

## Eccentric Exercise for Tendinitis

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I have been taking golf lessons every week for the past two months and while my golf handicap has improved, I have developed a physical handicap. My left shoulder has been painful. I've never experienced shoulder pain and acted like a typical patient thinking that it would just go away. My second mistake was to attempt to treat the problem myself.

My daughter (a DC) performed a functional examination which revealed an infraspinatus tendinitis. I immediately resorted to friction massage and ultrasound. My associate, Dr. Passero, also concentrated on my chronic C5 subluxation. I greatly improved during the first two weeks of care but stopped the treatment since I was much better. I kept taking golf lessons (with minimal pain) and played in a weekend tournament which really set me back. At this point I could almost understand patients who would resort to cortisone for relief.

Stanish et al.<sup>1</sup> wrote a classic article in 1986, which I would like to share with you, and which, by the way, helped to speed my recovery. He hypothesized that if eccentric loading is the cause of the micro- or macro-tearing of the tendon, then the treatment program should include specific eccentric strength rebuilding exercises. He felt that during the maximum load eccentric contraction, the muscle-tendon is lengthening (negative work), while during concentric contraction the muscle-tendon is shortening (positive work). It is accepted that more force is exerted on a muscle-tendon with eccentric contraction than concentric contraction under the same load. Most movements usually involve eccentric stress. For example, the quadriceps, while flexing the knee as in decelerating when landing from a jump or a runner decelerate and change direction eccentrically contracting the achilles tendon. In my case, during my (new) backswing I was eccentrically contracting my left infraspinatus.

"The maximum stress placed upon the muscle-tendon unit is during eccentric exercises, and only if one can strengthen the muscle-tendon unit to withstand these stresses will it be able to cope and prevent injury. Isometrics and concentric exercises have their place, but only through eccentrics will the maximum achievement be attained."<sup>2</sup>

An experiment was performed in which subjects were conditioned for seven weeks using concentric, eccentric, and no exercise.<sup>3</sup> The eccentric group on a percentage basis showed a greater increase in maximum tension than the concentric group in all concentric, eccentric, and isometric tensions, although it took the eccentric group a longer time to reach the maximal isometric tension relative to the concentric group. The concentric group also showed greater increase in maximum concentric tension. Eccentric work proved to be more fatiguing than concentric work.

Golf is an extremely repetitive type sport. Anyone over the age of 50 who plays frequently should be on a rotator cuff flexibility and strengthening program. EMG studies<sup>4</sup> reveal during the golf swing that the supraspinatus and infraspinatus muscles act in concert at the extremes of shoulder motion as external rotators, abductors, and stabilizers.

In my case, I had never bothered to worry about my shoulder until this incident and realized that besides the infraspinatus tendinitis, examination also showed shortening of the posterior and inferior capsule. It was interesting to note that each time I performed the following procedures, although there was moderate pain, my shoulder felt substantially better afterwards.

Stanish's, et al. program<sup>1,2</sup> for eccentric strengthening included stretching in order to increase the resting length of the muscle-tendon unit and decrease the stress on the joint, increasing progressively the load to increase tensile strength and increasing the speed of contraction which increases the force developed. The eccentric program consists of:

1. Holding a static stretch for 15 to 30 seconds and repeating three to five times (in my case the infraspinatus).
2. Perform the eccentric exercise slowly on days one and two, moderately on days three to five, and fast on days six and seven. Then increase the resistance (never more than five pounds for the cuff muscles). Three sets of repetition.
3. Stretch statically as in #1.
4. Ice for five to 10 minutes to decrease swelling and pain.

I stretched my posterior capsule by horizontally adducting my left shoulder across my chest and my inferior capsule by placing my left flexed elbow as far overhead as possible, behind my head, with my opposite hand contacting and tractioning my left elbow. I stretched my infraspinatus by putting it in an internal rotation position. I eccentrically strengthened my external rotator by lying prone with my left arm off the table, shoulder 90 degrees, with elbow flexed 90 degrees and internally rotated as outlined in #2 above. Rubber tubing is also an excellent method for eccentric work.

As usual, in all shoulder problems, besides the specific problems noted, all the rotator cuff and scapular muscles should be examined and treated for deficiencies in flexibility and strength.

### *References*

1. Stanish WD, Rubinovich M, Curwin S: Eccentric exercise in chronic tendinitis. Clin Orth & Rel. Res., 208:65-68, 1986.
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3. Komi PV, Buskirk E: Effect of eccentric and concentric muscle conditioning on tension and electrical activity of human muscle. Ergonomics 15, 1972
4. Jobe FW, Perry J, Pink M: Electromyographic shoulder activity in men and women professional golfers. Am J Sports Med., 17:782-787, 1989.

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Editor's Note:

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