PARIS INTERNATIONAL SHOULDER COURSE 2019

February 14-16
Marriott Rive Gauche
PARIS, FRANCE

Shoulder Arthroplasty
Current Concepts

WWW.PARIS-SHOULDER-COURSE.COM

Under the direction of
Ph. Valenti
M. Scheibl
The Paris International Shoulder Course has become an inescapable event for anyone interested in Shoulder Replacement and is now the world’s largest meeting on this subject. In absence but in particular in honor of our kind and charismatic friend « Philippe », we are welcoming you to the 4th edition, PISC 2019.

Our principal goal remains to offer to all levels - from junior trainees to experts in the field - a range of practical information with regard to new techniques and ideas. Particular importance should be given to younger shoulder surgeons, enabling them to increase their knowledge. The goal is to offer better treatment to our patients, and, with this in mind, we will propose a scientific program with up to date information concerning long-term results and latest innovations on shoulder prosthetic arthroplasties. This course belongs to you, and these 3 world-class scientific days will be of great benefit to everyone.

A large conference area will be set up for debates where experienced specialists will be able to share their knowledge and examples of difficult cases.

Importance should be given for technical innovations regarding the pre operative planning of shoulder arthroplasty. Live surgeries with various arthroplasties will be performed by the main experts of the world. And, of course, this event will be, once again, a great occasion to network with your colleagues from all over the world.

We look forward to welcoming you to Paris!

Philippe VALENTI, Markus SCHEIBEL
Chairmen PISC 2019
Reverse shoulder arthroplasty: New trends and controversies - presentations clinical results

**New biomechanical concepts**

- 30/ Biomechanical principles in reverse total shoulder arthroplasty............. 158
  G.Mazzocca (USA)
- 31/ Lateralization in Reverse Shoulder Arthroplasty: 
a descriptive analysis of humeral and glenoid lateralization ............. 164
  J.D. Werthel (France)
- 32/ The Biomechanics of Reverse Shoulder Arthroplasty Polyethylene Insert Constraint ............. 174
  G. Athwal (Canada)
- 33/ Correlation between distalization and lateralization and clinical outcomes in RSA ............. 179
  J. Barth (France)
- 34/ The relationship between post-operative integrity of subscapularis tendon and the functional outcome in Grammont style RSA ............. 183
  Ph. Collin (France)

**What do you prefer**

- 35/ Why I Choose a Convertible Humeral Component in Anatomic Total Shoulder Arthroplasty ............. 186
  D. Dines (USA)

**Presentations Clinical Results**

- 36/ Primary shoulder arthroplasty under age of 60 years old.
  Factors of survival of 1332 cases with a minimum follow up of 2 years ............. 190
  L. Favard (France)

**New Trends Video Demonstrations:**

**Pre Op Planification**

- 41/ Pre-op Planning and Navigation in Total Shoulder Arthroplasty ............. 223
  PH. Flurin (France)
- 42/ 3D Pre-Operative Planning And PSI For Correction Of Highly Deformed Glenoids in Primary OA ............. 227
  O. Verborgt (Belgium)

**Presentations**

- 43/ Reverse shoulder arthroplasty: technical considerations & outcomes .......... 231
  M.A. Frankle (USA)
- 44/ Salvage of Chronic Shoulder Dislocations ............. 235
  J. Sanchez Sotelo (USA)
- 45/ Reverse Shoulder Arthroplasty in Patients with Preoperative Deltoid Impairment ............. 240
  A. Laedermann (Switzerland)
- 46/ Outcome of reverse shoulder arthroplasty in patients with Parkinson’s disease: A matched cohort study ............. 250
  M.A. Frankle (USA)
MORE THAN 13 YEARS EXPERIENCE WITH THE SHORT STEMSLESS METAPHYSEAL RTSA WITHOUT A DIAPHYSEAL STEM - LONG-TERM RESULTS

Ofer Levy, Andreas Leonidou, George Panagopoulos, Paolo Consigliere, George Mazis, Ernest Fawzy, Caroline Witney-Lagen, George Arealis, Oren Tsvieli, Ruben Abraham, Ioannis Polyzois, Lora Young, Rupen Dattani, Riten Pradhan, Ali Narvani, Alexander van Tongel, Nir Hous, Omar Haddo, Jai Relwani, Giuseppe Sforza, Juan Bruguera, Ehud Atoun

