INTERPOSITION ARTHROPLASTY

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Disclosure

Dr de Beer is a consultant to the Tornier Company

Arthroplasty of the Shoulder Joint in young Patients

Total, Hemi or Biological??
Treatment options used at CSI in the young patient with OA:

- **Hemi shoulder arthroplasty**: erosion of glenoid; recent literature shows these patients did worse than pts who had a TSR.
- **Resurfacing (metal)**: fell out of favour due to poor patient satisfaction
- **Hemicap**: disappointing results
- **Short stem TSR**: lifespan of a TSR in the young??
- **INSPYRE**: recent development in OA for the younger patient; seems like a "good idea"; awaits long term results but definitely an option.
- **BIOSURFACING**; Graft Jacket interpositioning; very good medium term results
Biological Resurfacing

Biological glenoid resurfacing, as a therapeutic option in glenohumeral arthritis for young patients, has been suggested in numerous reports in literature.

Literature review: Adequate evidence of good results in Biological Tissue/membrane interposition in arthritic shoulders

1. 1989: Biological glenoid resurfacing was initially described by Milbrink and Wigren in 1989, when they published their results with 13 patients. This procedure involved the use of biological resurfacing for the treatment of glenohumeral arthritis in young patients. The use of biological material in arthroplasty was a significant advancement in the management of arthritis.

2. 1995: Burkhead and Hutton reported good results in 14 patients who underwent biologic resurfacing of the glenoid in conjunction with hemiarthroplasty. These patients achieved an average of 57° increase in active abduction and 45° in external rotation.

3. 2001: Ball et al. published their study on the use of cadaveric meniscus for transposition onto the glenoid in 2001. This technique was performed open and all 6 of the patients subjectively reported increased range of motion and decreased pain.

4. 2004: Brislin and Savoie described an arthroscopic intervention for glenohumeral arthritis that made use of a bovine patch for resurfacing. In their sample of 10 patients, there were good results overall, including a 60° increase in forward flexion, a 50° increase in abduction, and a marked subjective decrease in pain.

5. 2006: Pennington et al. reported good short-term results in ten patients after biological tissue interposition in young, arthritic shoulders.

More References

The shoulder pathologies
Degenerative diseases

**THE TREATMENTS**

**Medical**
Conservative treatment
Anti-inflammatory
Cortisone infiltration

**Surgical**
Synovectomy
Osteosynthesis
Rotator cuff reconstruction
Prosthesis

Algorithmic approach to arthritis
Glenohumeral Arthritis
Arthroscopic evaluation
Debridement and Capsular release

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<tr>
<th>Glenoid &gt; Humeral</th>
<th>Humeral &gt; Glenoid</th>
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<td>Both Glenoid and humeral surfaces affected</td>
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**ARTHROSCOPIC BIOLOGICAL RESURFACING OF GLENOID**

1. METAL+BIOLOGICAL
2. PROSTHETIC ARTHROPLASTY
3. G/J ON GLENOID

**OPEN BIOLOGICAL/METAL RESURFACING OF HUMERAL HEAD**

**A NEW THERAPEUTIC OPTION**

Arthroscopic resurfacing of the glenoid with a scaffold to permit repopulation by host cells.

Preserves anatomical soft-tissue planes for future open surgery.

(Journal of Arthroscopy, May 2006)
The aim

Interposition materia

- Acellular matrix.
- Derived from human tissue
- Bio-active scaffold (Rat and Canine models).

Why “Graft-Jacket” as a biological membrane?

