

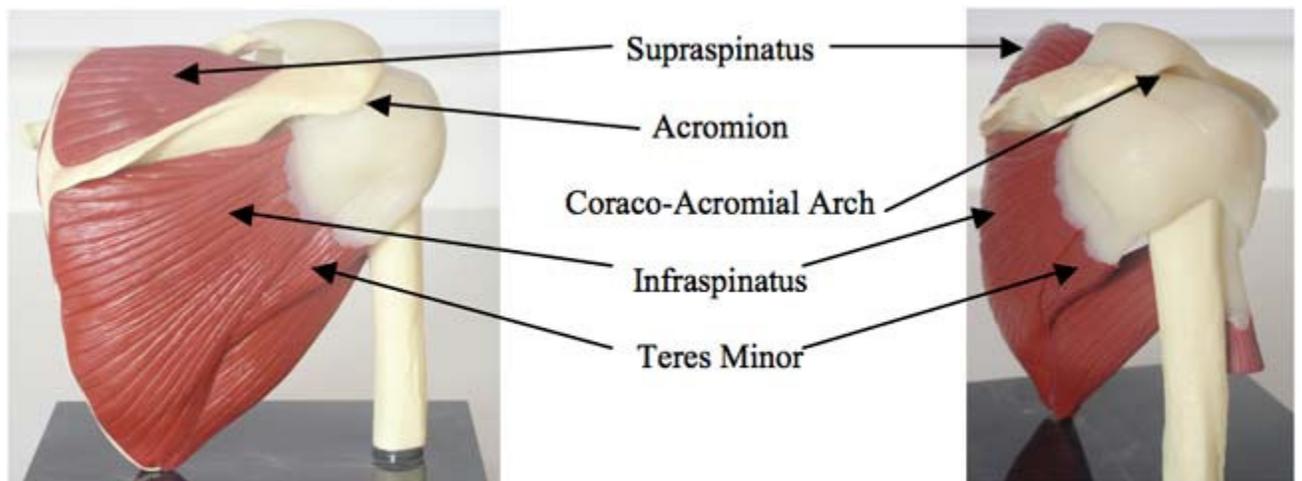
Swimmer's Shoulder

A Common Cause of Shoulder Pain in Swimmers & Multi-Sport Athletes

What is Swimmer's Shoulder?

Swimmer's shoulder is a lay diagnosis for any type of shoulder pain related to swimming. The pain is usually felt in the back, top, or front of the shoulder. It is often poorly localized; athletes will say, "I can't point to it exactly. It feels like its deep in the joint." The pain is usually felt with swimming, often in one particular stroke phase, and/or after swimming, often while at rest. It can also occur with any other activity that involves putting the arm above the head. The pain will often improve or even resolve if the athlete discontinues swimming for a time, but will usually return once they resume swimming.

There are several different issues that could be labeled as swimmer's shoulder, each having a more specific diagnosis. The most common scenario involves irritation and inflammation of any one of three (out of the four) rotator cuff muscles: supraspinatus, infraspinatus and/or teres minor. The supraspinatus and infraspinatus in particular have locations where they are susceptible to being compressed into a harder, bonier surface, especially when the arm is lifted above the head as in swimming. (The supraspinatus for example passes directly under the coraco-acromial arch.) When this happens repeatedly, the muscles become inflamed and tender. In this stage the diagnosis would be 'Rotator Cuff Tendinitis.' If allowed to progress and the athlete continues to swim with pain, the musculo-tendonous fibers will start to break down and adhesions (scar tissue) will form, becoming more of a 'Tendinosis.' If it becomes painful to lift the arm over the head, the diagnosis would be 'Impingement Syndrome.' Eventually an actual 'Rotator Cuff Tear' can develop, which in the worst cases could even require surgical repair.