INTRODUCTION

Reverse shoulder prostheses are increasingly used in recent years for treatment of glenohumeral arthropathy with deficient rotator cuff such as: rotator cuff arthropathy, rheumatoid arthritis, proximal humeral fractures sequelae, irreparable rotator cuff tears, and failed shoulder replacement. Good mid-term and long-term results with restoration of active elevation have been reported. However, early studies showed relatively high rates of complications (24%-50%), and many of these required further surgery. Therefore, preservation of bone has become a major goal. Metaphyseal cementless implants without a diaphyseal stem have been developed to preserve bone and respect only minimal amount of bone. Currently, the information about the long-term clinical and radiological outcomes associated with uncemented metaphyseal reverse TSA is limited. The aim of this prospective study is to report the 5-11 years clinical and radiological results with reverse total shoulder replacement with a novel short metaphyseal humeral design without a diaphyseal stem, discuss the design rationale and determine the safety and complication rate of this design.

MATERIALS AND METHODS

Patients

This prospective study included 159 consecutive patients that underwent cementless press-fit reverse TSA (rTSA) with a novel short metaphyseal humeral design without a diaphyseal stem (Verso, Innovative Design Orthopaedics, London, UK) for the treatment of glenohumeral arthropathy with deficient rotator cuff by a single surgeon (OL) in our institution between 2005 and December 2011. At the same period, 26 other patients were treated with stemmed press-fit cementless rTSA (Stemmed Verso, Innovative Design Orthopaedics, London, UK) due to acute fractures, surgical neck nonunions and revision of stemmed implant with deficient metaphyseal bone. The indications for surgery were disabling pain and poor function in patients in whom non-operative treatment had failed. We always try conservative treatment first with the default rehabilitation regime. All patients with indication for rTSA were included. All patients gave informed consent, and the study was approved by the Institutional Review Board and Clinical Quality Assurance office. Of the 159 patients, 146 were available for long-term follow-up analysis in the short metaphyseal group, and 21 patients of the 26 stemmed Verso prostheses were available for long-term follow-up analysis. The average follow up was 89 months (7 years and 5 months) (range 60 - 138 Months). There were 44 males and 141 females. The mean age at surgery was 74.8y (range 38-93y). 108 patients were operated due to cuff tear arthropathy, 22 for fracture sequelae, 24 for rheumatoid arthritis, 14 patients were after failed RC repair or massive irreparable cuff tear, 3 for osteoarthritis with cuff deficiency or eroded glenoid, 8 for failed anatomical prosthes with cuff deficiency, and 6 for acute trauma. 14 patients underwent bilateral (staged) rTSA at that period. 50 patients were operated as revision arthroplasty (21 from stemmed implants to stemmed Verso rTSA, 29 to short metaphyseal without a diaphyseal stem rTSA (3 of them from stemmed implant to short metaphyseal without a diaphyseal stem implant).

Description of the implant (Figure 1,2)

The humeral component is a short metaphyseal implant with three tapered thin fins that give immediate metaphyseal press-fit fixation when impacted into the cancellous humeral metaphysis with bone graft from the resected humeral head. The implant does not violate the humeral diaphysis and does not have a diaphyseal stem. These fins have titanium porous and hydroxyapatite coatings to improve the biologic fixation of the implant. The metaphyseal bone quality or osteoporosis is not a contraindication for the use of this metaphyseal implant, utilising bone graft impaction technique. The glenoid baseplate has a central tapered screw (hydroxyapatite coated titanium) with the largest core diameter of 9mm and additional 2 anti-rotational screws, superiorly and inferiorly. The glenoid sphere is lateralised 3mm from the glenoid face, this is built in the thickness of the baseplate and the gap between the baseplate and the glenoid helmet. The polyethylene humeral liners have 10º inclined shape, achieved by removing the redundant polyethylene walls inferiorly-medially and respectively on both sides. This provides very low profile medially, that reduces the impingement between the polyethylene liner to the glenoid neck (Figure 1, 2). The humeral cut is performed at 155º angle, with final implant angle of 145º using the inclined liner. The humeral liners can be dialled in a way that the correct version and offset of the liner can be determined and changed, adapted to each patient even after the definitive metal implants have been implanted.

