



Lateralized vs. classic style reverse shoulder arthroplasty



Outline

Introduction

- Shoulder Anatomy
- Evolution of Shoulder Arthroplasty

Methods

Results

Discussion

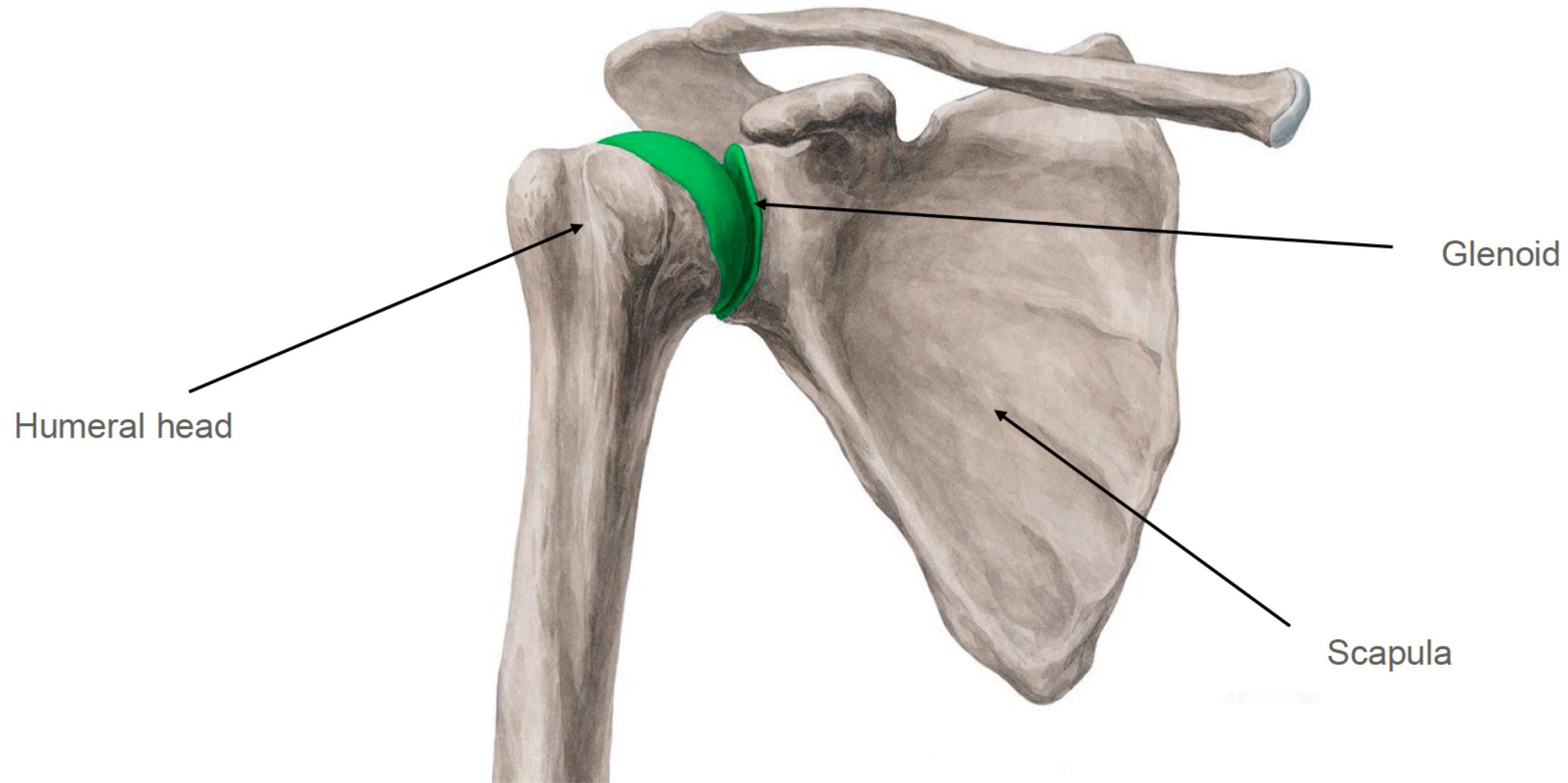


Introduction – Shoulder Anatomy

- Complex anatomy of the shoulder joint
 - Allows huge range of motion in all directions
 - Susceptible to injury and degenerative disorders
 - High dependency for daily living
- Big need for adequate treatment

