



REVERSE TOTAL SHOULDER ARTHROPLASTY

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Reverse Total Shoulder Arthroplasty

Sling	From Day 1	Restrictions	Strengthening
6 weeks	C-spine, Elbow, Wrist and hand AROM	Avoid HBB for 8/52 Limited ER to neutral for 6/52	Isometrics at 2 weeks. Can start squeezing ball day 1.

Pre-Operatively

- Teach active assisted/active supported mobilisation programme – C-spine, Shoulder, Elbow, Wrist and hand.
- Advice on continued CV, lower limb and non-operated shoulder exercise programme.
- Patient education regarding the procedure and expected outcomes.

Factors that may affect progression rate:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Tissue Quality inc bone health • Age • Multi-tendon involvement | <ul style="list-style-type: none"> • Anterior deltoid function • Diabetes • Smoking and Alcohol status |
|---|---|

Treatment Note: Rehab is geared towards avoiding early dislocation of the prosthesis (akin to hip precautions) and protecting the repair of subscapularis or deltoid, according to the approach used, and subsequently deltoid strengthening. Timescales are general guidelines and are dependent on the patients individual factors and pre-operative history / status. When considering dose of prescribed exercise consider aim of the exercise and the individual patient – consider they may need to build up to desired dose and manipulating the F.I.T.T principles.

¹Phase 1 (Day 1 - 2 weeks) Initial in hospital and on discharge exercises

Aims/Goals: Shoulder protection – In Sling for 6 weeks. Sling can be removed for home exercise programme.

Avoid: HBB, ER past neutral and combined abduction with IR or ER for 2/12. Heavy lifting or weightbearing on the hands in extension.

Exercise:	Dose:
PROM <ul style="list-style-type: none"> • Pendulum (circular motion) • Passive shoulder Flexion to 90 degrees • Passive shoulder External 	



rotation to neutral	
AROM <ul style="list-style-type: none"> • Cx – RR, LR, E, F, RSF and LSF • Tx – RR, LR • Elbow – F,E • Wrist & Hand – F, E 	
Strengthening <ul style="list-style-type: none"> • Ball Squeezes 	

Treatment Note:

- Reminder on importance of pain control.
- Use of ice pack
- Can remove sling to sleep but use body strap for support.
- Stitches to be removed at 2/52 post op at GP practice
- Patient can still engage with lower limb rehab and strengthening of the non-operated side to facilitate recovery.

Phase 2 (2 – 6 weeks)

Aims/Goals: Continued shoulder protection (Sling for 6 weeks). Progression of PROM to AAROM.

Avoid: HBB, ER past neutral and combined abduction with IR or ER for 2/12. Heavy lifting or weightbearing on the hands in extension.

Exercise:	Dose:
Submaximal Isometric Contractions: <ul style="list-style-type: none"> • Deltoids – Anterior, Middle and Posterior (in neutral) • External rotation (in neutral) • Gripping a pair of socks or small foam ball. 	
PROM <ul style="list-style-type: none"> • Continued Pendulum exercise • Continued Passive shoulder Flexion to 90 degrees • Continued External rotation to neutral 	
AAROM <ul style="list-style-type: none"> • Sliding hand forwards on a table • Seated self-assisted elevation 	

Phase 3 (6 weeks – 12 weeks)



Aims/Goals: Discontinued shoulder immobilisation, progression of AAROM to AROM

Avoid: Combined abduction with IR or ER for 2/12. Heavy lifting or weightbearing on the hands in extension.

Exercise:	Dose:
AAROM	
<ul style="list-style-type: none"> Pulley assisted Flexion 	
<ul style="list-style-type: none"> AAROM LR to 30 degrees which must be patient controlled 	
<ul style="list-style-type: none"> At 8/52 introduce AAROM HBB which must be patient controlled. 	
<ul style="list-style-type: none"> Assisted upright wall slide (start by assisting with none operated shoulder then allow the operated side to slowly lower independently. As this gets easier progress to AROM Flexion. 	
<ul style="list-style-type: none"> Supine → Incline → Upright Active flexion with weight (0.5 kg / Theraband). Progress through short lever – long lever principles. 	
<ul style="list-style-type: none"> Continue with Isometric contractions but increase MVC – patient controlled 	

Treatment Note: All patients are normally followed up in clinic with consultant at 6-8/52 post op

Driving is normally possible at 2/12 however this is dependent on patient function and safety and specific post op instructions. Patients should always check with the DVLA and insurance company.