Surgical technique

The procedure is performed through the antero-superior approach to the shoulder (Navina-Mackenzie approach). In the revision cases where deltoperpectoral approach was used in the primary operation, the old skin incision is extended and the antero-superior approach is used subcutaneously. 20mm slice of proximal humeral bone is resected using a guide, in 30º of retroversion. The resected bone is used for bone graft impaction into the humerus. The humeral triple tapered finned component if impacted into the humeral metaphysis. Good initial press fit fixation in conjunction with bone graft impaction technique, was achieved in all patients, regardless of osteoporosis or poor bone quality. The glenoid component is implanted in 10º downward inclination at the inferior border of the glenoid with good initial press fit fixation. Data was collected prospectively on computerised database. All patients were followed clinically and radiographically. Standardized video recording of range of movements and function was obtained for all the patients preoperatively and at regular intervals after surgery at all the follow-up appointments.

Clinical assessment

Patients demographics including the preoperative diagnosis, previous surgery, and preoperative shoulder function using the Constant Score (pain scores, activities of daily...
living (ADL), active range of movement (ROM) and shoul-
der strength) were obtained. Patient satisfaction was
assessed using the Subjective Shoulder Value (SSV21 or
SANE59). Operative findings, complications or revision
surgery were recorded.

Patients were assessed post-operatively with the
Constant score\(^7\), the patient satisfaction score (SSV
or SANE score)\(^11\); functional questionnaire regarding
return to work, sport and leisure activities\(^8\) and the Video
recording at 3 weeks \(^7\), 6, 12, 18, 24 months and yearly the-
thereafter.

**Radiographic assessment**

All radiographs were assessed by two independent ex-
perienced shoulder surgeons. A true AP view of the shoulder and an axillary view
radiographs were critically assessed for displacement,
migration or subsidence of the implant, appearance of
radiolucent lines, osteolysis, or signs of stress shielding,
as well as the Nerot-Sirveaux glenoid notching classifi-
cation\(^31\). Bone density was assessed using plain digital
radiography in the trabecular bone around the implant as
described by Kind et al\(^31\).

**Statistical Methods**

Data were collected prospectively and recorded using a
dedicated MS Access database. Improvement, or gain, in
both functionality (Constant Score) and patient satisfac-
tion assessed by the Subjective Shoulder Value (SSV21
or SANE59) was calculated for each case by comparing
the latest observed post-operative value to the corre-
spending pre-operative value, and the significance of the
difference was tested using the paired t-test. Improve-
mement in Constant score was assessed at each time point
(pre-op, immediate post-op, 3 weeks then 3, 6, 9, 12, 18, 24
months and annually thereafter. Statistical analysis was carried out using SAS (Release

### RESULTS

At most recent follow-up, patients' satisfaction (SSV)
improved from 0.8/10 pre op to 8.2/10 post op following
rTSA with this short metaphyseal prosthesis without a
diaphyseal stem. 93% felt much better and better at 5-11
years post op in all the diagnoses. 98% felt much better
and better (86% excellent) at 5-11 years post op in the
cuff arthropathy group. Mean Constant Score (for all di-
agnoses) improved from 15.6±8.6 preop to 59.0±20.4 at last
follow-up. Age/sex adjusted Constant score improved from
22.1±12.3 preoperatively to 88.8±30.3 at the last follow-up
(p<0.0001, paired t-test).

No clinical infections observed in this study. Patients were
monitored for infection with CPR, ESR, and intraoperative
intraarticular specimen collection. The prophylactic anti-
biotic treatment was withheld until the specimens were
collected. Single dose of Teicoplanin and Gentamycin was
used for prophylaxis.