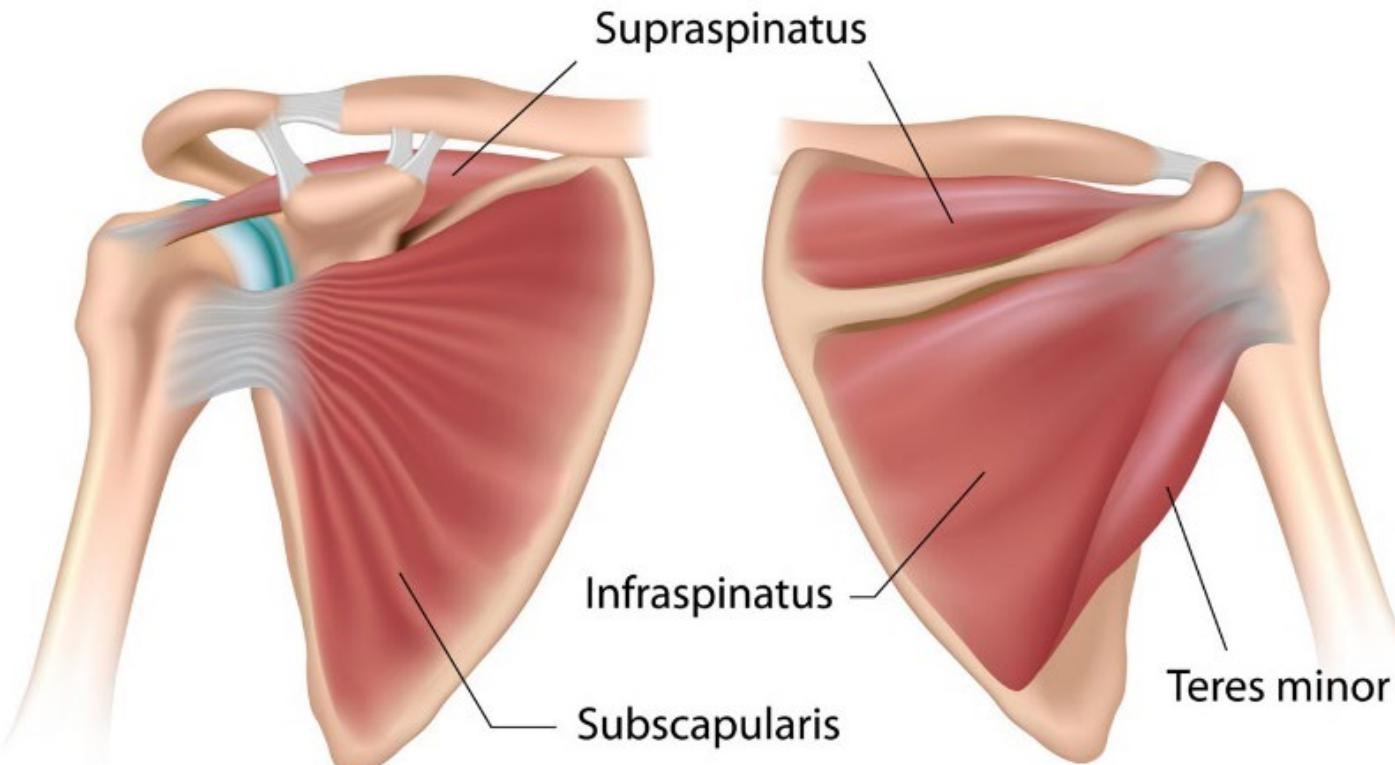


Introduction – Shoulder Anatomy



Introduction – Shoulder Anatomy

Rotator Cuff Muscles



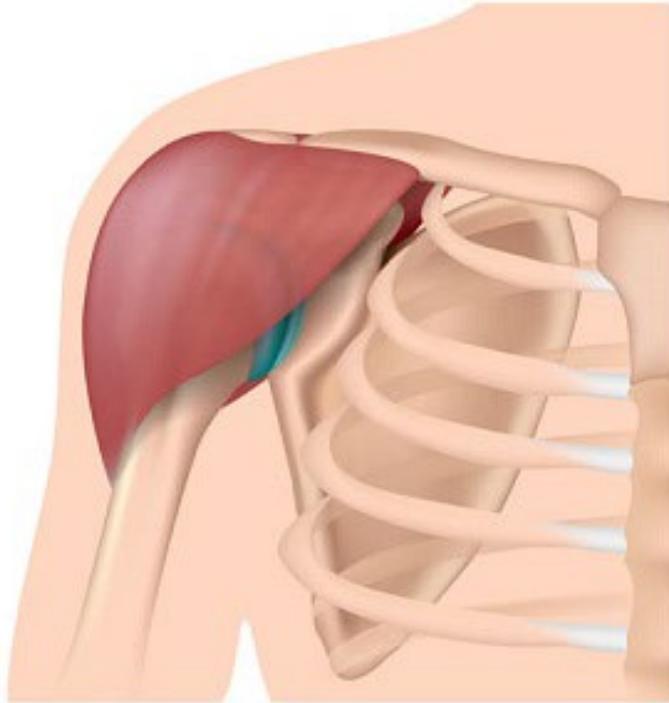
Anterior view

Posterior view



Introduction – Shoulder Anatomy

Deltoid Muscle



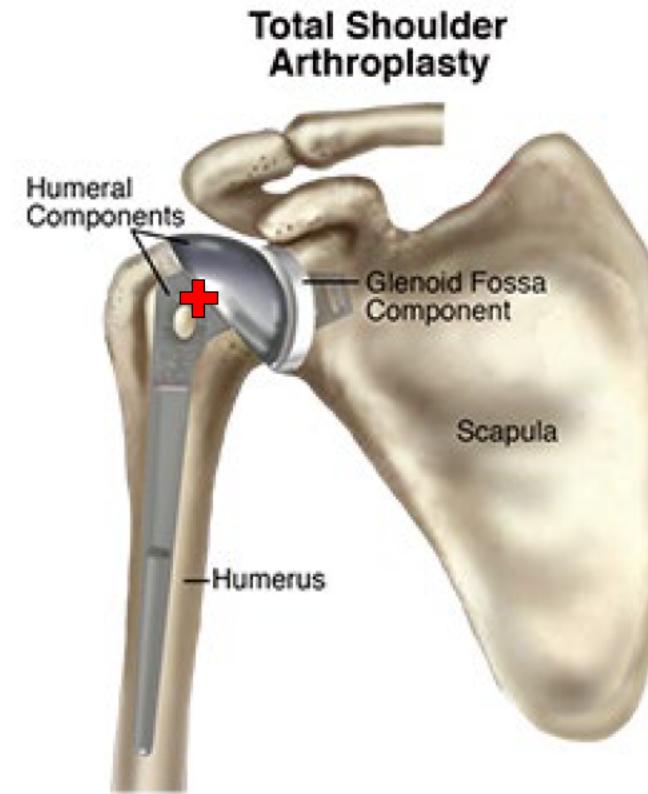
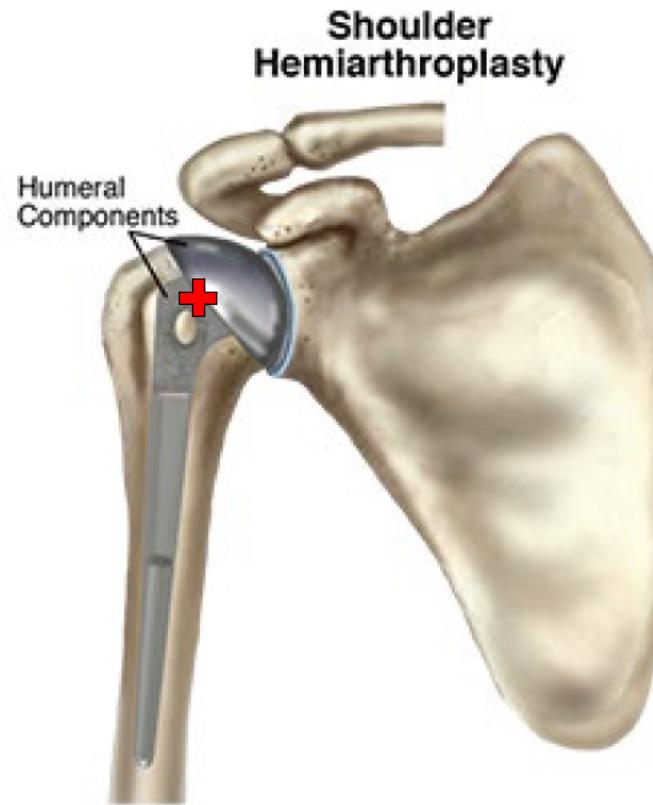
Anterior view



