



REVERSE SHOULDER ARTHROPLASTY – STATE OF THE ART

Lotte Verstuyft
schouder&elleboog chirurgie



[Rotator Cuff](#)



[Schouderprothese](#)



[Frozen Shoulder](#)



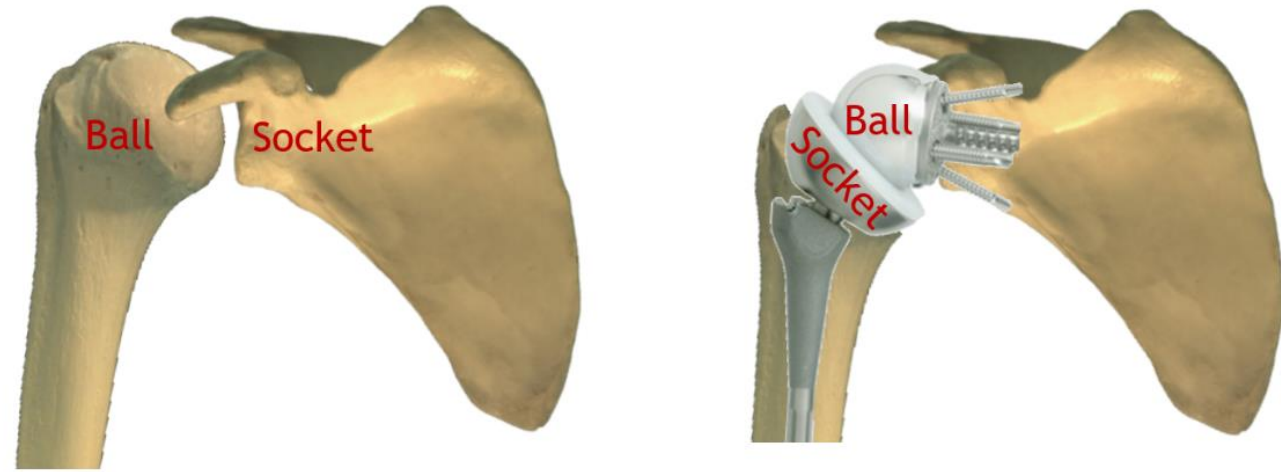
DR. H. VAN DER BRACHT



DR. L. VERSTUYFT

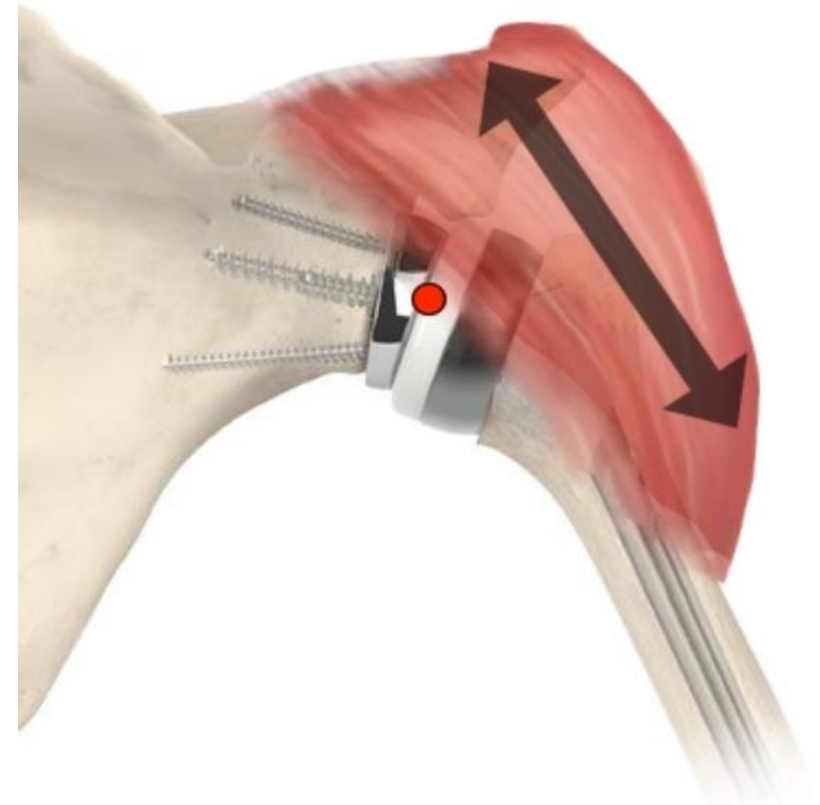
reverse shoulder arthroplasty

= Omgekeerde schouderprothese



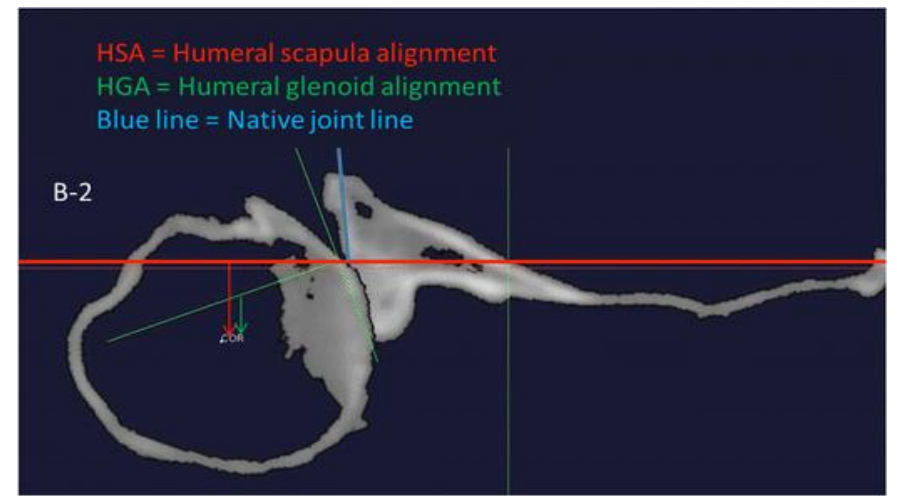
waarom omgekeerd?

- Bol wordt een pan en de pan wordt een bol
- Bij patiënten met cuff scheuren is een anatomische prothese niet mogelijk
- Deltoid is de motor van de schouder in plaats van de rotator cuff

