Reverse Total Shoulder Arthroplasty

Robert Rolf MD

Indications

- Reverse total shoulder replacement is indicated for use in grossly rotator cuff deficient joints with severe arthropathy, or for use when a previous joint replacement has failed with a grossly rotator cuff deficient joint.
- A functional Deltoid muscle is needed for use of this device.
- Also, the patient's joint must be anatomically and structurally suited to receive the device.
- The metaglene component and all other HA coated components are for cementless use only.
- All other components are intended for cemented use only.

Contraindications

- The following are contraindications for shoulder arthroplasty:
- Active local or systemic infection;
- Poor bone quality and/or inadequate bone stock to appropriately support the prosthesis;
- Severe deformity;
- Muscle, nerve or vascular disease;
- Obesity, drug abuse, over activity or mental incapacity.

Warnings and Precautions

- The following conditions tend to adversely affect the fixation of the shoulder replacement implants:
- Marked osteoporosis or poor bone stock,
- Metabolic disorders or systemic pharmacological treatments leading to progressive deterioration of solid bone support for the implant (e.g., diabetes mellitus, steroid therapies, immunosuppressive therapies, etc.),
- History of general or local infections,
- Severe deformities leading to impaired fixation or improper positioning of the implant;
- Tumors of the supporting bone structures;
- Allergic reactions to implant materials (e.g. bone cement, metal, polyethylene);
- Tissue reactions to implant corrosion or implant wear debris;
- Disabilities of other joints.

Adverse Effects

- The following are the most frequent adverse events encountered after total or hemi-shoulder arthroplasty:
- Change in position of the prosthesis, often related to factors listed in Warnings and Precautions.
- Early or late infection;
- Early or late loosening of the prosthetic component(s), often related to factors listed in Warnings and Precautions;
- Temporary inferior subluxation. Condition generally disappears as muscle tone is regained;
- Cardiovascular disorders including venous thrombosis, pulmonary embolism and myocardial infarction;
- Hematoma and/or delayed wound healing;
- Pneumonia and/or atelectasis;
- Subluxation or dislocation of the replaced joint.

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Reverse Total Shoulder Arthroplasty Protocol-Dr. Rolf

Hospital

- 2-3 days
- IP OT
  - ADL instructions
  - Precautions
  - Elbow, wrist and hand ROM
  - No shoulder ROM
- No IP PT

Dislocation Precautions

- Patients following a rTSA do not dislocate with the arm in abduction and external rotation. They will typically dislocate with the arm in internal rotation and adduction in conjunction with extension.
- For example, tucking in a shirt or performing bathroom / personnel hygiene with the operative arm is a dangerous activity particularly in the immediate peri-operative phase.
- No reaching across body to wash under opposite axilla or wash opposite shoulder (6 weeks)
- Precautions should be implemented for the first 12 weeks postoperatively unless surgeon specifically advises patient or therapist differently
- No shoulder motion behind lower back and hip (no combined shoulder adduction, internal rotation and extension)
  - No reaching behind back (12 weeks) to:
  - Tuck in shirt
  - To pull belt through the back loops
  - Reach to back pocket to get wallet out
  - Fasten bra (if applicable)
  - Perform personal hygiene
- No glenohumeral joint extension beyond neutral(always need to be able to see the elbow) (12 weeks)

Progression to the next phase based on clinical criteria and time frames as appropriate

Patient Precautions

- Avoid all activities using operative upper extremity for first 4 weeks except for those done with the physical therapist.
- Clothing: Oversized button down shirts, women should avoid wearing bras for the first 4wks
- No shoulder AROM or passive range of motion (PROM).
- No lifting of objects with operative extremity.
- No supporting of body weight with involved extremity.
- Keep incision clean and dry (no soaking/wetting for 2 weeks); No whirlpool, Jacuzzi, ocean/lake wading for 4 weeks.

How long does the patient need to wear the sling?
What position shoulder the arm be placed in when wearing the sling?

