



# *PREVENTATIVE REHABILITATION FOR RUGBY INJURIES TO THE SHOULDER COMPLEX – PRACTICAL GUIDELINES*

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*Providing coaches, referees, players, and administrators with the knowledge, skills, and leadership abilities to ensure that safety and best practice principles are incorporated into all aspects of contact rugby.*

## **INTRODUCTION**

When playing sport, the participant accepts there is a natural risk of injury. However, in rugby this risk is greater than in most other sports. This is explained for the most part by the nature of the game, which includes contact and collisions as a fundamental part of the game of rugby. Preventative programmes are aimed at reducing the incidence and severity of injuries. This document outlines a preventative programme for reducing the number of shoulder injuries in rugby, with a strong focus on exercise rehabilitation.

## **MOST COMMON SHOULDER INJURIES**

Although the lower limb is more frequently injured in rugby players, injuries to the shoulder are usually more serious and result in numerous days of play or practice missed.

Shoulder injuries account for between 6 and 20% of injuries sustained by rugby players. The most common shoulder injuries include:

1. **Acromioclavicular joint sprain.** This is a joint on the top of the shoulder.
2. **Shoulder dislocation.** A shoulder dislocation occurs if the shoulder pops out of the socket. This frequently requires surgery, and results in a substantial amount of time away from the game. **Shoulder instability** occurs when there is too much movement in the joint and the muscles around the joint cannot control this movement, which results in pain and dysfunction. This can occur as a result of dislocation or injury, or may just occur in players who have increased laxity in their joints.
3. **Rotator cuff impingement syndrome.** This injury is a complex one, and which has numerous causes. The rotator cuff is a special group of muscles which attach the arm to the shoulder and act as stabilisers to keep the shoulder joint stable. These muscles can get injured during a high-impact tackle, but can also be injured during repeated minor events. A further area of concern in rugby players would be poor technique while doing high load training in the gym. This overloads the muscles of the rotator cuff and can lead to injury.

A further injury which has been described is an injury to the Pectoralis (muscle of the chest) tendon. This occurs as a result of overloading and poor form during the bench press exercise.

A large percentage of shoulder injuries are recurrent injuries. This means the player has experienced the shoulder injury before. Either the injury has not completely healed prior to the player returning to the game, or the risk factors which led to the injury are still present. This could include factors like poor

flexibility, muscle weakness or imbalance. As a result, adequate rehabilitation programs for injured players and preventative strengthening programs to reduce the incidence of shoulder injuries are essential.

***So how do shoulder injuries impact the game?***

1. They are severe injuries, resulting in a large number of match or practice days missed due to injury.
2. In many cases these injuries require surgery.

These injuries tend to recur, resulting in more playing days lost.

***MECHANISMS OF INJURY***

By far the most common mechanism of injury is contact. This includes tackles, scrums, rucks and mauls. However, the most common form of contact during which injury to the shoulder occurs is the tackle. A greater number of shoulder injuries are sustained during a match, as opposed to during practices. However, the shoulder injuries sustained during a practice are more severe. The skills training component of the practice seemed to hold the greatest risk of injury.

Although contact accounts for as much as 97% of injuries in rugby, there is little known about inherent risk factors that some players may carry which increase their chance of injury. Factors including flexibility, poor muscle strength, training methods, and biomechanics need to be investigated to assess their contribution to shoulder injuries in rugby.

Rotator cuff impingement is a common injury in rugby players. Although there is little evidence of the cause of these in rugby players specifically, a number of risk factors have been identified in other sports. These include shoulder instability (the muscles and ligaments of the shoulder cannot control the head of the humerus in its socket), scapular dyskinesis (the movement of the shoulder blade is abnormal and uncontrolled) and rotator cuff pathology (inflammation and/or degeneration of the rotator cuff tendons). A functional instability of the shoulder is commonly diagnosed in players with rotator cuff impingement. This occurs when there is no control of the shoulder joint and/or the movement of the scapula. For the most part these problems are muscular. The treatment of these potential risk factors is exercise therapy aimed at the appropriate stability muscles.