- Only membrane with animal studies proving reliable and consistent cellular ingrowth.
- Only membrane with sufficient tensile and shear strength to resist in-vivo forces till host-tissue ingrowth occurs.
- Only membrane that has histologically shown chondrocyte ingrowth in HUMANS. (deBeer et al).
Technology Summary

Human Tissue

- Remove Cellular Components
- Retain Collagen, Elastin, and Proteoglycans
- Preserve Intact Matrix

GRAFTJACKET® Acellular Matrix

- Eliminates Immune Response
- Guides Revascularization & Cellular Repopulation
- Avoids Inflammatory Response

Regeneration of Normal Tissue

Laboratory Findings

GRAFTJACKET® Material

Bioactive Scaffold

Decellularized Matrix

Fresh Blood Matrix

Protein Structure

Vascular Channel
Current Indications

1. Osteoarthritis.
2. Glenoid > Humeral head. (assessed arthroscopically)
3. Concentric humeral head.

Contra-Indications

1. Inflammatory arthritis.
2. Cuff-tear arthropathy.
3. Severe bone loss
4. Humeral wear>glenoid wear.
5. Non-concentric humeral head.

Surgical technique: POSITION

- Lateral decubitus position.
- Extremity in 30 degrees abduction and 20 degrees forward flexion.
Surgical technique: Joint debridement

- Excision of hypertrophic synovium, remnants of cartilage, fibrous tissue.
- Resection of glenoid osteophytes.

Surgical technique: Correction of glenoid version

- Abnormal retroversion or anteversion is corrected with an arthroscopic burr.

Surgical technique: Micro-fracturing the glenoid surface.

Arthroscopic burr "dimples" the glenoid surface.

Important to stimulate ingrowth of host tissue cells into donor tissue.
Surgical technique: Graft-Jacket preparation

Posterior traction on the sutures for tissue introduction into the joint.

Surgical technique: Graft introduction

Surgical technique: Graft alignment and anchoring.

2 fixation techniques:

- Anchors
- Sutures to labrum
Final Result

Histology of the resurfaced glenoid.

Biopsy material:
1. "Second-look" arthroscopy
2. Retrieved interposition tissue from patients undergoing conversion to TSR.

Histology (continued)

• Host tissue ingrowth observed.
• Ingrowth tissue: Fibro-cartilage
• Proof of adequacy and utility of the arthroscopic technique and interposition material.
• Ongoing study with special stains to identify components of ingrowth tissue.

Fibro-cartilage ingrowth
Histology report:

Histo-pathologists were blinded to the procedure and randomization of cases.

- "Chondrocytes resembling hyaline cartilage cells found"
- "Thickness measured to be at least 15 layers thick."
- "Tissue resembles normal articular cartilage."

RESULTS- our study

- Between 2005-2010, 49 consecutive patients (52 shoulders) operated
- average age of 55.7 years
- The diagnoses included primary osteoarthritis (84.4%), arthritis after arthroscopic reconstruction for anterior instability (1 patient, 3.1%), and inflammatory arthritis (3 patients, 9.3%).

RESULTS

- Lost to follow-up: 6
- Revisions to total arthroplasty: 7 (16%)
- Revision to Graft Jacket: 1
- Patients satisfied with their pain level (0-3/10): 30 (69%)
- Patients with pain levels 4/10-6/10: 6 (14%) – they feel that they can cope well and do not feel any further surgery is needed. This group is on average 5 years post-op
CONCLUSION

Arthroscopic biological resurfacing of the glenoid can be considered as a minimally invasive therapeutic option in primary glenohumeral arthritis, especially for younger patients.

Thank you very much!
The surgical technique can be viewed on Vumedi.
Arthritis of the shoulder in young patients are challenging for treatment

One would like to use minimal invasive and arthroscopic techniques to achieve maximal pain relief and function, trying to avoid arthroplasty as much as possible
Increasing level of activity in increasing age

Young patients have higher functional demand and would like to resume all their activities including all sporting activities.

But what to do when conservative and arthroscopic procedures fail to provide pain control and adequate function?

What one should do when joint destruction has progressed with severe bone loss, beyond these arthroscopic techniques?