Normal rTSR
Day 5-6 weeks
Night 6 weeks

Revision rTSR
Day 5-6 weeks
Night 6 weeks

If lat dorsi tendon transfer (LDTT), place in gunslinger sling in neutral to 15 degrees ER position

Outpatient PT-Begins 1 week post-op

- See MD protocol and MD guidelines for specific details

When can patient begin codmans?

- 1 week post-op begin codman's forward/back with arm in neutral rotation and supported at the wrist
- Avoid adduction past midline and avoid IR
- DO NOT DO Codman side to side or CW, CCW
- If shoulder is unstable per MD, do codman's on ball
- Can begin codman's side to side and CW/CCW at 3 weeks post-op

Standard Post-op exercises

- Neck ROM
- Elbow, wrist, forearm hand AAROM
- Shoulder Shrugs
- Scapular Retraction

When can patient begin PROM? Any motions to avoid or limitations with motions?

- Begin flexion and scaption day 1-2 (limit flexion/scaption to what MD got in the surgical report for 6 weeks-this is generally 120-140 degrees but check with operative report before moving shoulder)

- Begin PROM ER in POS to about 5-10 degrees less than what the MD got at operative findings

- Avoid PROM IR for 6 weeks
- At 6 weeks, begin IR in POS but do not exceed 50 degrees
- At 8 weeks-IR at 45 degrees shoulder abduction
- At 10 weeks-IR at 60 degrees shoulder abduction
- At 12 weeks-IR at 90 degrees shoulder abduction

What PROM for flexion/Scaption was MD able to obtain at time of surgery?

- This is the ultimate goal of rehab
- Do not push flexion/scaption beyond what MD got at time of surgery
- PROM ER 20-30 degrees in POS

- Can we move PROM beyond if no tissue resistance prior to 6weeks-**No**

How far was shoulder able to be passively ER in POS in operative findings before tension?

- MD will let us know this
- Do not move arm beyond these limits for the first 6 weeks in the POS
- At 6 weeks, begin PROM ER at 45-60 degrees abduction
- At 8 weeks, begin PROM ER at 90 degrees abduction

When can patient begin shoulder Isometrics for Deltoid (shoulder flexion/abduction/extension)?

- Begin submaximal pain-free deltoid isometrics at 3 weeks PO as long as deltoid wasn't resected and repaired back down
- Shoulder flexion/abduction/extension) in scapular plane
- avoid shoulder extension when isometric shoulder extension for posterior deltoid.
- Do not do any resisted shoulder adduction/IR or ER

When can patient begin AAROM with pulley, cane-flexion, ER in POS?

- Can begin AAROM for motion at 6 weeks post-op?
- Can begin AAROM for motion at 8 weeks post-op for lat dorsi transfer

When can patient begin AROM?

- 6 weeks post-op

When can patient begin shoulder isotonic strengthening for shoulder occur with band or small dumbbell?

- 12 weeks for all patients

Was the rTSR a revision?

- If so, delay the typical rTSR protocol by 3-4 weeks
- Patient will generally begin OP PT at 3-4 weeks post-op
- Begin PROM at 3-4 weeks post-op
- Begin AROM at 6 weeks post-op
- Begin strengthening at 8-12 weeks post-op
- Wear the sling for 4-6 weeks during the day
- Wear the sling 6 Weeks at night

Was there poor bone stock?

- If so, delay the typical rTSR by 6 weeks
- Patient will generally begin OP PT at 6weeks post-op
- Begin PROM at 6 weeks post-op and progress ROM as tolerated
- Begin AROM at 8 weeks post-op
- Begin strengthening at 12 weeks post-op
- Wear the sling for 6 weeks during the day
- Wear the sling 6 weeks at night

What was the quality of the repaired soft tissue poor?

- Poor soft tissue quality occurs if there has been a prior open rotator cuff repair or if the deltoid was retracted off the acromion
- If so, delay the typical rTSR by 3-4 weeks
- Begin PROM at 3-4 weeks post-op
- Begin AROM at 8 weeks post-op
- Begin strengthening at 12 weeks post-op
- Wear the sling for 4-6 weeks during the day
- Wear the sling 6 weeks at night

Did MD use deltopectoral incision or superior lateral approach?