For cuff arthropathy patients (n=108) (including 17 cases of
revision of resurfacing with cuff deficiency to short meta-
physeal Verso without a diaphyseal stem and 11 cases of
revision of stemmed implants to stemmed prosthesis).
Constant score improved from 15.9±8.3 points to 60.5±19.9
(age/sex adjusted 23.1 to 90.5); fracture sequelae (n=22)
from 11.9±8.2 to 49.9±22.8 (age/sex adj. 15.9 to 70.1);
Rheumatoid arthritis (n=24) from 12.9±8.2 to 53.5±18.0
(Age and sex adj. 19.2 to 76.0) and the cases of revision of
failed arthroplasty with loosening and deficient cuff (n=8)
to metaphyseal fanned reverse TSA without a diaphyseal
stem from 14.7±8.1 to 49.3±24.3 points post-op (age/sex
adj. 21.3 to 73.7); Post failed rotator cuff repair or massive
cuff tears (n=14) from 23.3±7.3 to 77.1±3.7 (Age and sex adj.
31.4 to 109.4) For acute trauma (n=6) improved to 46.5±18.3
points and 74.0±25.8 age and sex adjusted. All these gains
were statistically significant (P<0.0001, Paired t-test, com-
paring post-op to pre-op\((\text{Figure 3a,b}).\) The Constant score
continued to improve over time in this series (Figure 4).
At most recent follow-up, pain scores were rated mild or
none in 161 shoulders (95.8%). The mean VAS pain score
(from 0 to 15) decreased from 12 to 2.5. The mean active
range of movement improved from 53° to 129.5° eleva-
tion, 10° to 50.6° external rotation (in adduction with the
arm beside the body) and 24° to 67.2° internal rotation (in
adduction) (reaching to the waist with the hand behind
the back) (Refer Figure 5, 6, 7, 8). Most patients resumed
normal or functional daily and leisure activities according
to their reply in the questionnaires.\(^34\)

**Radiographic analysis**

The postoperative radiographic analysis showed no radio-
lucencies around the humeral or glenoid components, at
the latest follow-up. There were no cases of prosthetic
humeral or glenoid migration, change in position over
time or loosening of the short metaphyseal reverse hu-
meral and the glenoid components. There was no sub-
sidence of the prostheses and no evidence of proximal
resorption of bone around the humeral implant to suggest
stress shielding. Increased bone density was measured
using plain digital radiography in the trabecular bone
around the implant.\(^31\) In 38 patients we observed glenoid notching (20.5%),
these cases appeared later (>1-2 years) after surgery; 32
of these patients had glenoid notching grade 1 or 2
(Nerot-Sirveaux)\(^50\), and only in 6 cases grade 3 glenoid
notching.
Figure 5
79 years old patient, 9.5 years post revision of left CSRA to short metaphyseal without a diaphyseal stem Verso rTSA:
A. Active range of movement at 9.5 years follow-up
B. Preoperative X-rays with resurfacing of the shoulder
C. X-rays at 2.5 years follow-up after revision to Verso rTSA.
D. X-rays at 9.5 years follow-up after revision to Verso rTSA.

Figure 6
79 years old patient with cuff tear arthropathy, 8 years post left Verso rTSA:
A. Active range of movement at 8 years follow-up
B. Preoperative X-rays with cuff tear arthropathy
C. X-rays 1 month after Verso rTSA
D. X-rays at 8 years follow-up after Verso rTSA.
Figure 7
65 years old patient with rheumatoid arthritis, 7 years post left Verso rTSA:
A. Active range of movement at 7 years follow-up
B. Preoperative X-rays with rheumatoid arthritis
C. X-rays 1 year after Verso rTSA
D. X-rays at 7 years follow-up after Verso rTSA

Figure 8
83 years old patient with cuff tear arthropathy, 7 years post right Verso rTSA:
A. Active range of movement at 7 years follow-up
B. Preoperative X-rays with cuff tear arthropathy
C. X-rays 3 months after Verso rTSA
D. X-rays at 7 years follow-up after Verso rTSA
Complications
Two cases had an undisplaced fracture of the humeral metaphysis due to excessive bone impaction in very soft bone and one glenoid rim was cracked during preparation. These were in revision cases. These healed around six weeks at three months with conservative treatment. They did not show any lucencies or loosening at the follow-up.
No patient suffered infection and there were no other intraoperative complications.

