ARTHROSCOPIC ROTATOR CUFF REPAIR

GENERAL GUIDE LINES

DR. NICOS PAPALOUCAS MD

Orthopaedic Surgeon
Aretaeion Hospital
Nicosia - Cyprus

FUNCTION OF THE ROTATOR CUFF

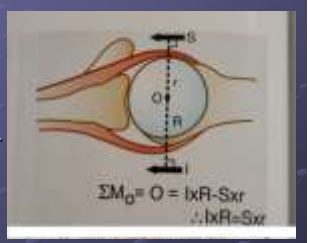
- Primarily to stabilize and centralize the humeral head
- Achieved by balancing the force couples in coronal and transverse plane

CORONAL PLANE FORCE COUPLE

- Superiorly: Deltoid
- Inferiorly: Inferior RC (Subscapularis, Infraspinatus, Teres Minor)
- This force couple is balanced as long as the RC-force is below the centre of rotation

TRANSVERSE PLANE FORCE COUPLE

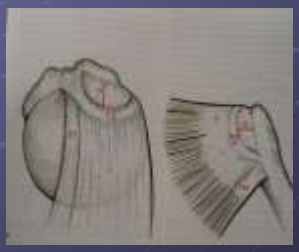
- Anteriorly: Subscapularis
- Posteriorly: Posterior RC (Infraspinatus, Teres Minor)



- When anatomical repair not possible
- Primary goal is to balance the force couples in the coronal and transverse plane (functional repair) and not necessarily to cover the hole

FUNCTIONAL TEARS

- Cable of the RC



FUNCTION OF THE ROTATOR CABLE

- Absorbing stresses

FUNCTION OF ROTATOR CABLE

- Despite a tear in the avascular zone, the RC could still exert compressive effect, as long as the rotator cable is intact
- Hypothesis proved by Halder et.al in 2002
- FUNCTIONAL TEARS
- Can demonstrate ¨ normal¨ kinematics

EXPERIENCE OF ROTATOR CUFF REPAIRS

- What have we learned from RC-repair through the years?

ASYMPTOMATIC TEARS

- Natural History:
- 51% symptomatic in avg 2.8 years
- 50% showed progression in size and retraction
- None of the tears showed healing

REPAIR OF RC-TEARS

- DELAY OF REPAIR MAY CAUSE:
- Extension of the tear and retraction with adhesions
- Muscle atrophy and fatty degeneration
- Degenerative changes and altered kinematics

EXPERIENCE THROUGH THE YEARS

- NEGATIVE PROGNOSTIC FACTORS:
- → The delay of the initial symptoms to operation
- → The degree of retraction (time dependent)
- → The presence of delamination and fatty degeneration
- → The age of the patient

EXPERIENCE THROUGH THE YEARS

- EARLY TREATMENT PROVIDES:
- Long term pain relief of all patients
- The best potential for healing esp in young patients with small tears
- Excellent function
- Prevention of the development of chronic degenerative changes

ARTHROSCOPIC REPAIR OF RC-TEARS

- Technically demanding procedure
- Steep learning curve
- Requires :
  - Special surgical skills
  - Good training
  - Good organization in OR- theatre
  - Investment of time at the beginning

A STABLE CONSTRUCT

- INITIAL MECHANICAL FIXATION
- Good surgical technique
- BIOLOGICAL FACTORS
- Favourable issues:
  - Patient's age
  - Size of tear and quality of tendon
  - No smoking
  - Growth factors (Acromioplasty?)

INITIAL MECHANICAL FIXATION

- Transosseous tunnels
- By using anchors the weak point is the tendon
- So tension free Repair
- Respect the crescent shaped margin of the tear
- Medialization than tension
- Increase number of fixation points (more sutures)
- Double row technique (more fixation points)

INITIAL MECHANICAL FIXATION

- Insertion angle of anchors
- Dead man angle less than 45°

GOOD SURGICAL TECHNIQUE

- Understanding the pathology and the tear pattern
- Optimal repair with initial stable construct
- Time for healing
- Rehabilitation

ARTHROSCOPY

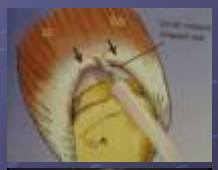
- Greatly enhances our understanding of RC-tears
- Provides ability to assess from several different angles with minimal disruption
- Has led us to recognize four major tear types

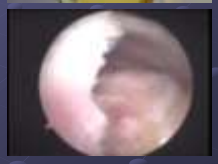
TYPES OF RC-TEARS

- Crescent- shaped tears
- U-shaped tears
- L-shaped, Reverse L-shaped tears
- Massive contracted immobile tears

Crescent – shaped tears

- Usually not significant degree of retraction
- Excellent medial-to-lateral mobility
- Can be easily repaired direct to bone (anatomic repair)
- Excellent candidates for double row technique



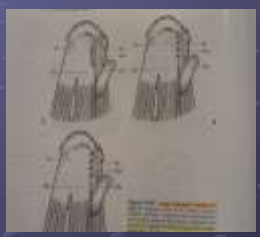


U-SHAPED TEARS

- Extend much further medially
- Decreased mobility from medial-to-lateral
- Significant mobility from anterior to posterior and opposite direction
- Their recognition is critical
- Margin Convergence

L-SHAPED TEARS

- Additional longitudinal splitting along the rotator interval
- The posterior leaf has more mobility from posterior-anterior direction
- The longitudinal tear is repaired firstly



REVERSE L-SHAPED TEAR

- Additional splitting along SSP and IFS tendon
- The anterior leaf has significant anterior-to-posterior mobility

WHY IS IT IMPORTANT TO RECOGNIZE THE TEAR PATTERN?