Deltopectoral incision

- See rTSA protocol-Dr. Rolf

Superior lateral

- Dr. Rolf doesn't use this approach
- Deltoid surgically reflected off acromion
- Begin shoulder deltoid isometrics at 6-8 weeks po
- Begin shoulder deltoid isotonics at 8-12 weeks po
- Deltoid incised along its fibers
- Begin shoulder deltoid isometrics at 3 weeks po
- Begin shoulder deltoid isotonics at 6-8 weeks po

Was subscapularis incised or reflected?

- Only passive ER in POS as indicated by the operative findings for weeks 1-6 (this is usually around 20-30 degrees)
- At 6-8 weeks can begin ER at 45-60 degrees abduction respecting the healing soft tissue
- At 8-12 weeks, can begin ER at 90 degrees abduction
- If the subscapularis was repairable, no active subscapularis (IR for 6 weeks)
- If the subscapularis was repairable, no resisted subscapularis (IR for 8 weeks)

Was the rotator cuff deficient or absent?

- If deficient or absent, what part was absent (subscapularis, Supraspinatus, teres minor)
- Was the latissimus transferred for the function of the deficient ER's-If so, see rTSA Lat Dorsi Transfer protocol
- If posterior cuff repair-no passive IR
- If anterior (subscapularis) cuff repair-no passive ER beyond limits of operative findings

Was the latissimus dorsi used as a transfer for the ER's?

- If surgery is a revision or if poor bone stock is present, delay the normal protocol for 3-4 weeks
- Avoid combined movement of shoulder Adduction/IR and extension by reaching behind the back (prosthesis dislocation) for 12 weeks
- Avoid aggressive IR, Flexion (Lat Dorsi) and Adduction (prosthesis dislocation) for 6-8 weeks

- May need biofeedback or neuromuscular re-education to retrain the latissimus dorsi to work as a humeral stabilizer for ER

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Reverse Total Shoulder Arthroplasty Protocol-Dr. Rolf

Phase I: Immediate Postsurgical Phase, Joint Protection (Day 1 to Week 6)

Goals:

- Promote healing of soft tissue/maintain the integrity of replaced joint
- Enhance PROM
- Restore active range of motion (AROM) of elbow/wrist/hand
- Independent with activities of daily living (ADL's) with modifications
- Patient and family independent with:
  - Joint Protection
  - Passive range of motion (PROM)
  - Assisting with putting on/taking off sling and clothing
  - Assisting with home exercise program (HEP)

Precautions:

- Sling is worn for a 3-4 week postoperatively. The use of a sling may be extended for a total of 6 weeks, often if it is a revision surgery
- While lying supine, the distal humerus/elbow should be supported by a pillow or towel roll to avoid shoulder extension. Patient should always be able to visualize their elbow while lying supine
- When doing scapular PNF-make sure arm stays in neutral GH rotation and do not allow it adduct or IR
- No shoulder AROM until 6 weeks post-op
- No lifting of objects with operative extremity
- No supporting of body weight with involved extremity
- Keep incision clean and dry for at least 2 weeks

Day 1 to 4 (acute care PT)

- Begin PROM in supine after complete resolution of interscalene block (usually 24 to 48 hrs post-op)
- Forward flexion and elevation in the scapular plane in supine to degrees of flexion MD got at the time of surgery as reported in the surgical reports
- External rotation (ER) in scapular plane to available ROM as indicated by operative findings, typically around 20-30 degrees
- No IR range of motion secondary to possibility of dislocation
- Codman's forward only (avoid adduction and IR)
- AAROM elbow/forearm/wrist/hand and neck
- Begin periscapular submaximal pain-free isometrics in the scapular plane
- Frequent ice application 15-20 minutes for at least 4-5 X per day