There were 3 early dislocations; one due to wrong liner version and the patient putting weight on his shoulder in extension of the shoulder (to push himself out of the chair) one week post surgery. The others, due to an inferior osteophyte that hinged the liner to dislocate. All were re-operated the osteophyte removed and the liners realigned and made a remarkable recovery.

In one patient, early in the series, the glenoid head disengaged from the baseplate during the first 3 weeks after surgery due to soft tissue interposition between the baseplate and the glenoid sphere that was unnoticed during surgery. The glenoid sphere was reinserted in revision surgery with uneventful recovery.

Two patients developed pathological fracture of the acromion, two months after surgery. They made a full recovery with conservative treatment and regained full range of motion with no pain within a month later. Twenty patients sustained traumatic proximal fractures due to falls:
Six patients sustained traumatic fracture of the scapular spine after a fall (2 months post op, 2 years, 2.5, 6, 7 and 8 years respectively). 3 were operated with plating of the spine of the scapula, and 3 were treated conservatively. They made a moderate recovery with almost no pain but limited function.

Postoperative acromial fractures have been reported in 1% to 7% of patients following all types of reverse shoulder arthroplasty.13, 15, 34

Four patients sustained glenoid periosteal fracture following a fall (with well fixed glenoid components), 3 of them had pain relief and the majority of the patients were very satisfied with their shoulder. (8.2/10). Good clinical outcome was observed for all the diagnoses with improvement of the Constant Score from 15.6 pre to 59.0 (Age/sex adjusted 86.8) at last follow-up.

Mazis et al. found no deterioration of the deltoid function up to 6-11 years follow-up with the short metaphyseal without a diaphyseal stem Verso rTSA4. The photostasis fixation is entirely metaphyseal with no stem in the humeral shaft. Good initial press fit fixation of the polyethylene humeral head in the cup on the scapular neck inferiorly and posteriorly as well as further osteolysis due to the wear particles4. Levine et al. study confirms that scapular notching after Grammont type reverse shoulder arthroplasty is frequent, 62%, similar to some previously published reports15, 16, 26, 30, 35, 50, 59.

This is a common radiographic finding at early follow-up.13, 17, 19, 23, 40, 47, 49, 50, 52. In Boileau et al.4 series, notching at the inferior aspect of the glenoid was present in 74% of cases, and this extended to or beyond the inferior screw (Nerot-Sirvazea grade 3) in 30% cases. Glenoid notching is a result of impingement of the humeral bone against the 10º-angled dial-able polyethylene liner reduces the risk of notching as the edges of the liner are removed, hence, reducing the impingement of the liner with the scapula inferiorly, as well as anteriorly and posteriorly in rotations, without increasing the risk of prosthetic instability. The use of the 10º-angled dial-able liner reduces the risk of notching as well as of osteolysis triggered by polyethylene particles51; 55; 62. Their study also confirms what Werner et al. reported 88% glenoid notching in series patients with Grammont type rTSA with follow-up over 8 years. They observed increase in incidence and severity of notching as well as of osteolysis triggered by polyethylene particles in substantial numbers of stemmed reverse prostheses with 5.9% of cemented and 47% in uncemented implants, as well as partial or complete resorption of the greater and lesser tuberosities (greater tuberosity resorption in 69% of cemented and 100% in uncemented implants lesser tuberosity resorption in 43% of cemented and 76% of uncemented implants)46. Similar findings reported with other types of stemmed rTSA as well42.

Neither lucencies nor resorption of bone around the humeral component suggestive of stress shielding were seen in this series. An explanation may be that as the entire fixation of the prosthesis is metaphyseal (without distal fixation) there is direct load transfer to the humeral metaphysis. This reduces the risk of stress shielding. Furthermore, use of the triple tappered finned humeral component combined with bone graft impaction technique may improve the density and resistance of the metaphyseal bone.