**What are the main mechanisms of shoulder injuries in rugby players?**

1. The most common mechanism is contact.
2. More injuries occur in matches but the injuries sustained during practice are more severe.
3. The skill component of training is an area of risk for shoulder injuries
4. Lack of control and strength of muscles of the shoulder joint and blade can place players at risk of developing shoulder pain.

**PREVENTION**

There are two areas of rehabilitation:

- a) Prehabilitation: This is rehabilitation or exercise therapy undertaken by players in an attempt to reduce the risk of injury.
- b) Rehabilitation: This is exercise therapy which is undertaken to prevent the recurrence of injury in players who have already experienced an injury.

Prehabilitation or preventative rehabilitation would be implemented to reduce the risk of injury by addressing a number of musculoskeletal variables which have been found to contribute to shoulder injury. The vast majority of shoulder injuries in rugby are sustained during contact. For this reason it is suggested that training or prehabilitation be implemented to prepare players for different contact situations. The merit of this argument is largely accepted but the point must be made that although adequate strengthening of the shoulder girdle may reduce the number or severity of shoulder injuries, the nature of the game of rugby means that the contact situations and collisions are associated with a naturally higher risk of injury. Fundamental to the reduction of shoulder injuries is skills training, most particularly during the tackle situation. However, the high recurrence rate of shoulder injuries would support both rehabilitation and prehabilitation programmes to reduce the number of such injuries .

Prevention of common shoulder injuries in rugby will be discussed under a number of headings: **(a) shoulder pads, (b) gym training, (c) skill training, (d) exercise therapy.** The focus of this document is exercise therapy but it is important that other factors aimed at reducing the number of shoulder injuries in rugby players are also discussed so that exercise therapy is put into context.

**a) Shoulder pads**

Shoulder pads are used by a large number of rugby players for a number of reasons. The most common reason is to absorb some of the force transmitted to the shoulder during contact and falling. There is no

evidence to support the idea that wearing shoulder pads does indeed decrease shoulder injuries. For this reason shoulder pads should be only 1 of a number of preventative strategies adopted to protect the shoulder from injury.

#### **b) Gym training technique**

Gym training is an essential component of a rugby player's conditioning programme. Poor technique while training in the gym has been recognised as a cause of tendinopathies in the shoulder. The National Strength and Conditioning Association (NSCA) have stated that a gym training programme needs to be designed and supervised by a qualified instructor to have enhanced effectiveness. This is especially true for young players.

*Gym training programmes should be designed and supervised by qualified professionals to reduce the number of injuries caused by bad technique and overloading in the gym.*

Some examples of poor technique associated with gym training are included in Table 1.

#### **c) Skill training**

Prehabilitation is called for to prepare players specifically for the various contact-related demands of the game. This may be done in part with appropriate exercise therapy as described below. However, it also includes specific training with regards to the technique of tackling, being tackled, scrumming, and the ability to fall to name but a few. Although this usually falls within the domain of the coach, these areas can be included in rehabilitation programmes which include exercises such as forward rolls (Specific exercise examples: Phase 3). Similarly boxing (Specific exercise examples: Phase 3) may be used to assist with on-field agility during the tackle situation.

**TABLE 1. STRENGTH TRAINING TECHNICAL FAULTS THAT LEAD TO INJURY**

<b>INCORRECT TECHNIQUE</b>	<b>CORRECT TECHNIQUE</b>
 <p><b>Problem:</b> Elevated shoulder when lowering the weight.</p> <p><b>Cause:</b> Weak shoulder, weight too heavy</p>	 <p><b>Correction:</b> Keep both shoulders at the same level.</p> <p><b>Solution:</b> Slow progression of weight, correct spotting</p>
 <p><b>Problem:</b> Letting the weight down too high (close to the face)</p> <p><b>Cause:</b> Incorrect technique</p>	 <p><b>Correction:</b> Lower the bar to the level of the nipple line.</p> <p><b>Solution:</b> Movement of the bar is in an arc, from the eyes at full extension to the nipples, when the bar is on the chest</p>
 <p><b>Problem:</b> Swaying forward and back when doing a bicep curl</p> <p><b>Cause:</b> Weight too heavy</p>	 <p><b>Correction:</b> There should be no movement in the upper body when lifting the weight.</p> <p><b>Solution:</b> Slow progression of weight, stand with your back to the wall.</p>