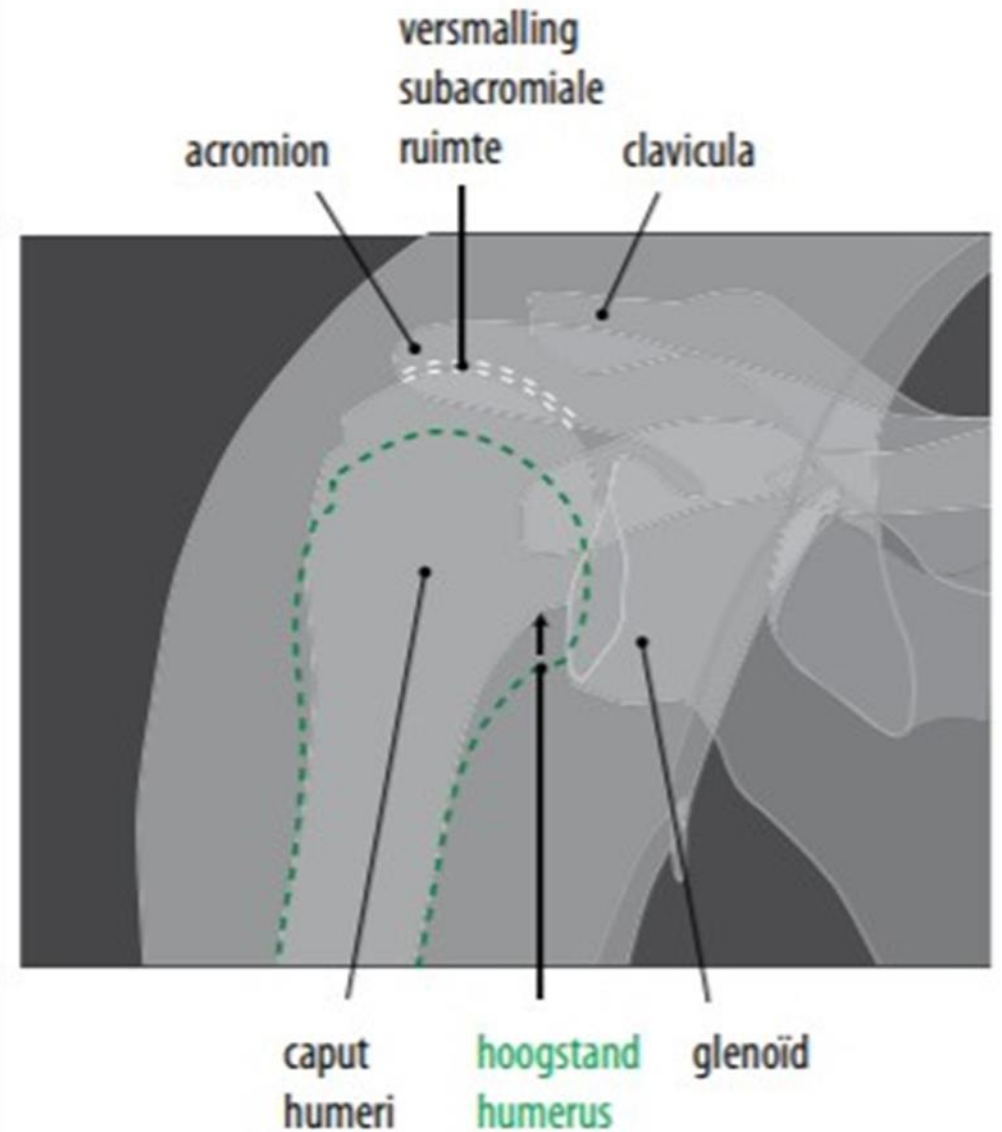