Glenoid notching was observed in 38 cases in our series (20.5%). In 32 of these patients it was mild glenoid notching (Nerot-Sirvazea grade 1 or 2). In these patients the glenoid notching seemed to be non progressive with sclerotic margin. Only in 6 cases a Nerot-Sirvazea grade 3 glenoid notching were observed. This low rate compares favourably with most of the published series with 44% to 95% in different series4, 13, 17, 19, 47, 49, 50, 52.

The 3 mm lateral offset of the glenoid implant baseplate, may reduce the risk of impingement between the liner and the glenoid neck without increasing substantially moment at the baseplate-bone interface. The use of the 10º-angled dial-able polyethylene liner reduces the neck-shaft angle of the humeral component to 145º. The gapping of the humeral head and the glenoid notching seemed to be non progressive with sclerotic margin. The edges of the liner are removed, hence, reducing the impingement of the liner with the scapula, as well as anteriorly and posteriorly in rotations, without increasing the risk of prosthetic instability. The use of the 10º-angled dial-able liner reduces the risk of notching as well as of osteolysis triggered by polyethylene particles51; 55; 62. According to Werner et al.4 and a large French multicentre study by Lebigne et al.32, notching occurs early after surgery and progress in severity with time.32, 37 The fact that we have seen only 20.5% of glenoid notching so far in this series with this short metaphyseal reverse prosthesis, with a follow up period of 5 to 11 years is very encouraging.

The rate of glenoid component loosening reported in the literature for rTSA range between 2% to 5%,11; 12, 15, 30, 43, 51, 56, 58, 57. No radiolucency lines were seen around the glenoid component in our series so far, with follow-up of 5 to 11 years. Hopkins et al. assessed the glenoid components of six different reverse shoulder prostheses and compared the primary stability through the minimisation intraoperative micromotions of the glenoid baseplate of the short metaphyseal rTSA design was the most stable with peak micromotions of less than 48 microns. When the relative displacement of the bone-implant interface (termed ‘micromotion’) is below a threshold of 150µm, it is assumed that the implant will not induce the generation of unwanted fibrous tissues46, and micromotions below 50µm are considered low enough to allow bone ingrowth.

The 3 mm lateral offset of the glenoid implant baseplate, may reduce the risk of impingement between the liner and the glenoid neck without increasing substantially moment at the baseplate-bone interface. The use of the 10º-angled dial-able polyethylene liner reduces the neck-shaft angle of the humeral component to 145º. The gapping of the humeral head and the glenoid notching seemed to be non progressive with sclerotic margin. The edges of the liner are removed, hence, reducing the impingement of the liner with the scapula, as well as anteriorly and posteriorly in rotations, without increasing the risk of prosthetic instability. The use of the 10º-angled dial-able liner reduces the risk of notching as well as of osteolysis triggered by polyethylene particles. According to Werner et al.4 and a large French multicentre study by Lebigne et al.32, notching occurs early after surgery and progress in severity with time.32, 37 The fact that we have seen only 20.5% of glenoid notching so far in this series with this short metaphyseal reverse prosthesis, with a follow up period of 5 to 11 years is very encouraging.

The rate of glenoid component loosening reported in the literature for rTSA range between 2% to 5%,11; 12, 15, 30, 43, 51, 56, 58, 57. No radiolucency lines were seen around the glenoid component in our series so far, with follow-up of 5 to 11 years. Hopkins et al. assessed the glenoid components of six different reverse shoulder prostheses and compared the primary stability through the minimisation intraoperative micromotions of the glenoid baseplate of the short metaphyseal rTSA design was the most stable with peak micromotions of less than 48 microns. When the relative displacement of the bone-implant interface (termed ‘micromotion’) is below a threshold of 150µm, it is assumed that the implant will not induce the generation of unwanted fibrous tissues46, and micromotions below 50µm are considered low enough to allow bone ingrowth.
Some authors raised concerns that use of the Grammont type reverse arthroplasty may lead to deficient or absent external rotation and internal rotation, leading to functional problems for patients. They argued that the functional ability of patients to perform simple daily activities such as combing the hair would be impaired.