• Challenging
• Worse and less predictable results
• ~ 50% of young patients unsatisfied
  Sperling, Cofield, Rowland, JBJS April 1999
• Increasing expectation
• Increasing use
• Concerns re risks of failure and need for revision

Shoulder Arthroplasty in Young Patients
Outcome of shoulder stemmed arthroplasty in patients of 50 years or less

- Provide marked long-term relief of pain & improved motion
- However:
  - 50% of the patients were disappointed
- High failure rate
  - 17% (19 of 114) of the stemmed TSAs needing revision
  - 14% (11 patients) of stemmed Hemis required revision for painful glenoid erosion
  - Revision for other causes: aseptic loosening (4 patients), infection (3 patients), and unexplained pain (1 patient).

Sperling, Cofield, Rowland, JBJS April 1999

Revision TSA

- Any artificial joint may have limited life span
- The higher functional demand of the young patient may accelerate the joint wear
- Probable need for revision surgery

Between 1986 and 2005

- 46 stemmed total shoulder arthroplasties
- 20 stemmed hemiarthroplasties

in 63 patients who were aged 55 years or younger

- 9 shoulders underwent revision - 20%

Bartelt, Sperling, Schleck, Cofield
J Shoulder Elbow Surg (2011) 20, 123-130
How does arthritis affect the bone?

• Roughening of the bone end
• Therefore need a new surface to the bone
  No need for stem half the length of the humerus

29% of unsatisfactory shoulder replacements are due to component malposition  
Hasan et al. J.S.E.S. 2002

Design Concept

• Surface replacement
• Minimal bone removal
• Bone graft Impaction
• Cementless
  • Press-fit fixation
  • Hydroxyapatite coating
• Anatomical design / Geometry
  • Offset, Version, inclination
• Simple instrumentation

Copeland cementless surface replacement arthroplasty  
27 years Clinical experience

Surface replacement in young patients

- Series of surface replacement arthroplasty
- Performed in young people (under 50 years of age)
- Between 1988 - 2000
- Mean follow up of 15.2 years (9 - 22 years)

Surface replacement in young patients

- 39 Surface replacement arthroplasties (CSRA)
- 35 patients (4 bilateral)
- 22 hemiarthroplasties
- 17 total shoulder replacements
- Average age at surgery 39 years (range 25-50y)

The indications for surgery:

- Rheumatoid arthritis - 17
- Osteonecrosis (AVN) - 10
- Instability arthropathy - 5
- Primary osteoarthritis - 4
- Fracture sequela - 1
- Ankylosing spondylitis - 1
- Post septic arthritis - 1
Clinical Results

Clinical results

- All elements of the Constant score significantly improved in all diagnostic categories
- Overall considered to be by the patients:
  - 23 shoulders much better
  - 8 better
  - Only 2 the same or worse
AVN 50yo 11y po

Operated at the age of 39y
CS 94 points

BG 44y – fracture sequela Malunion

1991 - Age 23 - Brain tumour - Chemotherapy (steroids)
AVN both shoulders & both hips

1999
Rt Shoulder CSRA
age 31

1991
Lt Shoulder CSRA
age 28
Revisions
5 of 39 (12.8%) shoulders required revision
2 for persisting instability at the early stage
1 for infection
2 were revised to stemless reversed TSA (Verso)
due to rotator cuff failure
16 years & 22 years post the surface replacement respectively

Glenoid exposure with resurfacing?
Exposure for treatment of the glenoid when performing Surface replacement is more demanding as the humeral head bone is still in the way.

A thorough release is needed to enable to push away (postero-inferiorly) the humeral head, get a good soft tissue balance and insert a glenoid component (if desired)

Hemiarthroplasty = TSA without insertion of Glenoid implant
Microfracture technique to promote fibrocartilage cover

Surface replacement hemiarthroplasty of the shoulder with biologic resurfacing of the glenoid (interposed anterior capsule)

1996 - 2005, 18 shoulders
Average FU 4.8 years (range 2-10.6)
Average age 54.8 years
Postoperative Constant Score 71.4 points (Adjusted 83.9%)
Average active forward elevation 130°
83% - satisfied
Radiographic FU - none loose
56% of shoulders - moderate to severe glenoid erosion