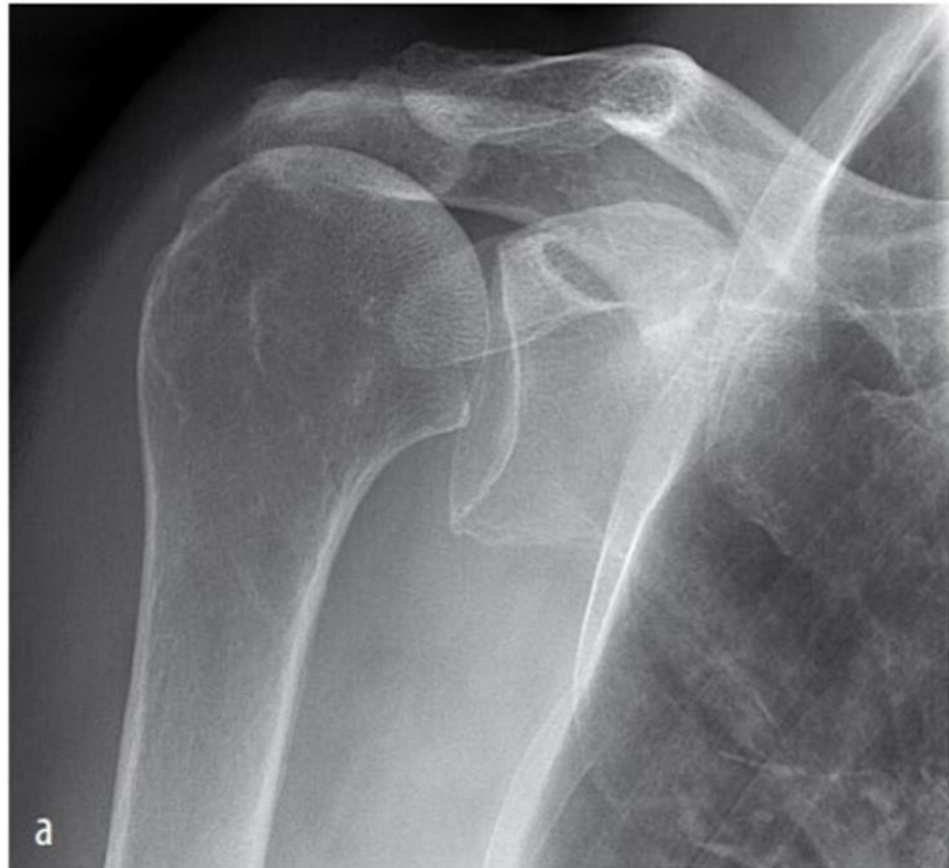