Posterior view



Introduction – Evolution of Shoulder Arthroplasty

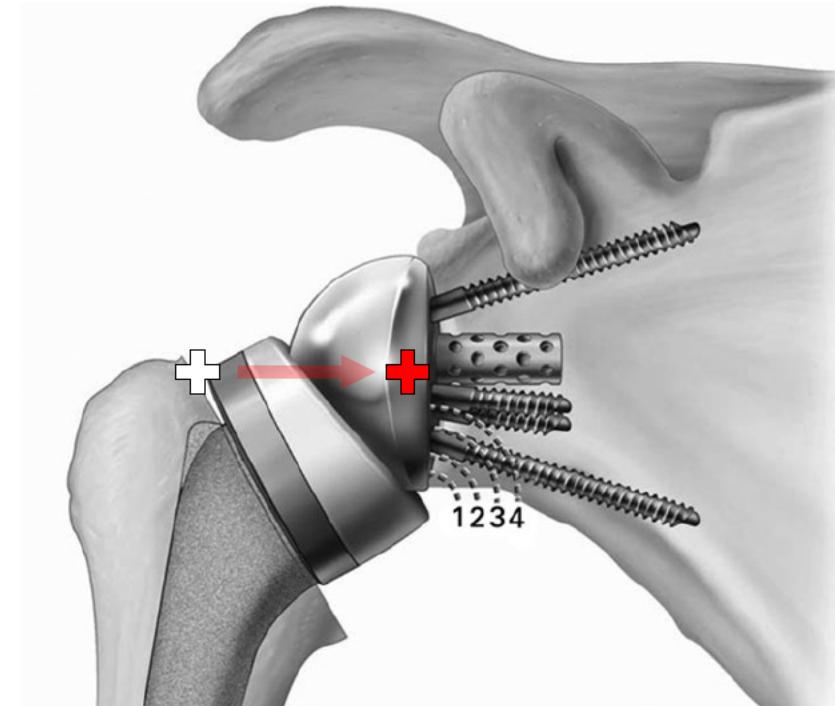


Center of Rotation



Introduction – Evolution of Shoulder Arthroplasty

- Reverse (Total) Shoulder Arthroplasty
- Inverted configuration of components
- Medialization of Center of Rotation
 - + bigger force output deltoid muscle
 - scapular notching

