletic trainers. Following Denegar (2000), the therapies included under this rubric are massage, myofascial release, strain-counterstrain, joint mobilization, and muscle energy. Each of these has its own uses as a modality, although there is a high degree of mutual utility among them. Here, the focus is on the therapeutic benefits of manual therapies as a group. Specific modalities are appropriately designated as they relate to the beneficial effects of therapy delivered on a manual basis. Following the discussion of the benefits of manual therapy techniques, a small number of case studies dealing with these techniques are summarized in order to demonstrate the use of manual therapy by medical personnel, especially as related to athletic injuries.

Benefits of Manual Therapies

Following injuries to athletes, athletic trainers apply a large number of techniques with the ultimate objective of returning athletes to full activity and competition. These techniques, therefore, carry therapeutic benefits when applied to the injured athletes. Manual therapy techniques are no different. When employed as therapeutic modalities, they are useful in terms of the forward end of the treatment-rehabilitation spectrum. That is, manual therapies as modality treatment are generally designed to relieve pain and restore normal range of motion (Denegar, 2000). When used as rehabilitation techniques, the objectives are the restoration of strength and muscular endurance, then the restoration of proprioception and coordination (Houglum, 2000), all directed toward full return to activity. These concepts (modalities and rehabilitation activities) are not mutually exclusive, and are often used together in the treatment of athletes. However, modality application is generally used in the first stages after injury in order to allow maximum benefit from rehabilitative exercise and other activities (Denegar, 2000).

A large number of benefits have been identified from the use of manual therapies when used as a therapeutic modality. In fact, each modality has its own identified benefits, although there is considerable commonality among them. This section enumerates and briefly describes the benefits from the various manual therapies used in athletic training, especially when these are employed as therapeutic modalities.

A number of writers have described the benefits of the various forms of manual therapy. These benefits are enumerated in Table 1.

Table 1: Benefits of Manual Therapies

Therapy	Benefits
Massage	Relief of spasm Increased lymphatic drainage Increased cutaneous circulation Increased cell metabolism Increased venous flow Increased extensibility of connective tissues Increased pliability of scar tissue Decreased neuromuscular excitability
Myofascial release	

Therapy	Benefits
	Relief of spasm Decrease in gamma gain/relaxation of hypersensitivity to stretch Relaxation of tight fascia
Joint mobilization	Restoration of correct joint function Stimulation of joint receptors Increased large-diameter afferent fiber input
Muscle energy	Increased stretching of tight muscles/fascia Strengthening of weakened muscles Mobilization of restricted joints
Strain-counterstrain	Reducing/arresting inappropriate proprioceptive activity

Source: Amalgamated from Denegar (2000), Houglum (2000), and Prentice (2003)

Massage is one of the most widely used manual therapies in sports medicine. Many therapeutic effects have been claimed for massage as a modality, to the extent that some claims of benefit are questioned by standard textbook discussions (see Denegar, 2000). However, the effects listed in Table 1 have generally been accepted as beneficial consequences of therapeutic massage. These include circulatory (lymphatic drainage, cutaneous and venous circulation), metabolic, neuromuscular, connective tissue, and analgesic effects. Massage techniques are being taught on an increasingly extensive basis in athletic training programs. In addition to the mechanical and physiological benefits of massage, it also may elicit therapeutic psychological responses (Prentice, 2003).

Myofascial release has arisen as a result of the development of increased attention to myofascial patterns (Fritz, 2000). A more gentle form of hands-on therapy than certain forms of massage or trigger point therapy, myofascial release aims at reducing pain and increasing muscle flexibility by realigning fascia and the muscle to which it is connected to a more normal condition. Indirect myofascial release reduces gamma gain, thereby allowing muscles and tendons to stretch farther. By removing stress from muscles through comfortable repositioning, output to gamma efferent nerves is diminished. Direct myofascial release gently stretches tight fascia, allowing fascia and muscle to relax, thereby improving stretch capability and range of motion.

Strain-counterstrain deals particularly with the relief of pain. By placing the affected segment in the position of minimum pain, then gradually moving the segment to neutral position, strain-counterstrain seeks to relax tender points deep within muscles, tendons, ligaments, or fascia (Prentice, 2003). The stretch reflex explains the reason for the effectiveness of strain-counterstrain, as overstretched tender points are relaxed and pain is reduced. The major beneficial effect of strain-counterstrain, therefore, is reestablishment of more appropriate proprioceptive activity, thus both reducing pain and allowing greater range of motion.