(R) Shoulder Viewed from Rear

(R) Shoulder Viewed From Side

There are several other potential causes of shoulder pain in swimmers. However, I will focus on rotator cuff injuries as they make up the vast majority of swimmer's shoulder cases, especially in multi-sport athletes.

What Causes Swimmer's Shoulder?

Swimmer's shoulder is usually classified as an "over-use" injury. This is sort of a misnomer, because it is usually not a situation of excessive swimming that causes the injury. More likely there is a problem with technique and/or a biomechanical issue present, causing problems to develop with even appropriate levels of training. Because water resists motion more than air, anything affecting the normal mechanics of the shoulder during swimming really magnifies stress on the rotator cuff muscles.

In general, any sort of technical flaw makes you less streamlined through the water, requiring more muscular effort to swim. The worse your technique, the greater the effort. The smaller rotator cuff muscles, which help to stabilize the shoulder joint, will fatigue prior to the larger propulsive muscles. When the cuff muscles fatigue, they can become over-powered by the larger shoulder muscles, allowing the humerus to get pulled too far up into the socket. The cuff muscles, particularly the supraspinatus (which sits on top of the humerus) become jammed up into the coraco-acromial arch.

One of the most important technical issues is to maintain a bend in the elbow during the pull phase of the stroke. I heard a great analogy at the most excellent swim clinic put on by Will Thomas and his brother at Bowdoin College. With your arms straight in front of you and palms flat on the edge of the side of the pool, it would be impossible to lift yourself out of the water. You need to bend the elbows to gain enough leverage to lift yourself. The same concept applies as you pull your hand through the water; not bending your arm enough creates a tremendous leverage disadvantage that transmits into the shoulder.

Other technical issues often implicated include allowing the hand to cross the midline as it enters the water, swimming with paddles, swimming exclusively a free-style stroke during work-outs (without any backstroke for example), and breathing only on one side.

Another major causative factor of shoulder pain is any muscular imbalance between the supporting rotator cuff on the back (posterior) side of the shoulder and the larger muscles on the front (anterior). This muscle imbalance can result from swimming exclusively free-style, a lack of back and posterior cuff resistance training, and pre-existing postural issues such as prolonged computer use. Typically the anterior muscles like the pecs and subscapularis are tight and the posterior cuff muscles and lower scapular stabilizers (lats and lower traps) are weak, leading to a slumped shoulder posture. This muscular imbalance negatively affects the mechanics of the shoulder, predisposing the athlete to the impingement described above.

When the imbalance is very pronounced, swimmers can develop shoulder issues even if their technique is perfect. On the other hand, if an individual does not have any major imbalance present and is developing shoulder pain with swimming, it almost assuredly relates to technique.

Athletes dealing with a swimmer's shoulder will often times have other joint and muscle problems in the mid to upper back and neck. Anytime the mechanics of the shoulder are altered there will be abnormal recruitment (and subsequent tightness and irritation) of the trunk and neck musculature to accomplish motion that should be happening primarily in the shoulder joint. This tightening can also lead to fixation of the spinal and rib joints and clavicle, causing further pain, which quite often is actually more intense than the actual shoulder pain itself.

Treatment

Treating swimmer's shoulder involves the following:

1. Acute care measures to reduce inflammation. This typically involves icing the shoulder after aggravating activities, possibly NSAIDs, and some reduction of training, depending on the severity of the condition.
2. Appropriate hands-on work. There are usually four different aspects of bodywork with swimmer's shoulder.
 1. Correct any associated joint issues, if present.
 2. Localize and treat which rotator cuff muscles are being impinged.
 3. Release any tight anterior musculature.
 4. Strengthen any weak posterior musculature.

I will often utilize a combination of techniques, such as trigger point therapy, Active Release Technique(R) (A.R.T.), cross-friction massage, and post-isometric relaxation stretching. A.R.T. in particular is very effective at breaking up adhesions within the rotator cuff muscles.

