Retrospective multicenter study on 90 cases of reversed prosthesis comparing 3 different types of implant

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Conflict of Interest

FX Solution, Zimmer, SBI, Synthes & Depuy, Medartis, Evolutis, Biotech & Wright, Argo
Introduction

N = 90 cases of reversed prosthesis
Non traumatic cases : Eccentric arthritis (82 %)

Prospective evaluation …
Retrospective correlation
… of functionnal and radiological results
depending on the procedure
Material & Methods  

N= 90 patients

Prospective Multicenter Evaluation

- 4 years
- 3 centers
- 8 surgeons
- 3 groups

Pre OP

- 3 mo
- 6 mo
- 1 year
- 2 years
- 3 years

Post OP

and evaluated retrospectively by an independent surgeon … AT same follow up

QuickDash score
Constant score
clinical and radiological complications / glenometaphyseal angle
Avoiding notch with gleno metaphyseal angle

Incidence des encoches du pilier de la scapula des prothèses totales inversées de l’épaule : influence de l’angle glénométaphysaire

Scapular notching in reverse shoulder arthroplasies: The influence of glenometaphyseal angle

V. Falaise, C. Levigne, L. Favard, et la Sofec
Material & Methods: 3 prosthesis

1st generation of reversed prosthesis (4 surgeons)
humeral neck angle of 155°, Aequalis-Reversed  Tornier®

BioRSA (2 surgeons)
humeral neck angle of 155°,
lateralization of center of rotation

Last generation of reversed prosthesis (3 surgeons)
more vertical angle of 145°,
Humelock-Reversed, FX-Solutions®
Material & Methods

81.6%: « senior surgeon » (4 years of practice)
71%: Deltopectoral approach

Most frequent: cementless, glenosphere 36 mm

Time of surgery: 116 min
Results

76/90 patients reviewed (15,6% of lost of FU)
Age : 74 yo (52-88)
Minimum Follow up of comparison : 18,4 mo

Complications : 18%

Satisfied or Very Satisfied : 93,4 %
Aesthetic issue : 8%
Results

Mobility and functional scores:

No differences depending on the type of implant significantly better in the group implanted after 2012 than before 2010
Results: evolution of EVA
Results: evolution of mobility
Results: evolution of Constant score
Results: evolution of Quick Dash

Quick Dash

<table>
<thead>
<tr>
<th>Time</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Préopératoire</td>
<td>77.99</td>
</tr>
<tr>
<td>3 mois</td>
<td>41.58</td>
</tr>
<tr>
<td>6 mois</td>
<td>31.55</td>
</tr>
<tr>
<td>12 mois</td>
<td>35.68</td>
</tr>
<tr>
<td>24 mois</td>
<td>34.00</td>
</tr>
<tr>
<td>36 mois</td>
<td>28.25</td>
</tr>
</tbody>
</table>
Results

The GAIN between pre & post op:

Abduction: 58,6° (-10°/140°)
Flexion (AEA): 62,6° (-15°/130°)
Constant Brut: 36,5 points (7-53,5)
Constant with ponderation: 53,2% (9,8-83,1)
QuickDash: 45,3 points (0-88,6)
Results

Gleno metaphyseal angle : 37.5°

The quantity of notch were significantly lower when the angle was between 35° and 45°
Results

Notch : 35%

No notch in FX group ... 57% in the 2 other groups

Most frequent with superior approach

Bio RSA : 46% partial or total lysis
Discussion

Learning curve .. !
Technical modifications may improve results …

Even if each notch is not followed in each patient by diminution of functionnal results …
each surgeon has to offer to his own patient the lower risk to develop a notch …

1) What do we have to explain to our patients : the gain
2) How to diminish the risk of notch
What is the « gain » … ? & the risk

What did we learn ? What can we explain …?

The gain between pre & post op :

<table>
<thead>
<tr>
<th></th>
<th>Our serie</th>
<th>32 series, 2214 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abduction</td>
<td>58,6°</td>
<td>62,6°</td>
</tr>
<tr>
<td>Flexion</td>
<td>62,6°</td>
<td>61,4°</td>
</tr>
<tr>
<td>Ext Rot</td>
<td>11,7°</td>
<td>12°</td>
</tr>
<tr>
<td>Constant B</td>
<td>36,5</td>
<td>37°</td>
</tr>
<tr>
<td>Constant Pond</td>
<td>53,2 %</td>
<td>53%</td>
</tr>
<tr>
<td>QuickDash</td>
<td>45,3</td>
<td>?</td>
</tr>
<tr>
<td>Complications</td>
<td>18%</td>
<td>24%</td>
</tr>
</tbody>
</table>
How to avoid notch?

1. Inf. Tilt 10°
2. Low position
3. Humeral neck
4. More vertical
5. Lateralisation ...
6. In the bone / in the implant
Biomechanical comparison of component position and hardware failure in the reverse shoulder prosthesis

Sergio Gutiérrez, MS,a,b R. Michael Greiwe, MD,a,c Mark A. Frankle, MD,a Steven Siegal, MD,a, and William E. Lee III, PhD, Temple Terrace and Tampa, FL
Avoiding notch with more vertical angle

**Table II** Prosthesis design as a risk factor for scapular notching

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>155 degree neck-shaft angle, no COR offset (N = 28)</td>
<td>143 degree neck-shaft angle, 2.5-mm COR offset (N = 37)</td>
<td></td>
</tr>
<tr>
<td>Notching present</td>
<td>17 (60.7%)</td>
<td>6 (16.2%)</td>
<td>.0003*</td>
</tr>
<tr>
<td>No notching</td>
<td>11 (39.3%)</td>
<td>31 (83.8%)</td>
<td>.011†</td>
</tr>
<tr>
<td>Grade 1 notching</td>
<td>7 (25.0%)</td>
<td>5 (13.5%)</td>
<td>&lt;.0001†</td>
</tr>
<tr>
<td>Grade 2 notching</td>
<td>9 (32.1%)</td>
<td>1 (2.7%)</td>
<td>.0081†</td>
</tr>
<tr>
<td>Grade 3 notching</td>
<td>1 (3.6%)</td>
<td>0 (0%)</td>
<td>.36*</td>
</tr>
<tr>
<td>Grade 4 notching</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>Inferior scapular neck spur present</td>
<td>8 (28.6%)</td>
<td>6 (16.2%)</td>
<td></td>
</tr>
</tbody>
</table>

* $P < .05$ considered statistically significant.
† 2-tailed Fisher exact test.
‡ Adjusted for length of follow-up using type 3 analysis of effects.
§ Exact Cochran-Armitage trend test.
‖ Adjusted for length of follow-up using logistic regression statistics based on Likelihood Ratio statistics.

**Journal of Shoulder and Elbow Surgery**

A radiographic analysis of the effects of prosthesis design on scapular notching following reverse total shoulder arthroplasty

Laurence B. Kempton, MD, Mamtha Balasubramaniam, MS, Elizabeth Ankerson, BS, J. Michael Wiater, MD*
Avoiding notch with gleno metaphyseal angle

You can reach the right gleno metaphyseal angle (35-45°) ... 

In playing on the glenoid part (tilt)
Or in the humeral part (verticalisation)
Or both ... FX solution ...
Avoiding notch with « big » glenosphere ?
Conclusion

What is the best way to decrease the notch …?
Combination of …
an inferior tilt,
a low implantation of metaglene,
a more vertical humeral angle
BUT … the right tension of deltoid …
remains up to the surgeon!

145°