Days 5 to 21

- Continue all previous exercises
- Begin submaximal pain-free deltoid isometrics at 3 weeks post-op
- Shoulder flexion/abduction/extension) in scapular plane(avoid shoulder extension when isometric shoulder extension for posterior deltoid).
- Do not do any resisted shoulder adduction/IR or ER
- Frequent ice application 15-20 minutes for at least 4-5 X per day

Weeks 3 to Week 6

- Progress previous exercises
- Progress PROM
- Forward flexion and elevation in the scapular plane in supine to 120 degrees
- ER in scapular plane to tolerance, respecting soft tissue constraints
- At 6 weeks post-operatively start PROM IR to tolerance (not to exceed 50 degrees) in the scapular plane
- Gentle resisted exercise of elbow, wrist, and hand
- Continue frequent cryotherapy

Criteria for Progression to the Next Phase (Phase II)

- Patient tolerates shoulder PROM and AROM program for elbow, wrist and hand
- Patient demonstrates the ability to isometrically activate all components of the deltoid and periscapular musculature in the scapular plane

Phase II-AROM, Early Strengthening Phase (Weeks 6 to 12)

Goals:

- Continue progression of PROM (full PROM is not expected)-See what MD got in surgery
- Gradually restore AROM
- Control pain and inflammation
- Allow continued healing of soft tissue/do not overstress healing tissue
- Re-establish dynamic shoulder stability

Precautions:

- Continue to avoid shoulder hyperextension
- In the presence of poor shoulder mechanics avoid repetitive shoulder AROM exercises/activity
- Restrict lifting of objects to no heavier than a coffee cup
- No supporting of body weight by involved upper extremity

Weeks 6 to Week 8

- Continue with PROM program
- Begin shoulder active assisted ROM/AROM as appropriate
- Forward flexion and elevation in scapular plane in supine with progression to sitting standing
- ER and IR in the scapular plane in supine with progression to sitting/standing
- Begin gentle GH IR and ER submaximal pain-free isometrics
- Initiate gentle scapulothoracic rhythmic stabilization and alternating isometrics in supine as appropriate

- Begin gentle periscapular and deltoid submaximal pain-free isotonic strengthening exercises, typically toward the end of the eight week
- Progress strengthening of elbow, wrist, and hand
- Gentle GH and scapulothoracic joint mobilizations as indicated (grades 1 and II)
- Continue use of ice as needed
- Patient may begin to use hand of operative extremity for feeding and light ADL's

Weeks 9 to Week 12

- Continue with previous exercises and functional activity progression
- Begin AROM supine forward flexion and elevation in the plane of the scapula with light weights (1 to 3 lbs) at varying degrees of trunk elevation as appropriate (supine lawn chair progression with progression to sittting/standing)
- Progress to gentle GH IR and ER isotonic strengthening exercises

Criteria for Progression to Phase III

- Improving function of shoulder
- Patient demonstrates the ability to isotonically activate all components of the deltoid and periscapular musculature and is gaining strength

Phase III: Moderate Strengthening (Week 12+)

Goals:

- Enhance functional use of operative extremity and advance functional activities
- Enhance shoulder mechanics, muscular strength, power and endurance

Precautions:

- No lifting objects heavier than 6 lbs with the operative extremity
- No sudden lifting or pushing activities

Weeks 12 to 16

- Continue with the previous program as indicated
- Progress to gentle resisted shoulder flexion, elevation in standing and progress as tolerated

Phase IV: Continued Home Program (4 months+ post-op)-Home Exercise Program

- Patient needs to continue with HEP 3-4 x per week to focus on:
- Continued strength gains
- Continued progression toward a return to functional and recreational activities within limits as identified by progress made during rehabilitation and outlined by MD and PT

Criteria for Discharge from PT

- Patient is able to maintain pain-free shoulder AROM, demonstrating proper shoulder mechanics (typically 80-120 degrees of elevation, with functional ER of about 30 degrees)

Please email Dr. Rolf with any questions!
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Updated 1/22/2011