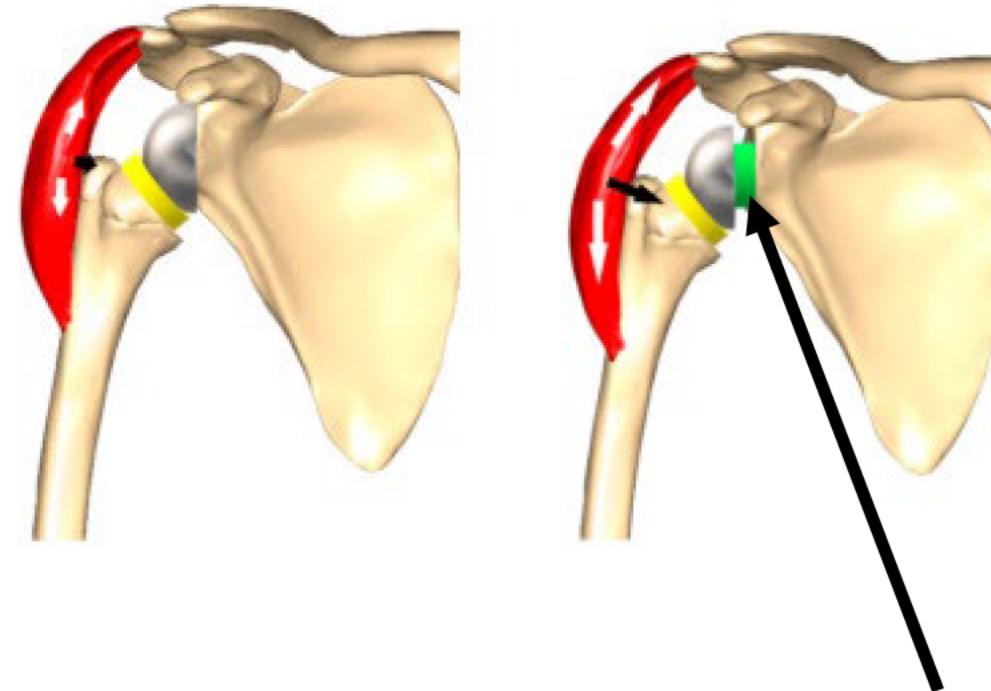


- + Center of Rotation rTSA
- + Center of Rotation TSA



Introduction – Evolution of Shoulder Arthroplasty

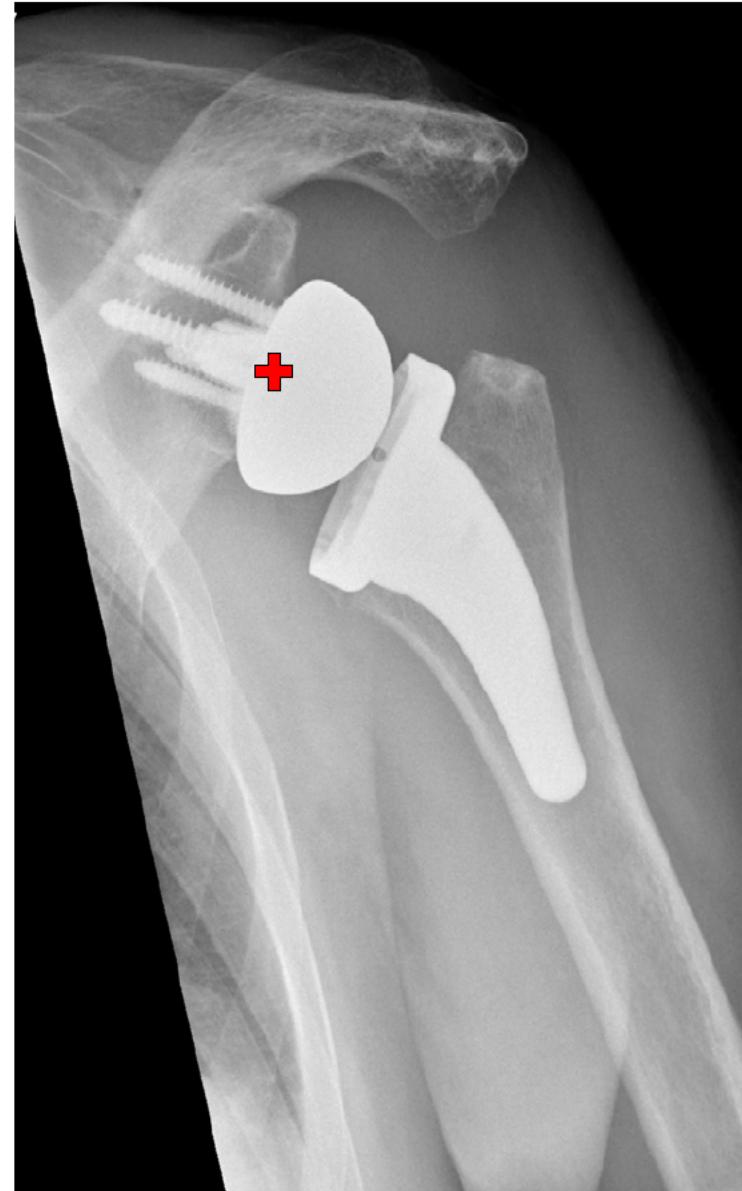
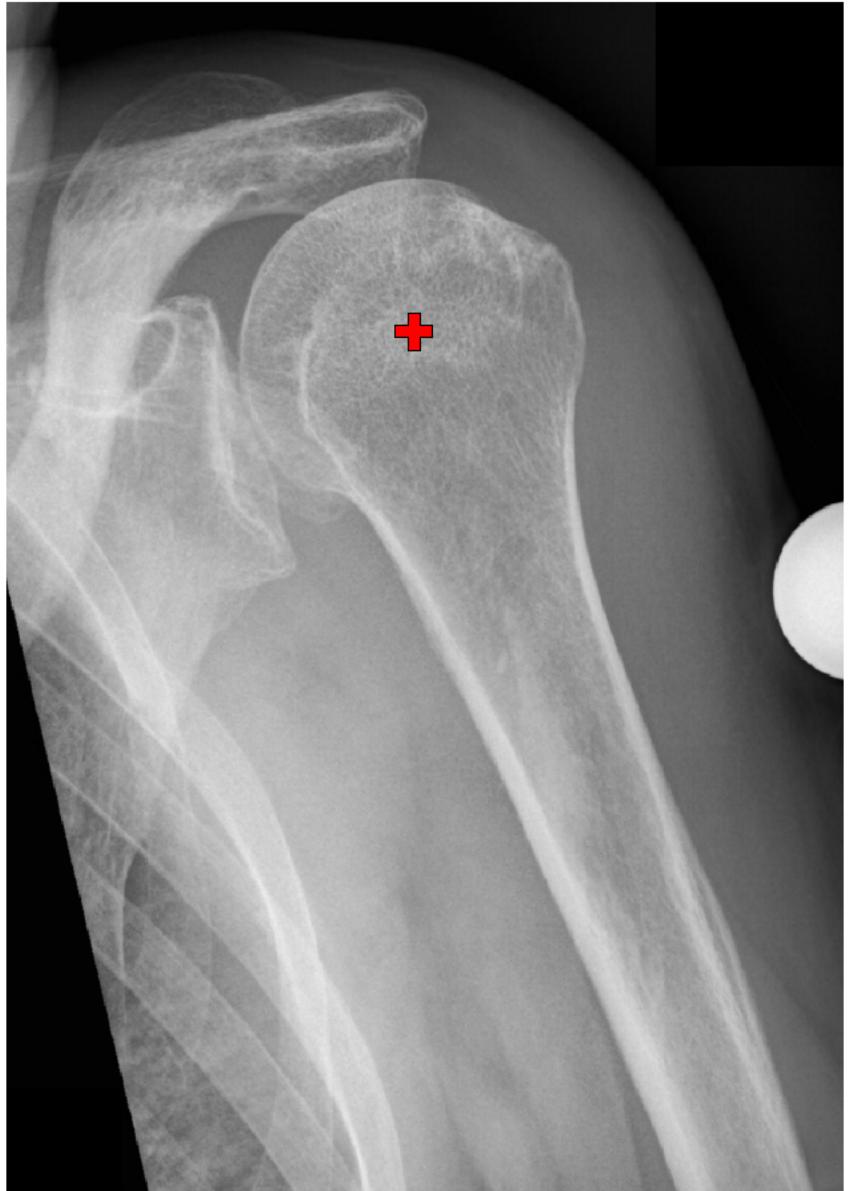
- Lateralization
 - Reduced rate of notching
 - Increased deltoid tension
→ more deltoid force



