Riverview Health Orthopedics and Sports Medicine

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Reverse Total Shoulder Arthroplasty

1. Defined
    a. Resurfacing of both the humeral head and the glenoid fossa with metal and plastic implants.
    b. In Reverse Shoulder replacement, a ball is placed in the glenoid (glenosphere) and the humeral head is cut differently with a socket shaped portion on top of the humeral head.
    c. This configuration reorients the geometry of the shoulder placing the deltoid on stretch and allowing the tension of the deltoid and the geometry of the components to make up for the lack of the rotator cuff.
    d. The two most common indications for this implant are rotator cuff tear arthropathy and proximal humerus fractures.
    e. With the reverse shoulder, there is typically less healing of soft tissue that needs to occur. Therefore, we can rehabilitate more quickly than a standard anatomic shoulder arthroplasty.
    f. This is a MORE AGGRESSIVE protocol than anatomic shoulder replacement because there is not as much soft tissue healing that we need to protect
    g. *This protocol will **NOT** be followed for proximal humerus fractures that have undergone a reverse shoulder replacement with extensive tuberosity repair. Those are to be rehabbed under the Anatomic Shoulder arthroplasty protocol*
    h.
    i. The goal with a reverse shoulder is to restore forward flexion and strength to 120 degrees or greater. Typically, internal and external rotation are less than a standard anatomic shoulder replacement.
2. Goals
    a. Protect healing tissue
    b. Control post-operative pain and swelling.
    c. Improve post-operative range of motion.
    d. Improve functional strength, stability, and neuromuscular control.
    e. ***Restore deltoid function*** and remaining rotator cuff force couple. **The deltoid is by far the most important determinant of function in the reverse shoulder.**

3. Rehabilitation Principles
    a. Be aware of compromised and/or repaired tissue.
    b. Healing tissue should never be overstressed but appropriate levels of stress are beneficial.
        i. Inflammatory phase days 1-3.
        ii. Tissue repair with proliferation phase days 3-20.
        iii. Scar tissue most responsive to remodeling 21-60 days but occurs from 1 to 8 weeks.
        iv. Final maturation taking as long as 360 days.
    c. Tissue reactivity of the shoulder and tissue healing will dictate the rehabilitation process. Reactivity is determined by the clinical exam.
        i. Level I Reactivity
            1. Resting pain, pain before end range.
            2. Aggressive stretching is not indicated.
            3. Grade I-II mobilization for neurophysiological effect.
        ii. Level II Reactivity
            1. Pain onset occurs with end range resistance.
            2. Grade III and IV mobilization appropriate per patient tolerance.
        iii. Level III Reactivity
            1. Engagement of capsular end feel with little or no pain.
            2. Pain occurs after resistance.
            3. Grade III and IV mobilization and sustained stretching is appropriate.
    d. Eliminate inflammation as the cause of pain and neuromuscular inhibition.
    e. Ensure return of appropriate joint arthrokinematics.
    f. Apply techniques in the loose pack position and apply unidirectional movements to minimize the strain on the soft tissue and articular structures.
    g. As mobility increases and reactivity decreases, initiate more multi-directional techniques.
    h. Re-establish voluntary and pain-free control of the deltoid and rotator cuff musculature. Progress by the following principles:
        i. Isometrics (submax/non-painful) intended for neuromuscular education and fluid decongestion.
        ii. Isotonics “Downstairs” (<90 degrees) “Gravity Eliminated” elevation in a controlled fashion.
        iii. Isotonics “upstairs” (>90 degrees)
    i. Improve and or maintain scapular mobility and stabilization.
    j. Facilitate performance of complex skills with proprioceptive and kinesthetic techniques: Low to high, sagittal to frontal, bilateral to unilateral, stable to unstable, slow to fast, fixed to unfixed surface
    k. Encourage life-long activity modification with the use of safe zone principles.
    l. Factors that affect the rehab process
        i. Tissue quality (appearance, temperature, texture)

ii. Presence of concomitant bicipital/deltoid/scapular pathology
iii. Age of patient
iv. Presence and severity of osteoporosis
v. Activity level
vi. Pre and intra-operative range of motion
vii. Pain and sensitivity levels
viii. Cognitive abilities