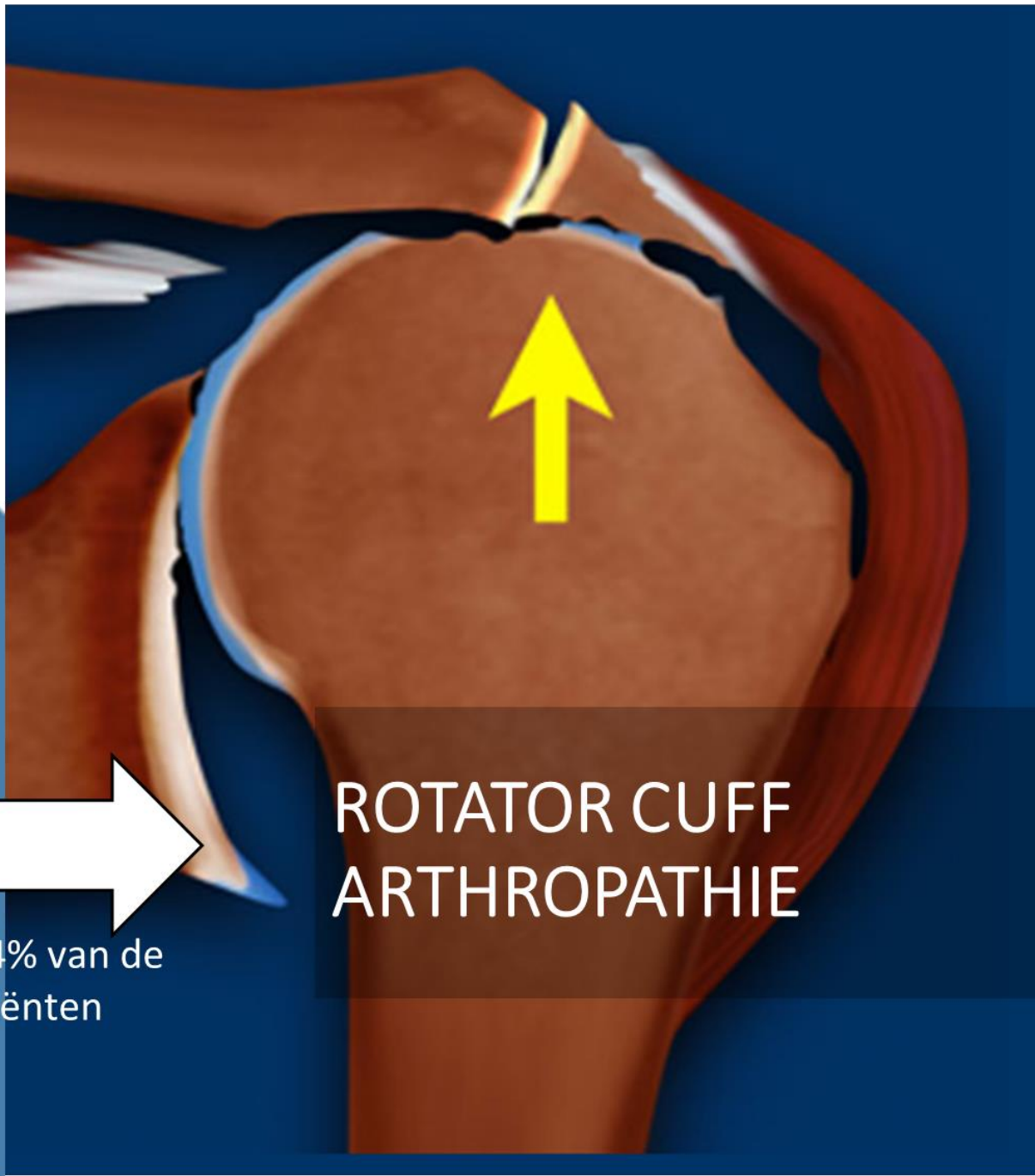
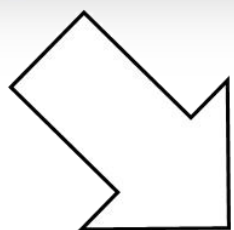
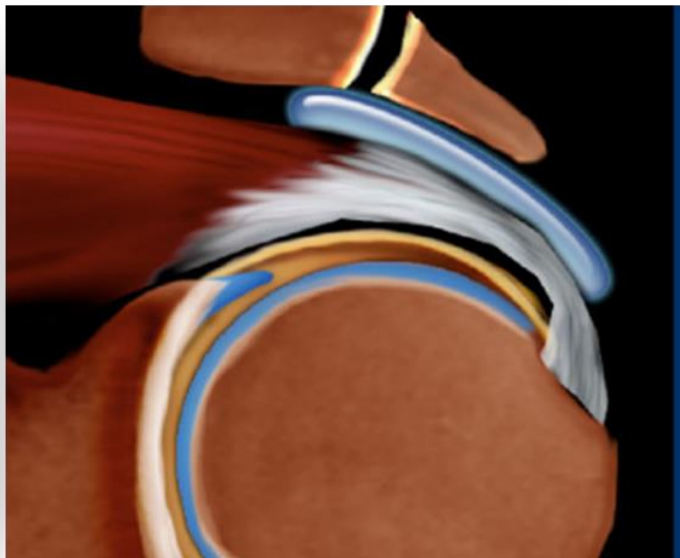
Indicaties