3. Identifying and correcting the reason the structures are tight and/ or weak in the first place. This would include addressing any swimming technique issues, postural problems, or other contributing life-style factors. Home exercises will also typically be given (see 'prevention').

The length of time it takes to treat and recover from swimmer's shoulder, and how much training will be affected, depend a lot on how long the condition has been present. Minor cases of short duration can take as little as 2-3 in-office visits over the course of two weeks coupled with appropriate at-home exercises. Longer-term cases where substantial adhesions have developed, while taking much longer, can usually still expect to recover within 10-12 visits over the course of 2-3 months. One exception to this is if a true rotator cuff tear has developed, which in this context is not common, or if there are other structural problems present. These can usually be identified with appropriate hands-on testing or, if necessary, X-rays or MRI. Having a rotator cuff tear does not automatically mean surgery. Some cases, especially older tears that have healed with scar tissue, may respond well to conservative care, especially A.R.T.

Prevention of Swimmer's Shoulder

The single biggest issue in preventing shoulder injuries is proper swim technique. It is common for the sport of triathlon to draw individuals with stronger running and/or biking backgrounds than swimming. Swimming is the most technique-dependant discipline of triathlon, and so even with experienced swimmers it is not uncommon for an athlete to have technical problems with their stroke.

Swimming technique theory has evolved in recent years. If you are new to the sport or in need of a stroke tune-up, the best thing to do is to seek out a coach or swim clinic to help refine your technique. Another good resource is the "Total Immersion" series of books/ DVD's. Since speed in the water is as much a function of technique as muscular effort, coaching cannot only help to prevent injury but also decrease your lap times. Even elite swimmers focus on their technique every time they swim. As a relative new-comer to swimming I can vouch that it can take years to truly master swimming technique (in fact I'm still waiting for that day), and even then there is always something else to refine.

I find the second biggest factor in preventing swimmer's shoulder to be addressing any shoulder muscle imbalances as detailed previously. When the anterior shoulder muscles are overly tight vs. weak posterior muscles, problems can arise even with a perfect swim stroke. Therefore preventative shoulder-specific resistance training and stretching are helpful.

Examples of strengthening exercises for the posterior shoulder muscles include pull-ups, seated rows, and external rotator work. I find overhand grip pull-ups in particular to be one of those "most bang for your buck" exercises. In terms of triathlon training, if I am very short on time at the gym (which, when you have three young kids is often the case) and can only do two upper body exercises I would choose pull-ups and external rotators with a cable. Most gyms have weight-assisted pull-up machines available, or if you can, just use your own body weight. While doing pull-ups, focus on keeping your core engaged and use a slower controlled motion. Avoid the "herky-jerkiness" that comes with trying to use momentum to pull yourself up, which can irritate the shoulders.

Strength training of the chest and internal rotators is good for performance since these muscles help pull the arm through the water, but I'm not so sure it is necessary for injury prevention. The key is to maintain balance between anterior and posterior. Since most of us tend to be anterior dominant I would err on the side of spending more time on the posterior muscles.



In terms of stretching the anterior muscles, a simple doorway stretch is a good place to start. Vary the angle of the arm from horizontal to nearly vertical to find the tightest aspects, which will usually be somewhere in between as pictured. The best time to do this would be when the muscles are warm (i.e. in between sets at the gym or after a swim or run.) I always notice that

during the moments before a triathlon, as we all stand on the beach nervously stretching, most people are stretching their external rotators by crossing their arm in front of their body and pulling. This is probably the one shoulder stretch they've seen. It is not nearly as common to find posterior shoulder muscles tight enough to be causing problems, but extremely common to find tight anterior muscles.

Swimmer's shoulder is largely preventable. When it does occur, it generally responds well to treatment. If you do start to develop shoulder pain while swimming, don't wait too long before talking to a swim coach and/or a sports-oriented health-care provider. The earlier it is addressed the quicker it will respond, and the less training time you will lose. Good luck and happy, healthy training.

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