

## **Muscle Strains**

By Whitney Lowe, LMT

A *strain*, sometimes referred to as a *pulled* muscle, is a muscle injury produced by excessive tensile stress that causes fibers to tear within the tissue. A muscle strain does not usually result from excess stretch alone, but from a combination of tension and contraction.

Muscle strains can develop when excess tension is placed on a muscle while it's also in contraction. Due to muscle mechanics, strains are more likely while the muscle is in eccentric contraction than concentric or isometric.<sup>1,2</sup>

There are three grades of muscle strain: first degree or mild, second degree or moderate, and third degree or severe. In a first-degree strain, few muscle fibers are torn. While there might be some post-injury soreness, the individual usually returns to normal levels of activity quickly. With second-degree strains, more fibers are involved in the injury. There is a greater level of pain with this injury and a clear region of maximum tenderness in the muscle tissue.

A complete rupture of the muscle-tendon unit occurs with a grade-three strain. Some strains are classified as third degree even though the muscle still has some fibers intact because the damage is extensive. There is likely significant pain at the time of the injury. Pain can be minimal afterwards, because the ends of the muscle are separated and limb movement does not cause additional tensile stress.

Third-degree strains generally require surgical repair. In some instances, surgery is not performed because the muscle does not play a crucial role and the potential dangers of surgery outweigh the benefits. Ruptures to the rectus femoris are an example because the other three quadriceps muscles make up for the strength deficit caused by the strain.

The muscles most susceptible to strain injuries are multi-articulate muscles, which are those that cross more than one joint. The more joints crossed by a muscle, the greater is their vulnerability for strain injury. All

involved joints cannot achieve full range of motion at the same time due to limited extensibility of the muscle tendon unit. If the muscle is stretched across multiple joints at the same time, it's more susceptible to tearing from excess tensile stress.

Strains can develop in any part of the muscle, but usually occur at the musculotendinous junction.<sup>3</sup> The junction of muscle and tendon places one tissue with higher pliability (muscle) directly adjacent to another with limited pliability and more tensile strength (tendon). As a consequence, the point of interface between the two tissues becomes a site of mechanical weakness where the strain occurs.

Muscle strains generally arise from acute injuries. However, there might be repetitive tensile forces on the muscle that cause small degrees of fiber tearing, producing a chronic strain. In most cases, the client can recall a specific movement or accident that produced the strain. Swelling might occur in the area immediately after the injury, but is likely to subside after the initial inflammatory phase (an estimated 72 hours).

Strains, both acute and chronic, are increasingly common where they have previously occurred. Scar tissue that repaired the original strain is a weak point in the muscle's continuity, and therefore a location vulnerable to re-injury. It's important to find out whether the client has suffered a previous injury to the area.

Following a strain, resting from offending activities for several weeks provides the body time to heal damaged tissue. Another primary goal of treatment is tension reduction in the affected muscle. Tension is reduced with massage techniques such as effleurage, stripping, broad cross-fiber sweeping, etc. In addition, it's important to help develop a functional scar at the site of tearing and prevent scar tissue from adversely binding adjacent fibers. Deep transverse friction massage is used to develop a healthy, functional scar. Muscle strains are a common soft-tissue injury and massage is an excellent treatment option to help in the management of these conditions.

### *References*

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