Joint mobilization is also a passive technique, primarily designed to restore normal range of motion in affected joints. By gently moving motion-restricted joints through a specific part of the range, joint receptors can be reeducated to allow a greater pain-free range of motion. Additionally, the low-velocity passive movements of joint mobilization increase stimulation of the large-diameter afferent fibers, thus reducing pain. By passively moving an affected joint, the beneficial effects will also result in diminishing splinting by the athlete, and the pain-spasm cycle can be reduced, leading to restoration of the optimal length of muscles (American Academy of Orthopaedic Surgeons, 1991).

The last manual therapy to be reviewed here is muscle energy. This series of techniques requires more active participation by injured athletes than other manual therapy techniques, in that the athletes actively contract affected muscles against a counterforce. Isometric, concentric, and eccentric contractions are all used in restoring muscle and joint function (Houglum, 2000). Muscle energy techniques are often used in the treatment of lower back problems (Denegar, 2000). The primary benefits are provision of stretch to hypertonic muscles and fascia, strengthening of weak muscle, and increased mobilization in restricted joints (Woerman, 1989). Thus, the two primary functions of modality application, reduction of pain and increase in range of motion, are directly addressed through the application of muscle energy as a therapeutic modality.

Application: Case Studies

This section summarizes two case studies in which some form of manual therapy was used as a therapeutic modality. Obviously, there are many studies that could be cited and reviewed. However, these two provide examples of the use of manual therapy techniques in the healing process of physically active persons.

As reported by Ryterband (2000), a male 50-year old was injured while playing recreational volleyball. The player inverted his right foot when he landed on another player's foot after a jump. The injury was evaluated as sprains of the anterior talofibular and calcaneofibular ligaments, as well as damage to the distal fibula. There was ecchymosis, swelling, and limited range of motion in dorsiflexion, plantar flexion, inversion, and eversion. Initial treatment included RICE and self-medication with an NSAID. The therapist, a physician, used lymphatic drainage (a compressive massage technique) to reduce

swelling, and three-planar fascial fulcrum release (a combination of myofascial release and joint mobilization) for range of motion. These therapies resulted in significant increase in range of motion for all four restrictions, as well as ambulation without pain. A primary concern of the physician was bruising of the bones (talus and lateral malleolus), which she treated with techniques other than manual therapy. In terms of manual therapy, however, the physician concluded that manual therapy techniques are directly applicable, and should be used with typical ankle injuries.

Lunn (2001) reported the case of an 18-year old male who had reconstructive surgery of the right anterior cruciate ligament following a skiing accident and subsequent reinjury. The patient therefore had considerable restriction in range of motion and muscle strength, as well as concomitant pain. The patient used crutches, toe touch weight bearing only, and no brace. Medication was prescribed for pain. The physical therapist used integrative manual therapy, or a variety of manual therapy techniques used in combination, for initial rehabilitative treatment. The specific techniques used were Jones strain-counterstrain, lymph node advanced strain-counterstrain, advanced strain-counterstrain, myofascial release, bone bruise therapy, disruption of membrane, and neural tissue tension. Home exercises were also performed as directed by the therapist. After two days, there was significant improvement in quadriceps strength, ambulation, and range of motion in hip, knee, and ankle joints, as well as sensory improvement in the affected thigh. Ad additional manual therapy technique, immune deficiency motility, was used to increase quadriceps strength, which had not progressed to the extent as other elements of recovery at 15 days post-surgery. Overall, the integrated manual therapy techniques were successful in rehabilitating the ACL reconstruction.

Summary

Although manual therapies are more extensively used in later stages of rehabilitation, they have definite uses as modalities to reduce pain and increase range of motion in injured tissues. Especially, the use of therapeutic massage, myofascial release, joint mobilization, muscle energy, and strain-counterstrain are important for modality application. These therapies are usually used in conjunction with other modalities such as TENS or other non-mechanical techniques (American Academy of Orthopaedic Surgeons, 1991), but are often used by themselves in the early rehabilitation of injuries (Denegar, 2000; Lunn, 2001). However they may be used, it is certainly the case that the athletic therapist's hands have become much more widely employed modality tools in recent years.

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