4. Post op functional guidelines
    a. Functional Activities dependent upon: (will assist in decision to return to functional activity)
        i. Glenohumeral ROM
        ii. Pain
        iii. Tissue healing restraints
        iv. ***deltoid*** strength
        v. Scapular strength and stability
        vi. Proprioceptive/reflex control
        vii. Quality of tissue and degree of discomfort
    b. Driving-6-12 weeks Dependent upon:
        i. Automatic Transmission
        ii. Ability to maintain arm in a safe, functional position.
        iii. Alleviation of sharp pains/muscle spasms.
        iv. No dependency on pain medications
        v. Car insurance restrictions on driving after surgery.
        vi. Adequate confidence to handle car in challenging situations.
    c. Work dependent upon:
        i. Sedentary job- no earlier than 2-4 weeks
        ii. Physical job- no earlier than 12 weeks
    d. Golf-3-6 months dependent upon:
        i. Symptoms (pain frequency and intensity)
        ii. Ability to tolerate prolonged dependency
        iii. Ability to move arm in multiplanar, overhead motions
        iv. No significant, unnecessary thoracic substitutions.
            1. encourage the following
                a. Backwards golf (putting, chipping, short irons, progressing from 50-90% swings)
                b. Avoid heavy grass or possibilities for increased ground contact.
                c. Warm up properly with stretching
5. Post-operative equipment guidelines
    a. Sling: at all times (includes night) except bathing and exercises. Most Reverse Total Shoulder patients are in a sling for 4 weeks.
    b. Cryo Cuff for patient comfort
6. Rehabilitation
    a. **Phase I** (0-2 weeks) *Protective ROM*
        i. Goal: decrease tissue reactivity. Maintain joint integrity. Reduce pain.

ii. RX:
    1. Inspect incision sites for any significant drainage, odors, or discoloration that would necessitate MD contact.
    2. Hand/finger/elbow AROM exercises
    3. Scapular setting-without pain increases.
    4. Shoulder PROM (initiate in plane of the scapula and progress based on tissue tolerance)
    5. Grade I-II mobilizations-avoid pain, guarding.
    6. Postural education-initiate for brief periods, emphasize less kyphosis.
    7. Encourage trapezius/levator stretches in cervical region if needed.
    8. "Fav 4" AAROM exercises (flex to 90, ER, Shrugs, table slides with contralateral assistance. (must first demonstrate safety and competence in clinic)
    9. Incorporate "core strengthening" as appropriate within framework of rehab.

iii. Limitations/ Precautions
    1. **Sling use at all times**
    2. **Sleep in recliner if more comfortable than bed use.**
    3. **No Shoudler Extension**
    4. **No AROM (no lifting or reaching back)**
    5. **No activities creating vibrational stress (running, jumping, horseback riding etc.)**

iv. Rx/Clinical Expectations
    1. Reduction in guarding with PROM
    2. Achieves at least 90 degrees flexion PROM
    3. Achieves at least 90 degrees abduction PROM
    4. Achieves around 0-10 degrees ER PROM (plane of scapula)
    5. Achieves at least 30 degrees IR PROM (plane of scapula at 30 degrees of Abduction)

b. **Phase II** (2-3 weeks) *PROM and AAROM- "gravity reduced"*
    i. Goal: **Activate the deltoid**, increase PROM and decrease tissue reactivity. Reduce pain.
    ii. RX:
        1. AAROM flexion/scaption (if patient demonstrates independent competence)
        2. Verbal and tactile queing for proper performance of home program.
        3. Scapular exercises (no resistance)
        4. Continue PROM
        5. Grade I-III mobilizations
        6. Start elbow strengthening (while minimizing stress on shoulder)

7. Initiate upper extremity progressive weight bearing in an upright position with hands in “downstairs” position (avoid pain and encourage proper long axis closed chain mechanics)
8. Encourage trapezius/levator stretches in cervical region if needed.
9. Isometrics (submax/ subpain).
10. Gentle soft tissue massage for alleviation of muscle spasm/fibrosis.
11. Incorporate “core strengthening” as appropriate within framework of rehab.

iii. Limitations/ Precautions

1. **Begin to transition out of sling at 2 weeks. All patients should be completely out of sling by 4 weeks.**
2. **Sleep in recliner or wherever is comfortable**
3. **No activities creating vibrational stress (running, jumping, horseback riding etc.)**
4. **No extension.**
5. **No use of operative arm to push up out of a chair or recliner**

iv. Rx/Clinical Expectations

1. No guarding with PROM.
2. Tolerates AAROM, isometric program
3. Achieves at least 100 degrees flexion PROM
4. Achieves at least 100 degrees abduction PROM
5. Achieves at least 15 degrees ER PROM (plane of scapula)
6. Achieves at least 40 degrees IR PROM (plane of scapula at 45 degrees of abduction)

c. **Phase III** (3-6 weeks) *Active ROM*

i. Goal : Strengthen Deltoid, reduce pain, increase AAROM, increase to or maintain full PROM.

ii. RX:

1. Continue PROM and AAROM techniques
2. Continue scapular strengthening techniques
3. Continue isom. with gradual increase in force (add IR-submax/non-painful)
4. Isotonic exercises for RTC (except subscap)-avoid substitutions with arthroplasty.
5. Begin “gravity reduced" AROM, then progress to seated/standing positions (with elbow flexed initially to reduce lever arm)
6. Grade I-IV mobilizations
7. Encourage trapezius/levator stretches in cervical region if needed.

