

IMPINGEMENT SYNDROME

Diagnosis

Impingement syndrome causes pain in the shoulder, when lifting the arm between 60 and 120 degrees sideways, or when rotating the lifted arm inwards. The nagging pain occurs because the supraspinatus tendon (the muscle under the roof of the shoulder) and/or the bursa are pinched and aggravated when lifting and rotating the arm.

The two most common areas where impingement occurs are:

1. Subacrominal or external impingement: between the roof of the shoulder and the head of the upper arm.

The space between the roof of the shoulder and the head of the upper arm is quite narrow, and becomes smaller when the arm is lifted between 60 and 120 degrees sideways. If the supraspinatus tendon and bursa become thicker than usual (because they have been strained or aggravated), or the space becomes more narrow than usual (due to bony structures or projections) this may result in impingement (figures 1 and 2).



Figures 1 & 2. Diagram showing common areas of shoulder impingement

2. Internal impingement: between the shoulder socket and the head of the upper arm.

When the arm is in the overhead position and rotated outwards (the position the arm is in when preparing for a serve), the arm is put in the maximum position for the shoulder joint, causing the supraspinatus tendon and upper edge of the shoulder socket to come into contact. If this is repeated continuously, the edge of the shoulder socket as well as the supraspinatus tendon may become impinged (figures 1 and 2).

Impingement is most commonly caused by straining (due to performing many serves and high forehands), an imbalance of the muscles around the shoulder (the front shoulder muscles are much stronger than the back ones) and when shoulder blade movements change pace (for example due to tiredness, weak shoulder muscles or instability).

Symptoms

These include pain around the shoulder, often at the outer portion of the upper arm. The pain is worse with overhead activities such as serving, hitting high tops spin forehands or hitting overhead smashes. There may be an aching pain after play. The pain may make it difficult to sleep, especially when lying on the affected shoulder.

Sometimes there is loss of strength, usually due to pain, though in later stages a rotator cuff tear may develop which may also be responsible for shoulder weakness. There may be limited mobility of the shoulder, especially when reaching behind (back pocket, bra) or across the body, or a catching or grinding sensation.

Occasionally, the athlete will also note pain in the front of the shoulder, that is worse with bending the elbow or lifting due to involvement of the biceps tendon in the impingement process.

What should you do? First Aid!

Play less tennis and certainly perform fewer serves and smashes. Try to minimise any movements above shoulder level! If you absolutely must reach out for something or lift something, rotate your arm outwards whenever possible (with the palm of your hand turned up).

The next step is to start an exercise programme, monitored by a (sports) physician or a (sports) physiotherapist, and thus treat the cause of the impingement.

Cortisone injections may help in the short term as they reduce the swelling and the worst of the pain. However, a side effect is that they weaken the tendon tissue. When tennis is resumed, the pain often returns, especially if the underlying cause is not taken care of. We recommend limiting these injections, especially for competition tennis players.

Surgery is generally only considered if, after intensive remedial therapy, pain has not clearly subsided or disappeared and/or there is an anatomical impediment which causes the pain to persist.

How to Ensure the Best Recovery

Stage 1. Improvement of Normal Function

- Posterior shoulder stretch. Extend your injured arm in front of you to shoulder level and take hold of your elbow with your other hand. Draw your elbow in towards you until you feel a stretch at the back of your shoulder (figure 3). Do this for 20 to 30 seconds, followed by a 10 to 20 second rest. Repeat three times.

Also do muscle strengthening exercises to strengthen the muscles which stabilise the shoulder blade. Gradually



Fig 3. Posterior shoulder stretch

build up the exercises. It is alright to 'feel something' in your shoulder whilst performing these exercises, however the pain should have dissipated once you have finished them. Start with a set of 10 to 15 repetitions per exercise, with a 60 second rest between each set. An exercise band or small free weight can be purchased in a sports shop.

