

Coaching Applications

Overuse Shoulder Injuries In Swimmers

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Abstract

Shoulder injury is a significant barrier to the training regime and competition experience of the swimmer, both male and female. Both male and female swimmers have a unique potential for the onset of clinical shoulder symptoms. This review of shoulder symptom onset includes information related to growth, stroke biomechanics and signs and symptoms.

Applications to Swimming

Shoulder pain occurs at predictable times over the span of a swimmer's training careers. For female swimmers, shoulder syndromes are likely to occur approximately three times over a career span. First, during early to mid adolescence; second, during the later stages of high school competition; and last, during the transition from high school to college swimming. In males, there appear to be two peak times for the onset injury. The first, at the end of the second growth spurt; and second, as in the case of females, when starting the first big increases in yardage when first starting in a college program.

In most of these cases, injuries can be prevented if dry land programs designed to strengthen the intrinsic muscles of the deltoid and supraspinatus, the scapular retractors, and the levator scapulae muscles are initiated. In addition, it is imperative that swimmer's stroke mechanics are well monitored.

The Causes of Tendonitis during Swimming

Freestyle: The biceps muscle is very active during many phases of the freestyle. The long tendon of this muscle is most vulnerable during the entry and catch, when the hand is forcibly supinated. The mid-phase of the underwater pull is also seen to be a place where this tendon is stretched and therefore likely to be stressed.

Butterfly: The bilateral pull pulling action requires more bicepital muscular work when swimming butterfly. Part of the problem is that unlike the Freestyle, where there is a more positive alignment of the large shoulder girdle muscles, the butterfly stroke fixes the shoulder and stresses the biceps long tendon. Not unexpectedly, the double-arm recovery also imposes shoulder stress, as the entire arm is levered around the fulcrum at the front of the shoulder.

Backstroke: The biceps muscle is also engaged during the arm recovery and entry. The lack of proper shoulder motion during the entry can aggravate the biceps long tendon, band where contributes is the initial contributor to the exit of the hands

from the water pressing the anterior shoulder tissues, into the overlying bone structure causing an impingement between the humerus and the scapula. This tendon can continue to be stressed during the rest of the underwater pull phases as the elbows flex and hands supinate.

Breaststroke: The initial pull, from the end of the out-sweep to where the hands change direction, is the phase where most stress is placed on the biceps long tendon. This is caused by the supinated hand position and right angle elbow pull just prior to the hands being drawn together.

Injury: Stages & Symptoms

The onset of shoulder problems can be viewed as occurring in four stages. In Stage 1, the tendon starts getting inflamed, producing mild prolonged pain over the front of the shoulder is noticeable for several hours after exertion, and can be reproduced by a direct pressure over the tendon in question. During this stage there may be mild discomfort in the shoulder at the start of warm-up, but this subsides without notice, and may not be apparent until after the completion of the workout and up to several hours after the workout.

The symptoms in Stage 2 are as expected, pain persisting during some portions of the workout and for a time after workout. Usually the swimmer needs a longer warm-up, and tends to avoid hard pulling sets as these aggravate the problem. Pain usually dissipates during the workout to the point of tolerance, but sprint and quality work intensifies the problem, and as a result, the swimmer may start developing a “dropped elbow” pull.

When Stage 3 is reached, pain is noticeable during practice, immediately after practice, and is generally prolonged throughout the rest of the day. A slow gradual warm-up does not appear to dissipate the pain to any level of tolerance, and heavy arm work such as pulling is extremely aggravating. Because this stage is accompanied by intermittent bouts of severe pain or a stabbing sensation, the swimmer may at this point, take several days off to rest. Unfortunately, resumption of workouts after this period of rest produces exactly the same kind of pain and discomfort as before.

For all intents and purposes, a swimmer should never be allowed to reach Stage 4, simply because the pain is chronic and generally unchanging which produces a disruption of normal activities, along with avoidance of regular practices and team functions. In general, there is a period of denial about the severity of the pain, but the day-to-day inability of the individual to reduce the symptoms causes a change in personality. This often results in the belief that no resolution or cure is possible, and swimming may have to altogether be stopped.

Identification of Stage One

Swimmers presented with discomfort in Stage 1, with no history of shoulder problems, should take into account that often a change in stroke technique may stress muscles that previously have presented no pain or discomfort. The problem may in fact be muscular strain. This type of shoulder pain is of particular importance to the swimmer who is resuming training after a long layoff, often seen when the swimmer returning to training after taking a break between the end of the summer season, and the beginning of Fall training.

The characteristics of this type of muscular strain are tenderness over the deltoid muscle when moderate pressure is applied, heaviness or slowness in performing daily activities the next day, and a feeling that they didn't exist previously. When the muscle does not function optimally due to fatigue, the underlying tendons and ligaments will accept an undue stress, which may then lead to the initial stage of tendonitis.

Progressive Deterioration

The majority of cases of tendonitis can be treated very quickly and effectively if they are diagnosed quickly and treated correctly. Unfortunately, most cases proceed beyond the Stage 1 phase into the Stage 2 because swimmers and coaches are unwilling or unable to deal with the problem soon after it begins. While it is more than appropriate to have swimmers ignore pain while working out, they must be made aware of the need to identify and report isolated anterior shoulder pain that persists following training sessions.

As the stages progress, periods of rest may be tried that last anywhere from one to several days, but invariably the resumption of training will cause a resumption of symptoms. As described above, if the swimmer attempts to swim through the problem it only because more severe, and while therapy and medication can control the symptoms the cause persists, making the problem progress to a greater stage of disability. The delay in securing a comprehensive rehabilitation plan and following an acceptable program of exercise, rest, and prescribed activity usually produces the inevitable need for a prolonged rest.

In the progression from one stage of inflammation to another the tendon and its underlying intrinsic layers will gradually undergo microscopic changes which will alter the tensile and elastic properties of tendon, placing it at risk of having a recurrence of the problem. This is a particularly important concept concerning tendonitis, because the swimmer must be aware that preventing the problem will require a regular routine of maintenance exercised for the duration of their competitive careers.

Conclusion

The planning of rehabilitation programs for tendonitis should always be prepared with the swimmer's individual needs in mind. This is especially true for the younger swimmer, and those in collegiate programs, because so much of the problem has to do with the maturity and demands of the training regimes. Regardless the underlying causes, tendonitis treated early on have shorter periods of training interruption and greater degrees of resistance to recurrence.

While the evaluation and diagnostic techniques are not foolproof, they are quick and effectual indicators of where the problem lies and how to proceed thereafter be it training adaptations, or medical follow-up. Overall, the best prevention is through exercise and good stroke mechanics, and gradual increases in work load at all levels, but when the injury does arise, as surely it will, the best result occurs from quick, effective treatment.