Dublin Shoulder Institute

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Considerations for Rehab of Superior Capsule Reconstruction (SCR) of the Shoulder.

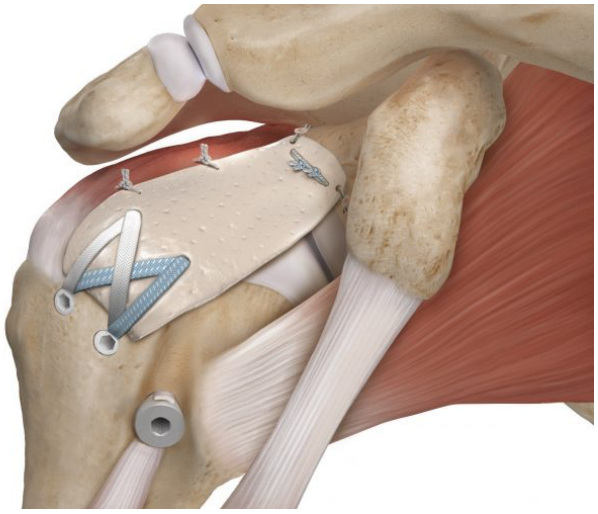
What is SCR?

SCR is an anatomic reconstruction of the Superior Capsule of the Shoulder (Mihata et al 2012). It is indicated in patients with irreparable tears of the rotator cuff and where there is evidence of a defect in the superior capsule, with no arthritis in the Glenohumeral joint.

In patients who have a large, full-thickness tear of the rotator cuff the humeral head may move superiorly in the glenoid during arm elevation. This disrupts the force couple that exists between the deltoid muscle and the rotator cuff, and can present clinically as the patient "hitching" their shoulder .

SCR can restore glenohumeral joint kinematics by helping to centre the humeral head in the glenoid fossa, establishing a stable fulcrum and allowing the deltoid and the cuff to function more effectively. This helps the patient with elevation of their arm.

While patients may not regain complete strength without a native rotator cuff, initial clinical studies on SCR show that patients can achieve significant reduction in pain and improvement in function .



THE GRAFT:

We currently use a porcine xenograft dermal extracellular graft (Arthrex DX Matrix) to reconstruct the superior capsule of the shoulder. Biological grafts are preferred over synthetic grafts because they contain collagen thus natural cell interactions such as proliferation and migration occur.
A successful post-operative outcome is dependent on a successful healing process, which consists of the initial inflammatory phase. The following occurs:

1) Fibroblasts must penetrate the collagen matrix within the biological graft.
2) Cell Proliferation/degradation occurs , essential for host acceptance of biological graft.
3) Remodelling/maturation phase – cells, blood vessels and collagen organise where the fibres align along different tension lines to achieve overall tensile strength of the graft.

IF REMODELLING DOES NOT OCCUR PROPERLY, TISSUE DEGRADATION AND REJECTION OF THE GRAFT COULD OCCUR.

REHABILITATION PRINCIPLES

Three main principles are:

- Optimise graft healing as part of a conservative rehab approach.
- Deltoid re-education.
- Collaboration between surgeon, therapist and patient.

OPTIMISE GRAFT HEALING via a conservative approach. Evidence suggests that the grafts undergoes significant remodelling and becomes weaker before it gets stronger.

DELTOID RE-EDUCATION - The deltoid plays key role in the rehab process of patients who have undergone SCR as the deltoid is considered the prime mover of the arm in the absence of a complete, functioning rotator cuff.

COLLABORATION SURGEON/THERAPIST/PATIENT- close communication with the surgeon is essential for a successful post-operative outcome. Clinicians also need to constantly monitor the patient's expectations by explaining the time lines of expected benefits and recovery.

REHAB PHASES

Patients are discharged from hospital wearing a shoulder immobiliser (DonJoy Ultrasling III) and with a home exercise programme consisting of AROM for elbow/ wrist / hand. Patients will then attend for a 2-week post-op review before attending with their Chartered Physiotherapist.

A video explaining how to correctly wear the shoulder immobiliser can be found here: https://www.dublinshoulder.com/services/shoulder-surgery/

PHASE 1: PROTECTIVE PHASE 0-6 weeks (patient in sling, initial inflammatory phase occurring - healing the graft).

Goals:

- It is beneficial for the patient to have a clear understanding on the rationale of the surgery and the rehabilitation process.
- Ensure fine balance between protecting graft and reducing post-op stiffness.
- Ensure patient compliance with sling and home exercise program.
- Ensure patient is comfortable, managing any pain and sleeping well. (Reassure the patient that it may take some time to be comfortable at night and sleeping normally, this is an expected part of the initial post-operative period)

Precautions:

- Arm is to remain in sling, and removed only for HEP and washing/dressing.
- NO Active ROM of the shoulder. No hand behind back or across body.
- NO supporting of body weight with hands.
- NO driving.