Classic:
no offset

Lateralized:
glenoidal offset





Center of Rotation



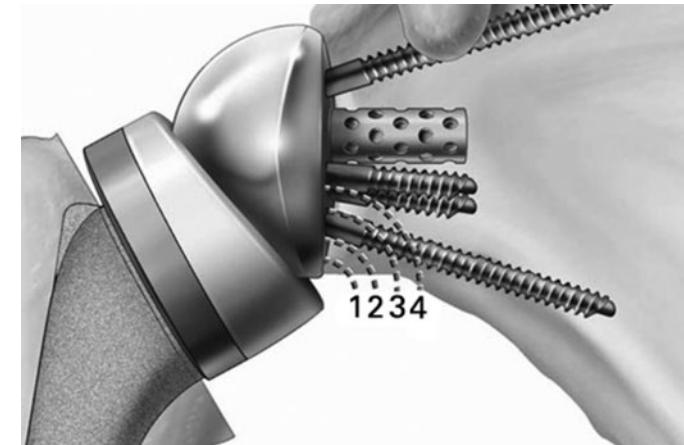
Methods

- Data Source: Shoulder arthroplasty registry at Schulthess Clinic
 - Inclusion criteria:
 - Implantation of reverse shoulder arthroplasty, model Aequalis
 - 2 years postop follow up data available
 - Exclusion criteria:
 - Revision operations
 - Groups
 - Classic configuration without lateralization
 - Lateralized Glenoid



Methods

- Constant Score (composite objective parameter, 0-100)
 - Abduction strength
 - ROM
- Subjective Shoulder Value (patient reported outcome, 0-100)
- Scapular Notching grade (objective parameter, 0-4)
 - 0 = no sign of notching
 - 1 = notch limited to the scapular pillar
 - 2 = notch reaching the inferior screw of the base plate
 - 3 = notch extending beyond the inferior screw
 - 4 = notch reaching the base plate central peg/screw



Methods

- Pearson D'Agostino Test for normality
- Unpaired t-test for normal distributed CS and SSV (Welsch's Correction if unequal SD)
- Mann-Whitney U Test for not normally distributed CS and SSV
- Chi² Test for categorical data (notching)
- Level of Confidence: 95% → $\alpha = 0.05$
- Libraries: pandas, numpy, matplotlib, scipy



