

## Medialization / Lateralization



RTSA

Ph Valenti  
Shoulder Unit  
Paris France

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## Disclosures

- Arthroplasty  
Consultant : FH orthopaedics  
royalties
- Arthroscopy  
Consultant : Arthrex and Biomet

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## OUTLINE

- Medialization : Gold Standard  
(Grammont arthroplasty)
- Lateralization in the glenosphere
- Lateralization in the humeral implant
- Lateralization in both

Advantages / Disadvantages

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GRAMMONT first Generation  
1985

- Two thirds of a sphere
- PE humeral stem
- Cemented glenosphere



Lateralized !!  
COR

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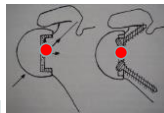
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GRAMMONT 2nd generation  
1989

- Half of a sphere
- 3 humeral stems
- Glensphere fixed with 2 screws



COR  
At the level of the glenoid

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Standard "Grammont" RSA  
Medialization + Distalization COR



Lever arm of the deltoid  
Tension of deltoid fibers

AA Elevation  $\approx 130^\circ$




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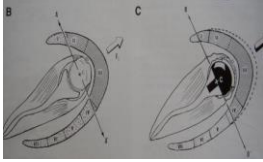
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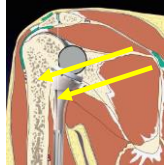
Problems related to Medialization !!!

Slackening of the remaining cuff  
( IS Tm SSC)  
Post / Ant fibers deltoid are not recruited



Boileau P JSES 2005

Course of the tendons  
are distalized  
SSC, IS, Tm



ER +++ IR ++  
are limited

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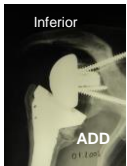
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Problems related to Medialization !!  
Scapular impingement: Notching !!



PE wear / glenoid notch  
Potential glenoid+++ humeral + loosening

Valenti Shoulder S 2000 Simovitch JBJS 2007  
Levigne JSES 2008 Kempton JSES 2012

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Problems related to Medialization !!!  
**Instability 3 to 6%**

No more wrapping of deltoid around greater tuberosity  
No compressive soft tissue forces  
Medial impingement



Courtesy P Boileau



Gutierrez CORR 2008 Gallo JSES 2011  
Zumstein JSES 2011 Scarlat I Orthop 2013

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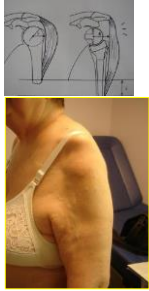
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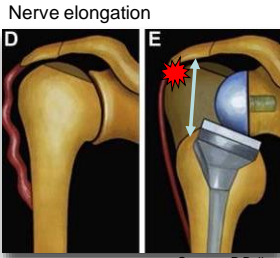
Problems related to Medialization

Loss of shoulder contour



Boileau P JSES 2005

Stress Fracture of the acromion



Valenti Anat Sci Int. 2014  
Ladernann OTSR 2014

Courtesy P Boileau

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Delta 3 « gold standard » = Medialization

↑ Lever arm of the deltoid  
Tension of deltoid fibers

AA  
Elevation

- No improvement External rotation
- Internal rotation is limited
- Loss of shoulder contour
- Risk of instability (revision ++)
- Glenoid Notch 40 to 75 %  
25% type IV
- PE wear
- Potential glenoid loosening  
Difficult revision
- Potential humeral loosening




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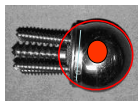
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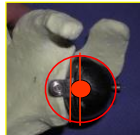
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Lateralization in the glenosphere  
*COR is outside of the scapula*

• *Metallic offset lateralization*



Two thirds of a sphere (DJO)



Glenosphere over the baseplate (FHO)

• *Bony increased offset*  
BIO RSA (P Boileau)  
Outside the scapula  
Inside the bone



Frankle M JBJS 2006  
Boileau P CORR 2011  
Valenti PH CORR 2011

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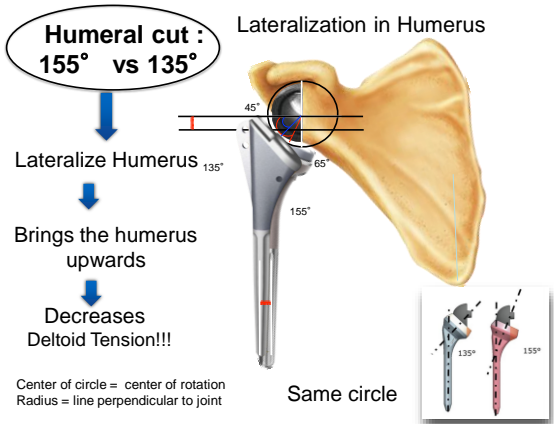
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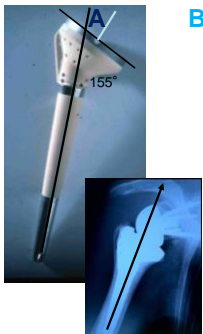
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**PE Inlay**  
Distalization



**PE Only**  
Lateralization + Distalization




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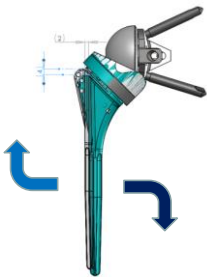
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Lateralization in the humerus  
*Excentric PE onlay socket*



- Lateralize and bring up the humerus
- Medialize and distalize the humerus

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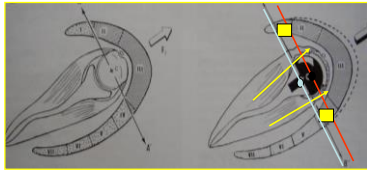
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Lateralization in the glenosphere  
 Medialization the humerus (PE Inlay 155° )

↑ Tension in remaining cuff  
 Recruitment ant and post fibers  
 of the deltoid

BETTER ER +++

Decreases risk of notching




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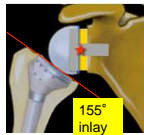
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Lateralization of the glenosphere +  
 Medialization of the humerus

- Decrease lever arm of the deltoid  
increase the deltoid force required for active abduction !!!!
- Increase deltoid tension  
 joint loads (PE wear!!)