**Problem:**  
Lifting arms above the head in different planes.

**Cause:**  
Shoulder not stable, weight too heavy



**Correction:**  
Arms must be elevated in the same plane

**Solution:**  
Improve shoulder stability. OR only do this exercise if the individual has sufficient stability to perform the lift. Lighten the load



**Problem:**  
Elevated shoulder during the lift

**Cause:**  
Weakness, lack of stability

**Problem:**  
Bringing your wrists together and not your elbows

**Cause:**  
Inflexibility of the posterior shoulder (posterior capsule), weight too heavy



**Correction**  
Shoulders must work together and be 'down' during the lift phase

**Solution:**  
Work on correct form and slow progression from lighter weights. Improve shoulder stability

**Correction:**  
Ensure sufficient flexibility prior to attempting the press. Stretch prior to the press. Elbows and wrists to touch at the same time

**Solution:**  
increase flexibility, lighten weight lifted

 <p><b>Problem:</b> Bringing the weight up in an arc, and not directly in front of the body</p> <p><b>Cause:</b> Incorrect technique, weak scapular depressors (shoulder stabilisers)</p>	 <p><b>Correction:</b> Bring arms up close to the body, keeping shoulders down</p> <p><b>Solution:</b> Train correct technique. Progression of programme and weight lifted</p>
 <p><b>Problem:</b> Lifting one shoulder when pulling up in the movement</p> <p><b>Cause:</b> Lack of flexibility, lack of shoulder stability, exercise too advanced</p>	 <p><b>Correction:</b> Keep both shoulders depressed and level with each other</p> <p><b>Solution:</b> Improve flexibility, appropriate training progression and programme design.</p>

#### d) Exercise therapy

Rehabilitation of the shoulder using exercise therapy consists of two distinct parts. The first is aimed at restoring the function of the stabilising muscles of both the shoulder joint and shoulder blade. The second part aims at improving the strength, power and endurance of muscles whose primary function is movement. Both are equally important and both are dependent on the other.

**IMPORTANT:** *There is strong evidence that pain alters the timing and function of stabilising muscles. As such the function of the stabilising muscles will be altered following an acute, traumatic contact injury such as a shoulder dislocation, acromioclavicular joint sprain or muscle tear. For this reason it is imperative that ALL shoulder injuries be appropriately rehabilitated to reduce the risk of recurrence or a secondary shoulder overuse injury developing.*

### **Phases of rehabilitation**

Rehabilitation occurs in 3 stages, which follow on from one another (Table 2). During phase 1 the stabilisers of the shoulder joint (glenohumeral joint) and shoulder blade (scapula) are retrained. This is a process which is followed in conjunction with a physiotherapist or biokineticist. It is not a long phase but it is essential to the success of the rehabilitation programme. Phase 2 continues the strengthening of the stabilisers and movers but in very simple exercises, which tend to isolate specific muscles. There is a strong emphasis on the correct motor pattern or movement. These are exercises that can easily be incorporated into general strengthening programs in individuals that are not injured and simply doing preventative rehabilitation. During phase 3 the emphasis is on skill training and strengthening. It is important that the approach to strengthening is to achieve muscle balance and strength on a strong stability foundation. There is a strong focus on technique, particularly if gym exercises are utilised. Exercises also include falling/rolling technique and plyometric exercises. Specific examples of exercises are included below.

**TABLE 2. THE PHASES OF REHABILITATION IN THE SHOULDER**

	<b>PHASE 1 COGNITIVE STAGE</b>	<b>PHASE 2 ASSOCIATIVE STAGE</b>	<b>PHASE 3 AUTONOMOUS STAGE</b>
Aims of the phase	To activate and isolate the stabilisers of the glenohumeral joint and scapulothoracic joint	To retrain movement patterns and isolated muscles	The aim is dynamic stabilisation with emphasis on skill training and functional rehabilitation

### **Specific exercise examples**

The following section outlines the phases a player must successfully negotiate in order to minimise the risk of shoulder injury. Each individual must pass through the phase before proceeding to the next. The phases are designed to improve shoulder stability in a progressive and structured way. The level of rugby played does not influence the phase at which the player starts. Each player should start at phase 1.