- Repairing the tear according to its natural mobility :

→Decreases tension
→Limits tension overload
→Improves the results

STEPS IN RC- REPAIR

- 1. Acromioplasty
- 2. Assessing tear mobility and tear pattern
- 3. Foot print preparation
- 4. Debridement of torn tendon
- 5. Anchors placement, sutures passing through the tendon and sutures management
- 6. Tying of stable knots

ACROMIOPLASTY

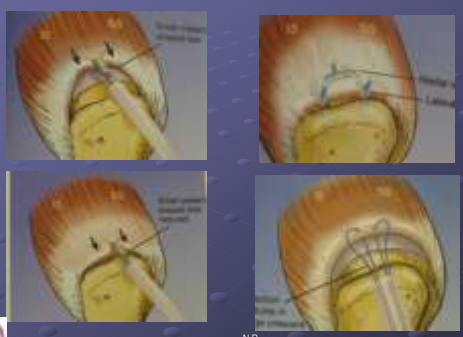
- Is it necessary?

- Most of the surgeons perform acromioplasty
- → to gain more space
- → to protect the repair
- → release of growth factors?
- → Beware if the tear is irreparable

ASSESSING TEAR MOBILITY

- This is the key factor in identifying the tear pattern before any release
- Assessing the mobility by viewing from several portals

ASSESSING THE MEDIAL TO LATERAL MOBILITY

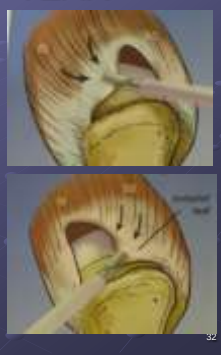


ANTERIOR-TO-POSTERIOR MOBILITY

N.P. 31

U-SHAPED TEAR

- If the medial –to-lateral mobility is decreased but
- both leaves demonstrate equal anterior –to-posterior mobility, then the tear is a U-shaped Tear



N.P. 32

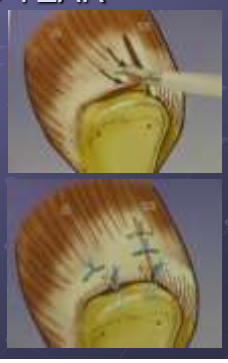
U-SHAPED TEAR

- Margin Convergence technique
- Initial side-to-side repair
- Then the lateral free edges can be repaired to bone

N.P. 33

L-SHAPED TEAR

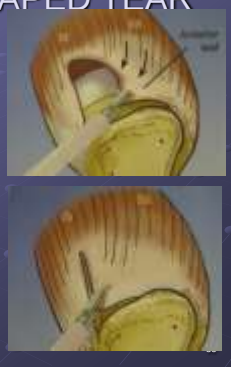
- If the posterior leaf shows more mobility than the anterior leaf then the tear is an L-shaped tear
- First side to side repair must be performed and then repair to the bone



N.P.

REVERSE L-SHAPED TEAR

- If the anterior leaf shows more mobility than the posterior leaf then the tear is a Reverse L-shaped tear
- Repair the side-to-side component first and then repair to bone



N.P.

MASSIVE CONTRACTED IMMOBILE TEAR

- If both the medial –to- lateral mobility and the anterior –to-posterior as well as the posterior –to-anterior mobility is decreased the tear is one of massive contracted immobile tear.
- Repair ?
- How?

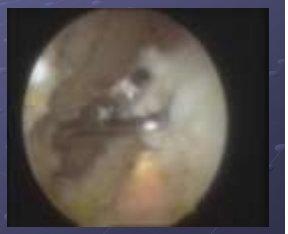
N.P. 36

BONE BED PREPARATION

- Delicate decortication with RF and shaver to increased bleeding

DEBRIDEMENT OF TENDON EDGES

- Very gentle debridement of the edges of torn tendon for refreshing



ANCHOR PLACEMENT

- Consideration of how many anchors are used
- Single row or double row technique

SINGLE ROW TECHNIQUE

Repair of a Crescent-shaped tear - video

Click on the link to watch video:

http://www.youtube.com/watch?v=Os04jFdLfbo&feature=youtu.be

Repair of a U-shaped tear -video

Click on the link to watch video:

http://www.youtube.com/watch?v=oUYVYevP16Y&feature=youtu.be

Repair of a Reverse L-shaped Tear- Video

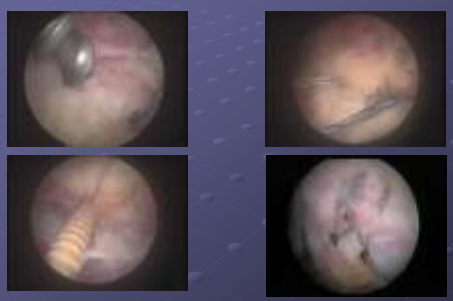
Click on the link to watch video:

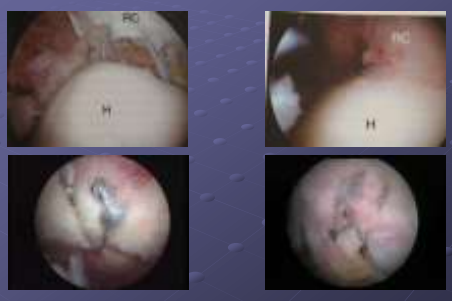
http://www.youtube.com/watch?v=Z958CWt7L8E&feature=youtu.be

DOUBLE ROW TECHNIQUE

- Apreleva -> Single row restores only 67% of foot print
- Advantages:
- Restore the foot print better
- Increased number of fixation points so less load on each suture

DOUBLE ROW TECHNIQUE





Double Row- Suture Bridge-technique - Video

Click on the link to watch video:

http://www.youtube.com/watch?v=iyHbEUmMOjA&feature=youtu.be