8. Progress, upper extremity progressive weight bearing in an upright position with hands in "downstairs" position; progress complexity (follow proprioception principles)
9. Incorporate "core strengthening" as appropriate within framework of rehab.
10. Postural education.

iii. Limitations/ Precautions

1. **No pushing up out of a chair**
2. **Activities which create large "vibrational stresses"**
3. **Avoid shoulder level and overhead activity.**

iv. RX/Clinical Expectations

1. Achieves 120-full flexion PROM
2. No guarding with PROM
3. Achieves full abduction PROM
4. Achieves at least 30 degrees of ER PROM (plane of scapula)
5. Achieves symmetrical full IR PROM (plane of scapula at 45 degrees of abduction)
6. Able to actively elevate shoulder against gravity with good mechanics to 90 degrees

d. **Phase IV** (6-10 weeks) *Strengthening*

i. Goal: Functional AROM and scapulohumeral rhythm, neuromuscular control.

ii. RX:

1. Isotonic Deltoid sets to increase tone and reduce fatigue
2. Scapular resistance may require gravity reduced positions initially.
3. Initiate closed chain work at shoulder height (follow proprioception principles)
4. Initiate sustained stretching
5. Encourage trapezius/levator stretches in cervical region if needed.
6. Progress ER PROM to max (continue capsular mobilizations as appropriate) ***May not be symmetric to opposite side***
7. Controlled bicep/tricep strengthening, while minimizing stress on shoulder.
8. Cervical stabilization
9. Incorporate "core strengthening" as appropriate within framework of rehab.
10. Continued postural education

iii. Limitations/Precautions

1. **No activities outside the safe zone**
2. **No Activities which create large "vibrational stresses"**
3. **No Activities requiring sustained upper extremity activity (light bulbs, screwdrivers)**

4. **No Frequent overhead activity**

iv. RX/Clinical Expectations
1. No guarding with PROM
2. Progress ER PROM from 30 degrees to 45-60 degrees by 12 weeks. This will vary from patient to patient. Use unaffected shoulder as guide for ER ROM goal.
3. Achieves at least 120 degrees flexion supine AROM
4. Achieves at least 120 degrees abduction supine AROM
5. Achieves at least 70 degrees IR AROM (plane of scapula at 30 degrees of abduction in supine)
6. Able to actively elevate shoulder against gravity with proper mechanics to around 120 degrees.

e. **Phase V** (10-16 weeks plus) *Advanced strengthening*
i. Goal: Prepare for overhead activities
ii. RX:
1. Continue all previous, necessary techniques
2. Advance **deltoid** strength as tolerated, avoiding substitutions.
3. Multi-planar strengthening activities (PNF patterns) and overhead endurance work.
4. Closed chain/kinesthetic work in overhead positions (proprioception principles)
5. Continue glenohumeral and sustained stretching techniques/mobilizations
6. Cleared for prone scapular activities if patient tolerates positioning (elbow flexed initially to minimize joint stress)
7. Body blade activities
    a. Progressing from:
        i. "downstairs" to "upstairs"
        ii. Short arm to elbow extension
        iii. Sagittal plane to coronal postions
8. Upper extremity plyometrics (including plyoball) can be initiated
    a. Progressing from:
        i. Two hands to one
        ii. "downstairs" to "upstairs"
        iii. "Safe zone" to multi-planar positions
        iv. Soft toss to higher speeds
        v. Light to heavy weight
9. Tailor final stage to particular work or hobby related activities and positions. (MD must clear for any dumbbell resistance workout programs)
10. Incorporate "core strengthening" as appropriate within framework of rehab.

11. Establish a life-long upper extremity fitness program to include appropriate stretching/strengthening activities, with solid education on global posture and joint protection.

iii. Limitations/Precautions

1. No loading the arm in extension.

2. No Pushing up out of a chair

iv. RX/Clinical expectations

1. Understanding of "safe zone" principles with ADL's
2. Gradually progress strengthening program
3. Gradually return to moderately challenging functional activities.

v. Late phase clinical expectations (4-6 months)

1. Return to recreational hobbies, gardening, sports, golf, doubles tennis

vi. Criteria for discharge from skilled therapy

1. Patient able to maintain pain free AROM
2. Maximized functional use of upper extremity
3. Maximized muscular strength, power and endurance in upper extremity.
4. Patient has returned to advanced functional activities.

7. References

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