We found significant improvement in the rotational movements in our series compared to published series with other reverse prostheses. The use of the oblique dial-able liners of this implant (Figure 1) combined with the lateral offset of the metal and the spherical shape and insertion of the humeral ball in 30° of retroversion may explain the improved rotation. Furthermore, the humeral liners can be dialled in a way that the correct version and offset of the liner can be determined and changed, adapted to each patient, even for cases with acute fractures. These good clinical outcomes are maintained over time for over 11 years. Radiographically, no implant loosening, subsidence or strain observed. The improvement in the range of motion and the increase in the range of the humeral component rotational movement before impingement of the liner on the scapula occurs. Indeed, asymmetric polyethylene wear has been observed on most retrieved humeral reverse prosthesis liners and it is more common with the restoration of a more normal range of internal rotation that the humeral component has a tendency to suffer from trips and falls. They are not suitable for treatment of cases with acute fractures, fracture nonunions or revision of stemmed prostheses. For these cases a stemmed implant should be used.

CONCLUSIONS

The bone preserving short metal-backed rTSA design without a stem shows encouraging long-term results with excellent pain relief and shoulder function, restoration of good active range of motion and high patients' satisfaction scores. These good clinical outcomes are maintained over time for over 11 years. Radiographically, no implant loosening, subsidence or strain observed. The improvement in the range of motion and the increase in the range of motion and the increase in the range of the humeral component rotational movement before impingement of the liner on the scapula occurs. Indeed, asymmetric polyethylene wear has been observed on most retrieved humeral reverse prosthesis liners and it is more common with the restoration of a more normal range of internal rotation that the humeral component has a tendency to suffer from trips and falls. They are not suitable for treatment of cases with acute fractures, fracture nonunions or revision of stemmed prostheses. For these cases a stemmed implant should be used.

REFERENCES

13. Farhad M, Gerber C. Reverse total shoulder arthroplasty- from the most to the least common complication. Int Orthop 2010;34:709-10. 10.1007/s00264-010-1125-2
INTRODUCTION

Several problems after reverse shoulder arthroplasty (RSA), including scapular notching, lack of improvement in rotation, instability, and loss of shoulder contour, have been attributed to the medialized glenoid design.10,24 To address these problems, some authors have proposed increased glenoid lateralization via either bone grafting (bony increased offset (BIO-RSA)) or prosthetic lateralization of the sphere or baseplate.3,12 Reported advantages of increased lateralization include decreased scapular notching and improved external and internal rotation.3 However, lateralization may have negative consequences such as decreased mechanical advantage of the deltoid and the need for grafting in the case of a BIO-RSA. To date, only a few comparative studies with small sample sizes have compared a BIO-RSA to a traditional RSA without bone graft (RSA).11 The aim of this study was to compare the clinical and radiological results of RSA to BIO-RSA. The hypothesis was that patients with BIO-RSA would have decreased scapular notching and improved range of motion (ROM) and functional outcome.

MATERIALS AND METHODS

Study design, study population, and data collection

A retrospective review was performed of RSAs performed at a single institution between November 2009 and October 2013 in order to compare RSA to BIO-RSA. Data was collected in a prospective fashion and reviewed retrospectively following institutional review board approval (CERC-VS-2016-07-1 BLIND FOR REVIEW PURPOSES). Inclusion criteria were a primary RSA with a minimum follow-up of 2 years. Patients with fracture sequelae, history of infection, or presence of neurological problems such as Parkinson’s disease, or glenoid bone loss were excluded. Bone loss was excluded because inclusion would have prevented analyzing the effect of lateralization. Effectively, the goal of the study was to compare standardized surgeries with either no or 10 mm of glenoid lateralization. The flow chart in Figure 1 resumes the patient selection.