Progression through the phases should be limited to the player's ability to complete the exercise set, and repetitions without compromising their technique or form.

**Phase 1:**

The aim of this stage is to set the shoulder blades onto the rib cage

	<p><b>Scapula setting:</b></p> <p>Draw the tip of the shoulder away from the fingers, which lie in the line of the pec muscle. Sustain a hold for 10 s and repeat 10 times</p>
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**Phase 2:**

The aim of this phase is to retrain movement patterns and improve the strength and endurance of the stabilising muscles.

	<p><b>Scapular protraction and retraction (push up plus):</b></p> <p>Keeping the elbows extended, drop your chest toward the ground. Push up through the chest.</p> <p>Take 3 s to go down, and 2 s to come up again.</p>
	<p><b>Dynamic hug:</b></p> <p>Place a piece of theraband across your shoulder blades as shown. Extend your elbows and push your shoulders forward, bringing your hands together.</p> <p>Take 2 s to extend, and 3 s to go back to the resting position.</p>

	<p><b>Scapular retraction with weights:</b></p> <p>Place a heavy dumbbell in your hand. Draw the shoulder blade toward the spine, moving the inferior angle more than the upper portion.</p> <p>Do not activate the muscles in your neck.</p> <p>Take 2 s up, and 3 s down.</p>
	<p><b>Serratus punch:</b></p> <p>Place the theraband as shown. Jab the leading arm forward while rotating the arm inwards. Concentrate on moving the arm and the shoulder blade forward. And slowly return to the starting position.</p>
	<p><b>Scapular retraction and protraction:</b></p> <p>Lying over a ball, with your upper body suspended. Keeping your elbows locked in extension, allow your chest to move toward the ground (shoulder blades to move together), push your chest up into the starting position.</p>
	<p><b>Theraband internal rotation:</b></p> <p>Tie the theraband to an immovable object. Bend your elbow to 90°, and keep it slightly away from your side, rotate the band toward your stomach.</p>

	<p><b>Step walking:</b></p> <p>Place your hands on either side of a step (as shown). Move one arm and then the other onto the step. Return to the starting position. Keep your shoulder blades in the protracted (forward) position.</p>
	<p><b>Bent over row:</b></p> <p>Place a weight in your hand. Retract your shoulder blade (move inferior border closer to the spine). Once that movement has been achieved, lift the weight up, bending your elbow. The weight must reach your waist.</p>
	<p><b>Cable rows:</b></p> <p>As you pull the rope towards you, make sure that you pull your shoulder blades back at the same time. Be careful not to elevate the shoulders.</p>

**Phase 3:**

The aim of the third stage is to provide for functional training and movement. The movements aim at including cross body movements in multi-directions, not in a single plane

	<p><b>Windmill:</b></p> <p>Start in a push up position, move onto one shoulder, by rotating your body to one side. Maintain neutral alignment, and do not allow your shoulder to collapse.</p>
	<p><b>Four point kneeling on a ball, with leg elevation:</b></p> <p>Place both hands and legs on the ball. Once you have achieved balance, extend one leg behind you, Maintain balance by using your shoulder blades as stabilisers</p>
	<p><b>Reverse throws:</b></p> <p>Tie the theraband to an immovable object. Facing the band, draw the band back and up, into the throwing position, using your shoulder blade and arm. Return your arm to the starting position slowly, releasing both your arm and shoulder blade. Be careful not to elevate your shoulder as you pull back.</p>