Risk of glenoid loosening  
 Acromial stress fracture



NOT  
 A GOOD  
 COMBINATION !!!!

Henninger HB JSES 2012

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Lateralization  
 Glenosphere + Humerus

- ↑ Deltoid Lever arm
- ↑ Tension ISS/Tm/SSC
- ↑ Deltoid tension → W Angle
- ↑ compressives forces
- ↑ Stability
- ↓ Medial impingement



08/02/2015

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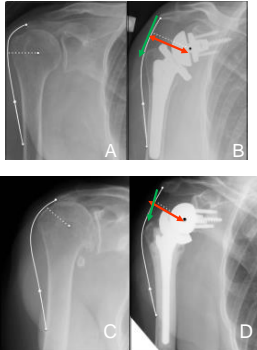
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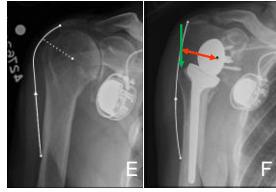
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Lateralized RSA

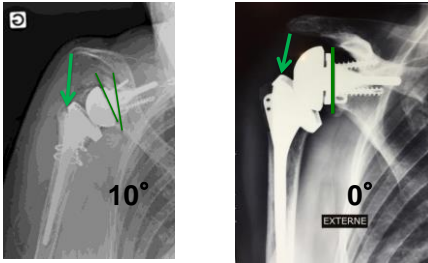


Medialized RSA



Decrease lever arm of the deltoid  
 More distalization of the humerus

→ Lateralize Both + Inferior Tilt  
 Distalization of the humerus



Increase tension of deltoid fibers  
 Lever arm of the deltoid doesn't change

Better ROM

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Is it safe to lateralize COR ?

Experimental studies  
 Numerous musculoskeletal model

Standard RSA / BIO RSA / Metallic RSA (10mm)

- No significant difference regarding the strain around all the screws
- Better ROM for Bony RSA and Metallic RSA
- Stable fixation baseplate with COR 11mm  
 (Encore P with non locking screw)



Terrier A et Faron A Sauramps Medical: 2010.  
 Harman et al JSES 2005.

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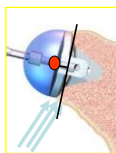
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### Prospective consecutive Lateralized RSA Arrow prosthesis

**n=615**

- 2004 -2011
- *30 glenoid notching = 4.7%*  
Type I non evolutive > 1 year
- *10 glenoid loosening = 1,6%*  
(intraop fracture, fall,  
no osseointegration)



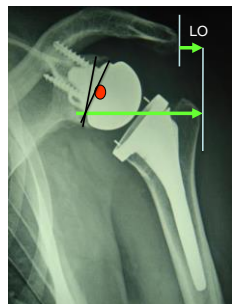
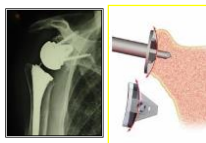
Take home messages  
against  
increase shear forces !!!



- Flush to inferior border of the glenoid
- Convex base plate (large contact area+++)
- Inferior tilt (compressive forces)
- Press fit
- Central compressive screw 6.0



« special design »  
Improvement fixation



Inferior Tilt  
Lateralization in Both  
No notch  
Good ROM



Strong deltoid



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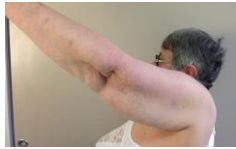
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No Good deltoid !!!



Lever arm of the deltoid ++  
Less distalization !!!!



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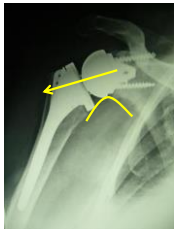
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### Conclusion #1 Strong Deltoid

Lateralization in the design of RSA  
(glenoid component + Humeral stem)

increase lever arm deltoid+++  
Distalize humerus +  
Increase Tension of the deltoid fibers



Good elevation  
Better ER +++ IR +  
More stability (revision )  
Better shoulder contour  
Less glenoid notch (none evolutive)

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### Conclusion #2 Thin Atrophic Deltoid

Less Lateralization

Lateralized Glenoid (No scapular notch)  
Inferior Tilt  
Humeral stem 155° Medialized PE Socket

- Distalization of the humerus ++  
Increase Tension of the deltoid fibers
- Increase Lever arm of the deltoid

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SAVE THE DATE!

Paris, MARCH  
18<sup>th</sup> & 19<sup>th</sup> 2016

Chairman:  
Ph. Valenti

Scientific comitee:  
P Boileau, B Elhassam  
H Resch, JP Warner

Symposium  
Institut de la Main  
Jouvenet

18 & 19<sup>th</sup>  
march  
2016


**UPDATE  
TENDON TRANSFER**  
in irreparable  
rotator cuff tear

Chairman: Ph. Valenti

Organization: EVERFORM Group  
Tel: 02 20 48 80 30 / 30 31  
contact@tendon-transfer.com

www.institutdelamain.com

Membres of the Institute:  
Ph. Valenti, Th. Dubert, Ph. Sautourel, E. Roulet, P. Gaudin, A. Kilian, M. Guez, A. Vigi



Thanks  
a lot for your attention

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