Lee, Bell, Salmon
Cementless surface replacement arthroplasty of the shoulder with biologic resurfacing of the glenoid

Very little difference in functional outcome & pain early, as well as, later after surgery
HSA (97.1%) survive significantly longer than TSA (81.7%)
Levy, Pearse et al. ICSES 2010

36 patients
Mean age 42.6 years
Mean 38.1 months FU
SANE, ASES scores - all significantly improved
No loosening
One - converted to a stemmed TSA due to pain
35 patients were satisfied
returned to their desired activity

Bailie, Llinas, Ellenbecker

Hemiarthroplasty and TSA using surface replacement

Lee, Pearse et al. JSES 2010

340 CSRA cases between 1987-2003 over 5y FU
218 Humeral Surface Arthroplasty (HSA) (hemi) & 122 TSA
Easier Revision surgery
CSRA to Stemmed prosthesis or to Primary Verso prosthesis

CSRA to arthrodesis

Had CSRA age 42y
Revision to Verso age 58y

7y po Verso 65 yo

www.readingshoulderunit.com

Thank you
Wadi Kelt, Judea Desert, Israel
Reading Shoulder Unit
Shoulder Arthritis in the Young Adult

Role of TSA

John W. Sperling, MD, MBA
Mayo Clinic

Disclosure

- Biomet-Royalties

HPI

- 31 yo RHD
- Occasional sense of shoulder instability
- No physical therapy
- No injections
- Physical Exam:
  - Active/Passive abduction 170
  - External Rotation 50
  - Mild anterior laxity
S/p thermal treatment of cartilage and capsule
**Infection studies**

- ESR - 3
- CRP - 0.108
- WBC - 4
- Aspiration: Gram pos rods
- Culture: *Prop Acnes*
Outline

- Etiology
- Treatment Options
- Literature Review
- Technical Consideration

Etiology

- Prior instability surgery
- Osteoarthritis
- Inflammatory arthritis
- Post-traumatic arthritis
- Avascular necrosis

Technical Difficulties

- Distorted Anatomy
- Scar formation
- Bone loss
- Failed instrumentation from prior surgery
Non-operative Treatment

- NSAID
- Glucosamine/chondroitin
- Physical therapy
- Activity modification
- Injection
  - Corticosteroid
  - HAs

Operative Treatment

- Shoulder arthrodesis
- Arthroscopic debridement
- Resurfacing fascial arthroplasty
- Shoulder Arthroplasty

Shoulder Arthroplasty

- Among all joint replacements, patients who undergo TSA have the youngest average age
Shoulder Arthroplasty

• Arthroplasty in Young Patients
  – Numerous reports on TKA/THA
  – Little information to guide clinical decision making in regard to shoulder arthroplasty

TSA vs. HHR

• Real question
  – Young patient with glenohumeral arthritis
  – Glenoid resurfacing

TSA vs. HHR

• Address the issue
  – Evaluation of specific comparative studies
TSA vs. HHR

• Results of shoulder arthroplasty
  – 1) Few long term results
  – 2) Rapid increase in different designs
    » Greater than 20 different designs

TSA vs. HHR

• Quantifiable Issues
  – Pain relief
  – Motion
  – Rates of revision

TSA vs. HHR

• Non-Quantifiable
  – Learning curve in the placement of a glenoid component
  – Exposure
  – Soft tissue balancing
TSA in Young Patients

- **Burroughs et al.**
  - 50 years old and younger
  - 22 shoulder arthroplasties
  - Mean f/u 5.6 years
  - 19/22 satisfied with results
  - No downward trend in results with longer follow-up

Burroughs et al. J Arthroplasty 2003

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TSA in Young Patients

- **Patients**
  - Time period: 1976-1985
  - Minimum 15 year f/u or until revision
    - 62 Hemiarthroplasties
    - 29 TSA
    - Mean f/u 16.8 years