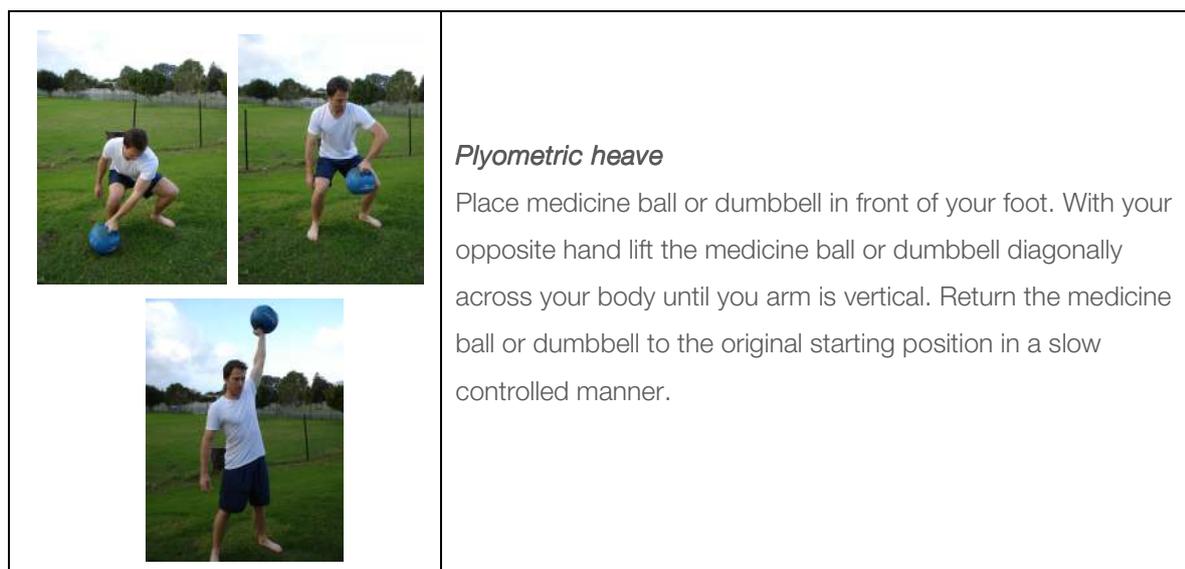
***Medicine ball push up:***

Place each hand on a medicine ball. Complete a push up. Do not allow the balls to touch together.



***Forward roll:***

Roll over on either shoulder. Ensure that you have the ability to fall and roll over each shoulder.



## **SAMPLE PROGRAMMES**

### **Phase 1:**

All players should be able to achieve scapula setting. This exercise must be performed 5 – 6 times a day, 7 days a week or until the player is able to set their shoulder blade with ease.

For those players who are involved with a strength training programme the following guidelines should be adhered to.

1. Scapular setting should be completed every day of the week, including gym days
2. Scapular setting must be completed just prior to and after gym training
3. During this phase of rehab, the players must limit their upper body routines to those exercises that are below shoulder height
4. Players should concentrate on correct form and technique, and should not attempt to make any weight gains on any of their exercises
5. The trainer/coach should re-evaluate their training programme and identify possible areas to concentrate on during this phase
6. Coaches should work on other aspects of the player's physical profile

## Phase 2:

This phase requires players to integrate the phase 2 preventative exercises into their current training programme. Player should be able to choose 4/5 exercises that are given and include those into their routines. These exercises should rotate with every training session they complete until they have mastered all the exercises. The guidelines for training are as follows:

1. Frequency – x3 a week
2. Intensity – Follow the remainder of the programme in terms of sets and repetitions.
3. Progression – Increase the number of exercises completed per session, increase the number of sets and repetitions, while maintaining correct form.
4. Load – The initial load should allow 3 sets of 10 repetitions performed without altering technique. Weight can be increased gradually still allowing players to perform 3 sets of 10 repetitions without losing form.

A sample programme would look as follows:

<b>Exercise</b>	<b>Description</b>	<b>Sets</b>	<b>Reps</b>
Bench press	Superset (Combining a set of one exercise and alternating it with another set of a different exercise).	1,1,1,1	15,12,12,10
Scapular protraction and retraction		1,1,1,1	10,10,10,10
Cable flys	Superset	1,1,1	12,12,12
Theraband internal rotation		1,1,1	10,10,10
Bent over row	Superset	1,1,1,1	10,10,10,10
Bench stepping		1,1,1	10,10,10
Cable rows		1,1,1,1	12,12,10,10

### **Phase 3:**

Phase 3 exercises should be seen as a separate programme on its own. Players should complete their other strength training independently of the rehabilitation exercises.

The guidelines for training are as follows:

1. Frequency – x3/4 a week
2. Intensity – Increased repetitions, low load (2/3 x 15/20)
3. Progression – should be made in consultation with a rehabilitation specialist. Sets and repetitions can also be increased to 4 – 5 sets of 15 – 20 repetitions

### **AUTHORS' BIOGRAPHIES**

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