Phase 4 (12 weeks – 20 weeks)

Aims/Goals: Active Shoulder Strengthening

Exercise:	Dose:
Anterior deltoid strengthening:	
<ul style="list-style-type: none"> Supine → Seated → Standing Active flexion with weight (0.5 	



kg / Theraband).	
<ul style="list-style-type: none"> • Supine → Standing Active Abduction in ER 0 – 45 degrees (0.5 kg / Theraband). 	
<ul style="list-style-type: none"> • Supine → Standing Active Abduction in IR 0 – 45 degrees (0.5 kg / Theraband). 	
<ul style="list-style-type: none"> • Seated, supported ER in 45 – 95 degrees abduction using (0.5kg weight / Theraband). 	
<ul style="list-style-type: none"> • Seated → Standing Lat pull down (Theraband). 	
<ul style="list-style-type: none"> • Seated → Standing rows (Theraband) (Progress range of abduction from 0 – 45 – 90 degrees). 	
<ul style="list-style-type: none"> • Supine Scapula protractions progression → wall press, incline press up against the table → press ups on knees → full press ups. 	

Treatment Note: Aim for function specific rehabilitation considering manipulating training principled for power and endurance. Loaded cuff strengthening and kinetic chain rehabilitation if appropriate.

Expected Outcomes²

(Data presented represents mean scores at long term follow up reported from literature review)

Outcome	Primary Elective Procedure		
ROM	Flexion	Abduction	External Rotation
Total (degrees)	122.5	117.6	32.1
Pain Scores	1.5/10		
Patient Satisfaction	93%		

Outcome	Elective Revision		
ROM	Flexion	Abduction	External Rotation
Total (degrees)	105.6	96	32.1
Pain Scores	2.7/10		
Patient Satisfaction	79%		



Outcome	Acute Trauma Procedure		
ROM	Flexion	Abduction	External Rotation
Total (degrees)	119.45	102.25	25.6
Pain Scores	2.2/10		
Patient Satisfaction	73%		

Appendix: Procedure Summary

Called a “reverse” because unlike in the normal shoulder (glenoid=socket, humeral head=ball), the humeral side is replaced using a stem with a socket and the glenoid is replaced with a hemisphere, i.e. the positions of the ball and socket are switched. The underlying biomechanics are relatively complex, but essentially the design allows a stable fulcrum for rotation and the deltoid takes over the function of the rotator cuff. (Implants: the glenoid component is usually fixed using screws and the humeral stem can be cemented or uncemented)

It is used in cases of arthritis combined with massive cuff tears where the patient has lost the ability to elevate the arm, also in selected cases of massive cuff tear without arthritis and for revision cases – i.e. cases where until recently there was no good surgical solution.

The reverse has a higher complication rate and is more difficult to perform than standard arthroplasty, also it is relatively new so there are few reports of any long term results, so usually done in patients over 70 years of age. The most frequent complications are infection or instability of the prosthesis, both of which can be very difficult to resolve.



Techniques:



Technique 1- Deltopectoral approach: a internervous approach between pectoralis major and deltoid muscles. No further tendon detachment is required as access to the joint can be achieved through the fracture itself

Technique 2 Lateral approach (McKenzie): gives better access to the greater tuberosity, a raphe split between anterior and middle portions of deltoid is made during the approach.

Reference List

1. Edwards, P., Ebert, J., Brendan, J., Ackland, T. & Wang, A. (2020). A randomised trial comparing two rehabilitation approaches following reverse total shoulder arthroplasty. *Shoulder & Elbow*, 0,(0). pp1-16.
DOI:10.1177/1758573220937394.
2. Liverpool shoulder clinic. (2016). Reverse total shoulder arthroplasty. Liverpool shoulder clinic, Retrieved July, 27, 2020 from https://www.liverpoolshoulderclinic.com/_Client/Documents/rehabilitation_RT_SA_ULTRA_2016.pdf.