Sperling et al. 2004 JSES

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TSA in Young Patients

- **Radiographic results**
  - Minimum 10 year f/u: 53 HHR and 25 TSA

Pre-op  Post-op  20 Year F/U
Pain

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<tr>
<th>Hemiarthroplasty</th>
<th>TSA</th>
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Active Abduction

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External Rotation

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HHR Revision

- Revision (17)
  - Glenoid arthritis (12)
  - Aseptic loosening (2)
  - Pain of unknown etiology (2)
  - Infection (1)
- Increased risk with trauma (p=.027) and prior surgery (p=.038)

TSA Revision

- Revision (5)
  - Infection (2)
  - Glenoid and humerus loose (2)
  - Glenoid loose (1)

Survival

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<th>HHR</th>
<th>TSA</th>
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<tr>
<td>10 Years</td>
<td>82%</td>
<td>97%*</td>
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<tr>
<td>15 Years</td>
<td>78%</td>
<td>84%</td>
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<tr>
<td>20 Years</td>
<td>75%</td>
<td>84%</td>
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Summary

• HHR vs. TSA
  – Early HHR revision for glenoid arthritis common
  – At ten years, TSA survival better than HHR

Humeral Head Replacement for the Treatment of Osteoarthritis

Damian M. Rispoli, M.D.
John W. Sperling, M.D.
George S. Athwal, M.D.
Robert H. Cofield, M.D.
Cathy D. Schleck, BS

Mayo Clinic
Rochester, Minnesota

Materials and Methods

• Patients
  – 60 humeral head replacements for osteoarthritis
Materials and Methods

- Survival analysis
  - All patients
- Clinical results
  - Minimum 5 year f/u or until revision
    - 51 Hemiarthroplasties
  - Mean f/u 11.3 years

Active Abduction

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<th>Degrees</th>
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<td>(p&lt;.01)</td>
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External Rotation

<table>
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<th>Degrees</th>
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<td>(p&lt;.01)</td>
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Results

Preoperative Pain Values

Postoperative Pain Values

Biconcavity

- 6/9 corrected intra-op
  - 1 satisfactory
  - 5 unsatisfactory (3 revisions)
- 3/9 uncorrected
  - 3 satisfactory, no revisions
- Not a significant risk factor

Revision

- Revision (10)
  - Glenoid arthritis (9)
  - Instability (1)
Survival

<table>
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<tr>
<th>Years</th>
<th>Survival</th>
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<tr>
<td>10</td>
<td>86%</td>
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<td>15</td>
<td>73%</td>
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<td>20</td>
<td>73%</td>
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Results

- Satisfactory, 20
- Unsatisfactory, 21
- Excellent
- Satisfactory
- Unsatisfactory

Hemiarthroplasty

- 20% revision rate
- No statistical difference for biconcavity
- Advanced age at time of surgery had a negative correlation with revision
- Inferior survival when compared to TSA
Approach

- Very challenging problem without an ideal solution
- Understand the occupational/recreational demands
- Patient expectations and goals are critical
- Tailor the procedure to the individual patient

Thank You
HA Membranes with Debridement and Microfracture

Paolo Paladini
Fabrizio Campi
Giovanni Merolla
Giuseppe Porcellini

Disclosure

I have no potential conflicts with this presentation.

ANATOMY

Humeral Head cartilage:

1.2–1.3 mm - central portion
1.0 mm - periphery

Glenoid cartilage:

3 mm - periphery
0.1 mm - central portion (bare spot)
EPIDEMIOLOGY

Chondral injuries of the glenohumeral joint:
- not uncommon
- incidental findings

- 200 shoulder arthroscopies in rotator cuff tear:
  - Mean age: 56y
  - Complete humeral cartilage loss over 150 mm: 4.5%
  - Minor cartilage lesions such as thinning or fraying: 8.5%

- Symptomatic glenoid or humeral or both cartilage defects incidence: 5% to 17%

Gartsman GM, Taverna SM. Arthroscopy. 1997
Cole BJ et al. JSES. 2007

ETIOLOGY

Cartilaginous lesions:
- trauma
- avascular necrosis,
- iatrogenic, osteochondritis dissecans,
- osteoarthritis, chondrolysis or focal defects.