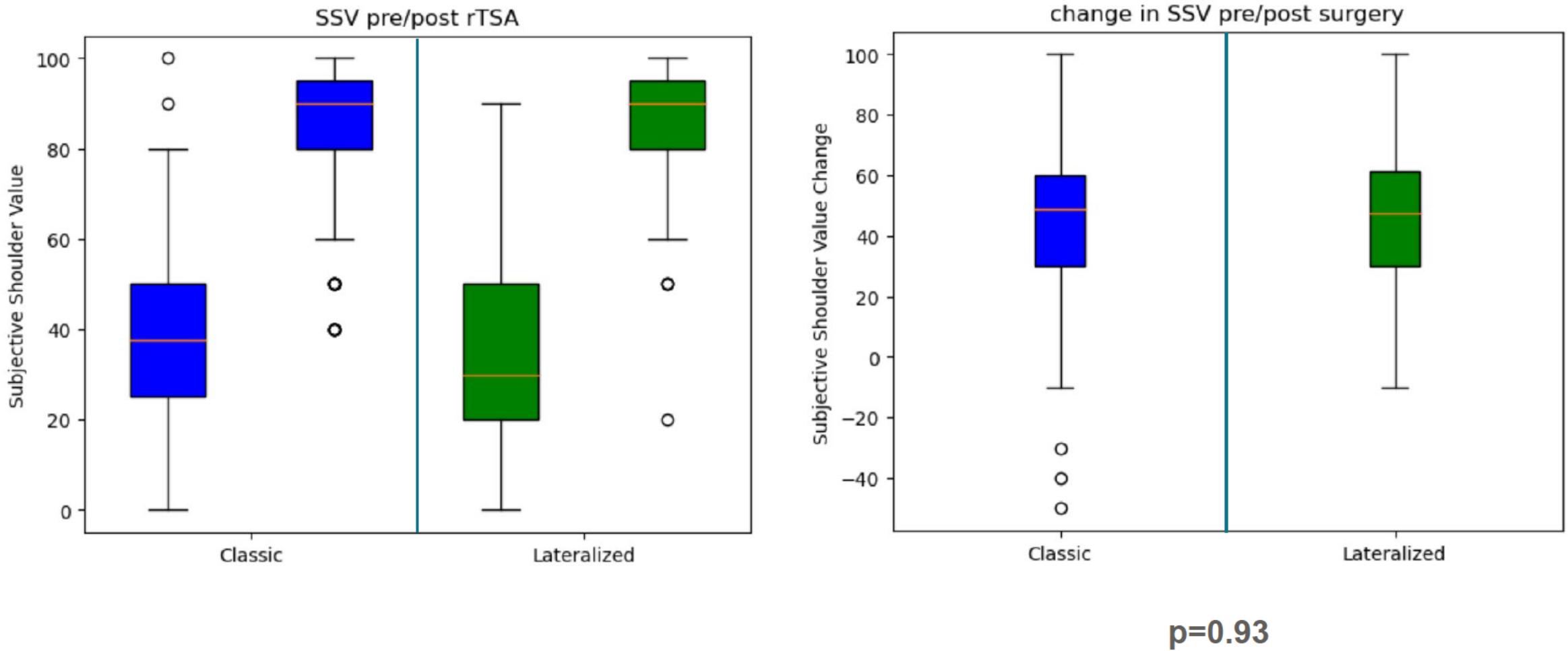
Results

	Classic	Lateralized
Gender		
male	151 (38%)	64 (42%)
female	251 (62%)	89 (58%)
Age at surgery	75 [41,95]	75 [42,95]
BMI at surgery	27.2 ± 5.0	26.8 ± 5.0
ASA Classification		
ASA 1: a normal, healthy patient	7 (2%)	4 (3%)
ASA 2: a patient with mild systemic disease	209 (52%)	88 (58%)
ASA 3: a patient with severe systemic disease	182 (45%)	60 (39%)
ASA 4: a patient with severe systemic disease that is a constant threat to life	4 (1%)	1 (<1%)
Diagnosis		
Cuff Tear Arthropathy (CTA)	203 (54%)	78 (56%)
Primary Osteoarthritis (OA)	90 (24%)	42 (30%)
Fracture Sequelae	44 (12%)	14 (10%)
Acute Fracture	16 (4%)	2 (1%)
Primary Humeral Head Necrosis	12 (3%)	3 (2%)
Rheumatoid Arthritis	5 (1%)	-
Other	4 (1%)	-
Osteoarthritis due to Instability	2 (<1%)	-