RIO-RSA

BIO-RSA

BIO-RSA

161 joints (154 patients)

76 joints (75 patients)

76 joints (75 patients)

161 joints (154 patients)

85 joints (79 patients)

161 joints (154 patients)

85 joints (79 patients)

61 joints

69 joints

Excluded

Fracture sequelae

Parksion: 1

Last Follow-up: 3

Follow-up >24 months: 8

Eligible Cases

161 joints (154 patients)

76 joints (75 patients)

85 joints (79 patients)

61 joints

69 joints

Figure 1

Flow chart of the study

39

STANDARD VERSUS BONY INCREASED-OFFSET REVERSE SHOULDER ARTHROPLASTY. A RETROSPECTIVE COMPARATIVE COHORT STUDY

RUNNING TITLE: BIO VS. STANDARD RSA

Philippe Collin, Xin Liu, Patrick J Denard, Alexandra Nowak, Alexandre Lädermann

Corresponding author

Alexandre Lädermann

Division of Orthopaedics and Trauma Surgery

La Tour Hospital

Av. J.-D. Maillard 3,

CH-1217 Meyrin, Switzerland

Email: alexandre.ladermann@gmail.com
This retrospective study has some limitations. We did not analyze the body mass index (BMI) and the previous indication of the RTSA. Pedegimas et al. found a higher risk of instability in patients with a higher BMI and in revisions of RTSA.

CONCLUSION

Unstable RTSA is not so rare and represents a difficult challenge for the shoulder surgeon. One or two or more causes have to be identified before the revision. Bilateral radiographs, CT-scans and biologic exams must be systematic. Closed reduction is rarely a success and open reduction with revision of some or all the components of the prosthesis is often mandatory. The restoration of an appropriate humeral length and lateralization of the prosthesis to increase the tension of the deltoid are crucial to stabilize the shoulder.

REFERENCES

Hervé Thomazeau
Universitary Hospital of Rennes
Orthopaedics dpt
Rennes
France
herve.thomazeau@chu-rennes.fr

Oren Tsveli
Reading Shoulder Unit
Royal Berkshire Hospital &
Berkshire Independent Hospital,
Reading, Berkshire
United Kingdom

Philippe Valenti
Paris Shoulder Unit
Clinique Bizet
21 rue Georges Bizet
75116 Paris
France
philippe.valenti@wanadoo.fr

Annemieke Van Haver
Orthopaedic Center Antwerp
Az Monica, Antwerp
Faculty of Medicine and Health Sciences
University of Antwerp, Antwerp
Belgium

Alexander Van Tongel
Reading Shoulder Unit
Royal Berkshire Hospital &
Berkshire Independent Hospital
Reading, Berkshire
United Kingdom

Olivier Verborgt
Orthopaedic Center Antwerp
Az Monica, Antwerp
Faculty of Medicine and Health Sciences
University of Antwerp, Antwerp
Belgium
olivier.verborgt@azmonica.be

Alexander Vervaecck
Orthopaedic Center Antwerp
Az Monica, Antwerp
Faculty of Medicine and Health Sciences
University of Antwerp, Antwerp
Belgium

Anne Vidil
Paris Shoulder Unit
Clinique Bizet
21 rue Georges Bizet
75116 Paris
France
avidil@free.fr

Gilles Walch
Centre Orthopédique Santy
24 Avenue Paul Santy
69008 Lyon
France
gilleswalch15@gmail.com

Brigit Werner
Department for Shoulder Surgery
Campus Rhoen Clinics
Germany

Jean-David Werthel
Paris Shoulder Unit
Clinique Bizet
21 rue Georges Bizet
75116 Paris
France
jowerthel@gmail.com

Inken Wiese
Department for Shoulder Surgery
Campus Rhoen Clinics
Germany

Laurent Willemot
Orthopaedic Center Antwerp
Az Monica, Antwerp
Faculty of Medicine and Health Sciences
University of Antwerp, Antwerp
Belgium

Caroline Witney-Lagen
Reading Shoulder Unit
Royal Berkshire Hospital &
Berkshire Independent Hospital
Reading, Berkshire
United Kingdom

Lora Young
Reading Shoulder Unit
Royal Berkshire Hospital &
Berkshire Independent Hospital
Reading, Berkshire
United Kingdom

Olivia Zbinden
Division of Orthopaedics
and Trauma Surgery
La Tour Hospital
rue J.-D. Maillard 3
1217 Meyrin
Switzerland

Vilijam Zdravkovic
Kantonsspital St. Gallen
Department of Orthopaedic
Surgery and Traumatology
Rorschacherstr. 95
9007 St. Gallen
Switzerland

www.eventime-group.com