McCarty LP III, Cole BJ. Arthroscopy. 2005

PATIENT HISTORY AND CLINICAL EVALUATION

HISTORY
- clinical history of a traumatic injury to the shoulder
- vague shoulder discomfort, difficulties with sleep
- mechanical symptoms: clicking or catching.

CLINICAL EVALUATION
- Range of motion: internal and external rotation with the arm in an abducted position, as capsular contracture.
- Shoulder outlet impingement syndrome: mimic chondral pain
- pain in the mid ranges of motion versus extremes of motion: suggestive of symptomatic cartilage abnormalities.
- the "compression-rotation" test by Ellman et al. may aid in differentiating chondral pain from impingement pain.
Imaging

Plain radiographs
- true AP, scapular “Y”, and axillary x-rays

Radiographic and arthroscopic classification of shoulder OA
- **Stage I**: normal radiographs, but with arthroscopic evidence of articular cartilage changes.
- **Stage II**: minimal joint space narrowing with concentricity of the humeral head and the glenoid.
- **Stage III**: moderate joint space narrowing with early inferior osteophyte formation.
- **Stage IV**: severe loss of joint space with osteophyte formation and loss of concentricity between humeral head and glenoid

CT Scan
- the extent of arthritic deformity, osteophyte formation, and glenoid version.

clear osteoarthritis
**Imaging MRI**

MRI
- soft tissue contribute to symptoms.
- rotator cuff, biceps tendon, glenoid labrum.

MRI, have a high sensitivity but low specificity for determination of articular cartilage lesions in the shoulder

**High resolution MRI**
Markovits S et al. EJR 2006

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**Arthroscopy Outerbridge Classification**
- **Grade I**: softening or blistering of the articular cartilage.
- **Grade II**: fissuring and fibrillation of the articular surface.
- **Grade III**: deep ulceration of articular cartilage without exposed bone.
- **Grade IV**: full thickness cartilage loss with exposed subchondral bone

Outerbridge RE, Dunlop JA. Clin Orthop Relat Res 1975

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**The OARSI osteoarthritis cartilage histopathology assessment system**
Arthroscopic Treatment option - Decision Making

**Indications:**
- Patient age,
- + ER: > 20°/Elev.> 120°
- Humeral head and glenoid concentric
- Visible joint space on an axillary radiograph.
- No respond to nonoperative treatment
- Occupation, activity level,
- Xylo test +
- Extent of injury: size, unipolar-bipolar
- Concomitant shoulder pathology

**Contraindications:**
- Severe joint incongruity or large osteophytes
- > 5mm glenoid erosion
- 25% humeral head subluxation (fixed?)
- Clinical mechanical block


Arthroscopic Treatment option - Decision Making

**Demanding:**
- Young pt., lower demanding:
  - Success with debridement and reparative (microfracture) procedures
- Young pt., high demanding:
  - Poor results

Decision making

Quantified mean size of the affected area:

Chondral lesion: $<150 \text{ mm}^2$ ± Osteoarthritis

$>250 \text{ mm}^2$

Map

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Algorithm for treatment of glenohumeral chondral injury

- Chondral defect
  - Pivotal arthroscopic debridement
  - Reconstructive, Arthroscopic, or Arthroscopy

Small Lesion
- Reparative, Microfracture
- Restorative, Osteochondral plug transfer
- Cartilage
- Bone

Large Lesion
- Reparative, Microfracture
- Restorative, Osteochondral plug transfer
- Cartilage
- Bone

Arthroscopic standard treatment

- Debridement
- Biceps tenodesis or tenotomy
- Remove osteophytes
- Capsular release and sinoviectomy
- Subacromial decompression
- Labral repair
- Distal clavicle excision, subacromial decompression

Arthroscopic standard treatment

- Debridement, synovectomy, capsular release, LHB tenotomy, A/C joint resection
Arthroscopic Debridment Technique

Results

- Follow-up: 2y.
- Osteochondral lesions >2 cm.: return of pain and failure of this procedure.