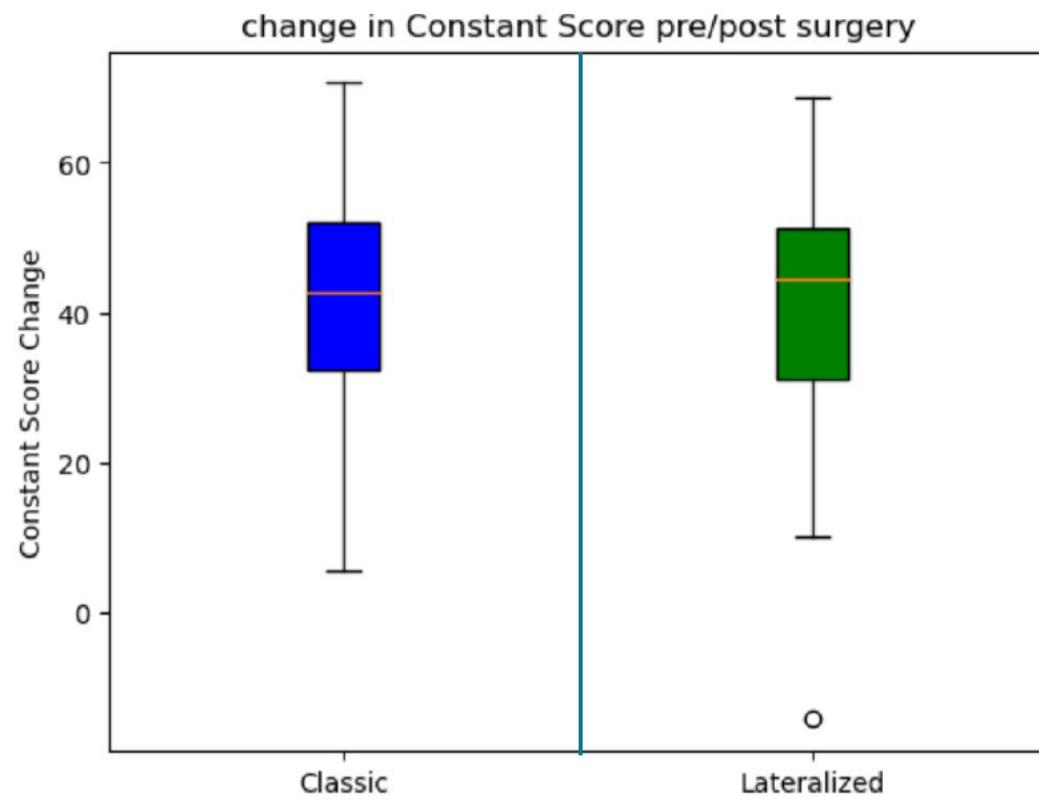
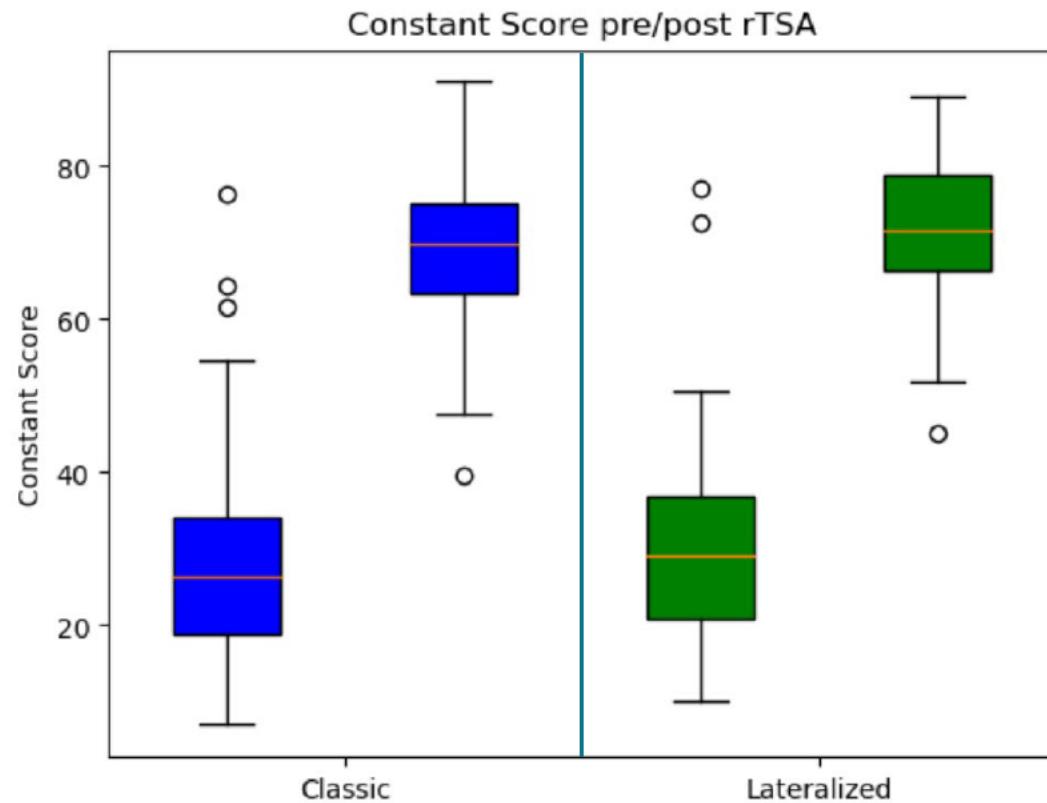
Note. N=555. Classic group (n=402), Lateralized group (n=153)