Treatment & Management:

- 2 week post-op check with surgeon for wound check (absorbable stitches are used) and physiotherapy instructions.
- Patient is to wear sling for 6 weeks.
- Inform patient re: timeframes of recovery and functional improvements.
- Ice (10 min, 3-5 x daily) and pain relief as prescribed.
- PROM may commence before 6 weeks to prevent post-op stiffness. Please refer to patient Physiotherapy Prescription note from Dublin Shoulder Institute.

Treatment Considerations:

- Sensorimotor control should start early in the rehab and progress through the phases.
- Assess for Pectoralis dominance. Patients will often be in a protracted shoulder position and have an increase in resting tone of the muscles (observable or by palpation).

PHASE 2 : INTERMEDIATE PHASE (6 weeks – 4 months, Graft incorporation and Revascularisation phase).

GOALS:

- Restore Functional AROM (Flexion, Scaption, ER, IR)
- Establish basic rotator cuff and scapular neuromuscular control, in pain free ROM.
- Regular physiotherapy required to guide patient through this rehab phase.

PRECAUTIONS

- NO exercise/ activity that increases pain
- NO specific cuff strengthening exercises until 12 weeks.
- NO bands/ heavy lifting/ weights to be used until 12-weeks.
- NO supporting of body weight by hands or arms.

Treatment & Management:

- Regular physiotherapy is required to guide patients through this rehab phase.
- Start with Active Asssisted ROM and progress to Active ROM through range, focusing on scapular control.
- GH joint and scapular mobilisations as indicated to regain ROM.
- Closed-chain stability exercises can start with wall push-ups.
- Can begin rotator cuff isometric exercises below shoulder height.
- Commence Anterior Deltoid Re-education programme*
- Serratus Anterior Activation: patient in supine, arms at 90 degrees flexion and full scapular protraction.
- Pool session are beneficial - supervised hydrotherapy session or self-directed PROM in the pool.
- End of Phase: Weight shifts and perturbations will improve static control through compressive forces acting on GH joint. Start in incline position and gradually lower to quadruped on floor.
- End of Phase: Kinetic chain exercises for strengthening posterior chain – where appropriate.
- Review with surgeon at 12 weeks post-operatively.

By end of this Phase, patient should be able to carry out light to moderate functional activity at waist and shoulder height, have minimal pain and be sleeping well.

Considerations:

Ensure exercises are goal orientated with proprioceptive, functional and dynamic elements.

Some patients may have difficulty recruiting the deltoid as the prime mover of the shoulder. Biofeedback, surface EMG, verbal/tactile cues and tape can be used to help patients.

*__www.shoulderdoc.co.uk/article/1028__ is an example of an evidence-based deltoid re-education program (based on study by Levy et al, 2008).

PHASE 3: STRENGTHENING phase (4-6 months). Remodelling phase of healing where collagen fibres are laid down to achieve tensile strength of the graft.

GOALS:
Rehab to include a structured and progressive strengthening program for the deltoid, remaining rotator cuff and scapular stabilisers.
Patients to return to more physically demanding work and activities.

Precautions:
- No lifting of heavy objects
- No contact sport.

Treatment & Management:

- Integration of the kinetic chain into Home Exercise Program.
- Progress strengthening program with body weight/ free weights/ resistance bands.
- Activate posterior rotator cuff through available range with band. Start in supine position and progress to standing.
- Progress through program for deltoid re-education.
- Progress closed chain exercises (use Swiss Ball/ Pilates Ball to increase co-contraction of deep stabilisers/ improve dynamic shoulder stability/scapular control).
- Incorporate sensorimotor control exercises.
- Dynamic bear hug (with resistance band) for Serratus anterior, Trapezius, Rhomboids). Can also be done in a lunge hold position to bring in kinetic chain.
- Exercises with weight transference – push ups at wall/ on incline and lift good hand away.
- Thoracic rotation and extension exercises
- Advise of injury prevention strategies and continued benefit of regular cardio-vascular exercise.
- Review with surgeon at 6 months post-op.

Treatment & Management:
- Integrate the kinetic chain in assessment and treatment plans. Consider Lumbo-pelvic hip complex (LHPC) and its importance in force production for upper limb function. A stable proximal base will enhance distal arm function. (https://www.aspetar.com/journal/viewarticle.aspx?id=198#.YCWxFqecY_U)
- Encourage good postural habits and maintain available range of thoracic extension: 15 degrees of thoracic extension is required for pain free shoulder elevation.

PHASE 4: End stage Rehabilitation (6-12 months).

GOALS:

- Encourage patients to maintain their exercise programme and an active lifestyle up to 12 months post-operatively and beyond.
- Provide an individualised rehab program for greater upper Llmb function.

Long term rehab program should include :

- Strengthening exercises for return to full functional activities.
- Enhanced proprioceptive and neuromuscular control programme.
- Exercises in overhead position.
- “Push-up Plus” for Serratus anterior.

Contact with patient at 12 and 24 months post-operatively for outcome scores.