Short-term relief in 70% to 88% of patients which tends to deteriorate over time

The Goal

to provide symptom relief while not attempting to replace or restore the damaged articular cartilage

Arthroscopic advanced treatment

- Microfracture
- Glenoidplasty
- Resurfacing

- Osteochondral autograft transfer
  Scheibl, JBJS, BR 2003
- Autogenous condrocyte transfer
  Romeo, Arthroscopy 2002

Reparative treatment: Microfracture

Indication:
- articular isolated lesion acute or chronic
- well contained lesion not exceeding an area of 4 cm²
- Humeral/ glenoid side
- No deeper than 10 mm

- Aim: to replace the damaged cartilage with fibrocartilage to provide some support, though not identical to the native tissue.

Arthroscopic advanced treatment

- Microfracture
  - Precise technique is similar to that popularized in the knee: Steadman et al.94
  - Loose chondral flaps are removed
  - A curet is used to remove the calcified cartilage layer: vertical wall
  - To penetrate the subchondral plate leaving a 3-4 mm osseous bridge between microfracture holes.
  - Bleeding after microfracture leads to a pluripotent mesenchymal clot

Microfracture results

31 shoulders
< 60 yrs
FU 47 months

Failure: 19%

Improvement: 20 pts ASES Score
Negative correlation between size of the lesion and ASES improvement

Humeral → Better
Bipolar → Worst

Millet PJ - Arthroscopy 2009

Microfracture results

Arthroscopic microfracture has also been reported in the treatment of isolated humeral head osteochondral defects with excellent results

but

Complications:
hypertrophic bone with proud cartilage layer

Doubts?
**Arthroscopic advanced treatment**

- Glenoidplasty

Biconcave glenoid

Concave Surface

Gartsman - 2006

**Glenoidplasty**

**Doubts?**

Posterior fixed instability doesn’t resolve!

Walch, et al - 1999

Gerber et al -

**Biological Resurfacing**

**Indication**

- Young active patient with glenohumeral arthritis in whom aseptic glenoid loosening and the likelihood of revision shoulder arthroplasty are high.

- Bipolar lesion

Ho JY, Miller SL. Sports Med Arthosc Rev. 2007
Material used for Interposition

• Anterior capsule, autogenous fascia lata, achilles tendon allograft, lateral meniscus allograft, graft jacket and porcine small intestinal mucosa have all been used.

• An open technique has been used traditionally but more recently arthroscopic interposition techniques have been also described. Ho JY, Miller SL. Sports Med Arthrosc Rev. 2007

Achilles tendon allograft
At minimum 2 yrs of follow-up, 92% of the patients reported good to excellent results. Krishnan SG et al Tech Shoulder Elbow Surg. 2004

Arthroscopic advanced treatment

• Resurfacing

Dermal Graft - A. Castagna

best results in glenoid monopolar.... worst results in bipolar lesions....

Arthroscopic advanced treatment

Glenoid resurfacing - Restore

20 pts.
FU: 3 and 6 yrs
75% satisfied

Results
Comparable favorably with humeral hemiarthroplasty

Sperling et al - JBJS 1998
McCarty et al - AJSM 2008
Lateral meniscal allograft

- In a series of 10 patients, using lateral meniscus allograft Pennington and Bartz described arthroscopic interposition arthroplasty of glenoid.
- They showed promising short term results with subjective pain relief almost immediately after the surgery.

Pennington WT, Bartz BA. Arthroscopy. 2005

- Creighton et al demonstrated in a cadaveric study that the peak force and contact area across the glenohumeral joint were significantly reduced after lateral meniscus interpositional grafting.