Results



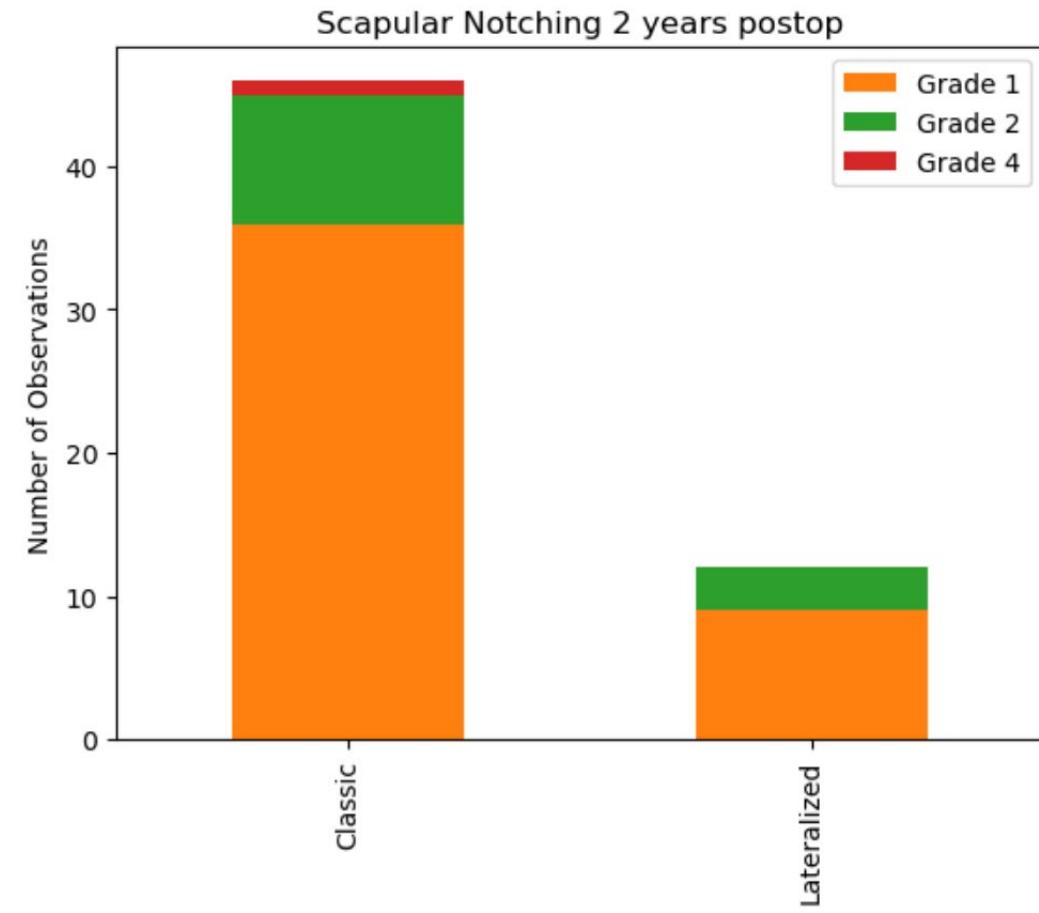
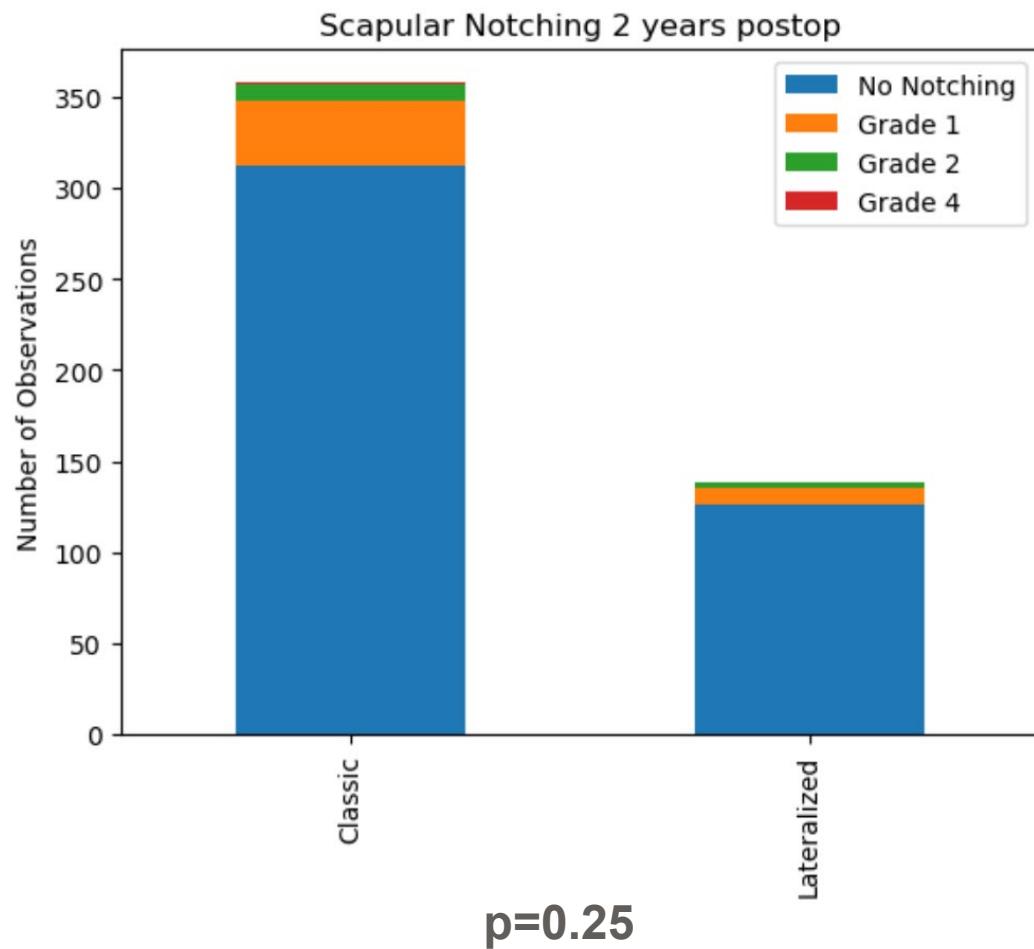
Results



$p=0.88$



Results



Results

- No significant differences for subgroup analysis either..
 - male classic vs. male lateralized
 - BMI>25 classic vs. BMI>25 lateralized **p>0.05 for all subgroup comparisons**
 - ASA 3 + 4 classic vs. ASA 3 + 4 lateralized
 - CTA classic vs. CTA lateralized
 - etc.



Discussion

- No observed statistical difference between the studied groups **classic** and **lateralized** reverse shoulder arthroplasty
- No difference in subgroups either
- Possibly trend towards lower rates of notching in lateralized glenoids
- With the data at hand, no advantage of incorporating lateralization in reverse shoulder arthroplasty could be detected



Thank you for your attention!

Questions?



References

- Literature:
 - [Grammont reverse prosthesis: design, rationale, and biomechanics - PubMed \(nih.gov\)](#)
 - [Etude et réalisation d'une nouvelle prothèse d'épaule | Semantic Scholar](#)
 - [Lateralization in Reverse Shoulder Arthroplasty - PMC \(nih.gov\)](#)
- Figures:
 - [Glenohumeral \(Shoulder\) joint: Bones, movements, muscles | Kenhub](#)
 - [Rotator Cuff Tears Anatomy | Town Center Orthopaedics](#)
 - [Total Shoulder Arthroplasty vs Hemiarthroplasty for Rheumatoid Arthritis of the Shoulder | Doctor Shoulder](#)
 - [Scapular notching and osteophyte formation after reverse shoulder replacement | Bone & Joint \(boneandjoint.org.uk\)](#)