- Protraction and retraction of the shoulder (figure 4). Attach an exercise band to a fixed sturdy object. Stretch out your injured arm and pull the exercise band back, whilst keeping your arm straight. This is done by moving your shoulder forwards (rounding your shoulders) and then back again (straightening your shoulders)
- Protraction and retraction of the shoulder (figure 4). Attach an exercise band to a fixed sturdy object. Stretch out your injured arm and pull the exercise band back, whilst keeping your arm straight. This is done by moving your shoulder forwards (rounding your shoulders) and then back again (straightening your shoulders).
- Sawing (figure 5). Attach an exercise band to a fixed sturdy object. Using a sawing motion, pull the exercise band towards your waist, and back again.
- Extension (figure 6). Attach the middle of the exercise band to a fixed sturdy object in front of you. Hold on to the ends and stretch both arms along the side of your body. Keeping your arms straight, stretch them against the resistance of the band, and then back again.



Fig 4. Protraction and retraction of the shoulder



Fig 5. 'Sawing' motion



Fig 6. Shoulder extension

Stage 2. Strengthening the Rotator Cuff

As soon as you are able to perform the exercises described above confidently and you can stabilise the shoulder blade, you can start performing muscle strengthening exercises for the actual rotator cuff.

These exercises are quite tough, so do not perform them every day and incorporate a day off. This will enable the muscles and tendons to heal and adapt. Gradually build up to three sets of 15 to 20 repetitions per day, with a 60 second rest between each set.

- Exercising the front of the shoulder: attach an exercise band to a fixed sturdy object to the right hand side of your body. Place your right elbow on your side so that your forearm is pointing forward. Remaining in this position, rotate your arm towards your stomach. Repeat on the left side.
- Exercising the back of the shoulder: attach the end of an exercise band to a fixed sturdy object to the left hand side of your body. Place your right elbow on your side so that your forearm rests on your stomach. Remaining in this position, rotate your arm outwards by 70 degrees and back again. Repeat on the left side (figure 7).



Fig 7. Posterior shoulder exercise

- Wall push-ups: lean your hands against a wall, standing at a distance of approximately one metre. Now do wall push-ups, changing the position of your hands (hands closer together, hands further apart, one hand above the other, using only one hand etc.). The closer you stand to the wall, the easier the exercise is. You can increase the difficulty by standing further away from the wall. You can target the specific muscles which need to be strengthened even more in this exercise by pushing yourself even further away from the wall whilst rounding your shoulders (push up plus).

- Rowing: attach the middle of an exercise band to a fixed sturdy object in front of you. Grasp each end of the exercise band and pull your elbows back. Hold for a few seconds and then slowly release the band. Maintain a constant and even tension, and tuck in the abdominal muscles.

Stage 3. Return to Play

When you can do all of the exercises confidently and without pain, you are ready to play tennis again.

- At first avoid any overhand strokes. Start off by playing against a practise wall or by playing mini-tennis, gradually taking small steps back. Use an underhand serve, delivering the ball below shoulder level as much as possible.
- Subsequently step up baseline speed, only hitting the ball flat. Only play low volleys when using a net.
- You may gradually start including topspins and higher volleys.
- The next step is to throw a ball over the net. Standing at the service line, throw the ball overhead to the other side of the net. Once this is going well, gradually increase distance and speed.
- You can now start incorporating serves. The first time you do so, serve without using a ball. Then serve standing at the service line. Gradually increase distance and speed. You may also perform a gentle smash. Pay close attention to technique and timing.
- The next step is to play points, and then a game, a practice set and a practice match. Once practice matches have been completed for two to four weeks pain free, you can sign up to play a match!

Preventing Re-injury

Shoulder injuries cannot always be avoided. However, you can minimise the risk by observing the following guidelines:

- Regularly stretching the back of the shoulder minimises the chance of sustaining (another) impingement.
- Be sure to perform a thorough warm-up before playing and a cooling down after the training or match, for a minimum of ten minutes each. Ensure that shoulder stretching exercises are performed correctly.
- Make sure your transversus abdominis muscle is strong and that you have good shoulder muscle balance by performing shoulder muscle stretching exercises at least twice a week.
- Build up training gradually, so that muscles and tendons can adapt to the increased load. Allow for a sufficient recovery period between training sessions and matches.