Chondral lesion

Glenoid

1. Bio-collagen (MeRG)
2. Hyalograft®
3. MAIORRegen™

Humeral → microfractures

Preliminary experience

MeRG

Equine collagen type I 95%
type III 5%

“Scaffold” effect

association with:
- microfractures
- stem cells
- PRP?
Preliminary experience

**Hyalograft® C**
hyaluronan-based scaffold

Matrix Autologous Transplantation Procedure - knee
Marcacci et al - 2005

association with:
- microfractures
- stem cells
- PRP?

Preliminary experience

**MAIOR®gen**

Multi-layer system
- Equine collagen type I
- Hydrossiapatite (bone)

Complications

- Delamination of the graft
- Mobilization and loose bodies formation
- Hypertrophy of the matrix
- Synovialization of the matrix
- Net uniform distribution of chondrocytes
Reparative treatment: (GLAD) Glenoid labral avulsion

- The capsule and labrum are repaired over the glenoid defect, offering coverage and perhaps remodeling of the defect, possibly slowing their progression.
- Careful not to imbricate or superiorly shift the capsulolabral complex which can lead to further arthritic changes.

Cole BJ et al. JSES. 2007

Associated lesions - Instability

Mumford procedure

It’s critical to treat the concomitant pathology if suspected as the source of the pain and dysfunction.

CONCLUSION

IDEAL SCAFFOLD

- Biocompatible, reasorbable
- No impurity and immunity reaction
- Stability
- High endurance
- High integration with surrounding tissues
- Homogeneous distribution of chondrocytes
- No need to harvest periosteum
- Maintenance of the chondrocytes phenotype
CONCLUSION
The treatment of a 35 year old active patient with end stage arthritis of the shoulder continues to be a challenge.

Numerous techniques have been developed to address defect of various sizes, location and etiologies.

Careful management of unrealistic expectations is vital to avoid disappointment of patient and surgeon alike...


Natural history — osteoarthritis?

HA Membranes with Debridement and Microfracture

Paolo Paladini
Fabrizio Campi
Giovanni Merolla
Giuseppe Porcellini

Thank You
CASES
VuMedi Webinar 27-08-2013
Shoulder arthritis in young patients

CASE 1
- Male, 37 yrs old, pediatrician
- Juvenile arthritis (Still’s disease): at present in remission
- Both hips Surface replacement
- 2008 : Painfull, limited R shoulder (R dom)
• Pain: VAS 6-9
• ROM: AAF : 90
  AFE : 85
  AER : 20 (4 points in CS)
  AIR : buttocks
Minimal passive glenohumeral motion
Constant score: 29 (normalised 30)

Socially very active;
Golf player with handicap 18

Options

• Arthrodesis
• Interposition arthroplasty
• Membranes /debridement/microfracture
• Resurfacing
• Hemi arthroplasty (stemmed/​stemless)
• Total shoulder arthroplasty
• Reverse shoulder arthroplasty
Hemi arthroplasty with resurfacing May 2008

June 2013; 5 yrs follow-up

- Sometimes mild painful (VAS 1)
- AAF : 160
- AFE : 150
- AER : 50  (10 points CS)
- AIR : T12
- Constant score : 82 (normalised 95)
- No restrictions in private practice; Plays golf
CASE 2

- Female, 33 yrs old
- Shoulder instability  R shoulder (R dom)
- St Elsewhere: 2010 Latarjet procedure

- Postop: continously painful shoulder
- Only AP X rays were taken
• Xray, 3 months postoperatively

• For pain relief and stiff shoulder 3 intraarticular corticosteroid injections were given

• 14 months postoperatively : CT scans were made

Screws were removed
18 months postoperatively referred

Very painful (VAS 9-10)
Used morphines
AAF 60
AFE 50
AER 10 (0 points)
AIR buttocks
Constant score: 16 (normalised 17)

What to do?

• Arthroscopic release and debridement
• Interposition arthroplasty
• Membranes/debridement/microfracture
• Resurfacing
• Hemi arthroplasty (stemmed/stemless)
• Total shoulder arthroplasty
• Arthrodesis
• Operation (6 weeks ago):
  - Very stiff: extensive release
  - Subscapularis scarred
  - Conjoined tendon released from graft