- patiënten met onherstelbare rotator cuff scheuren
 - Vettige infiltratie van de spierbuik
 - Retractie van de pees
- Rotator cuff arthropathie
- patiënten met arthrose en deformiteit van het glenoid
- Oudere patiënten met proximale humerus fracturen



Rotator cuff arthropathie (RCA) - radiografie



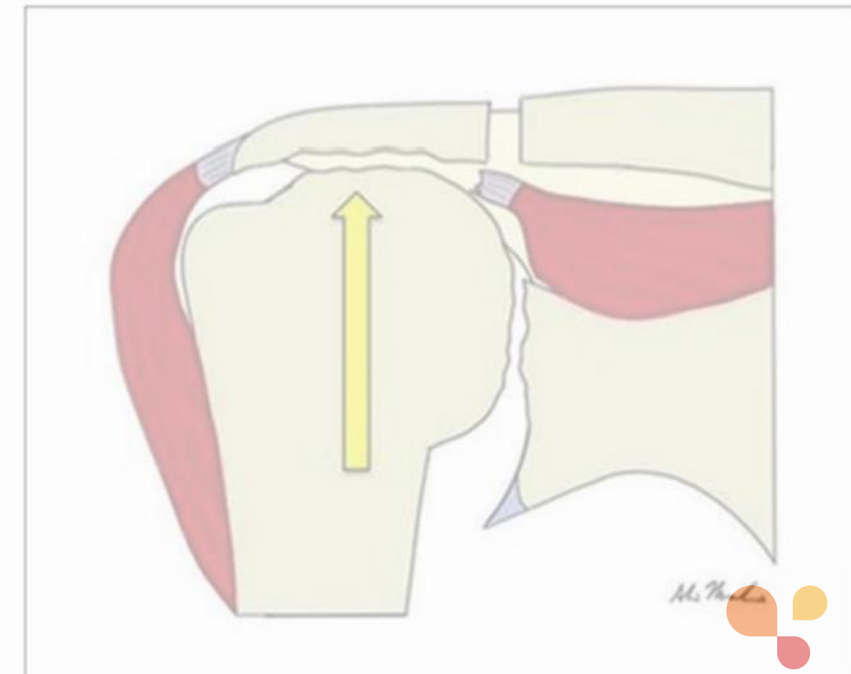
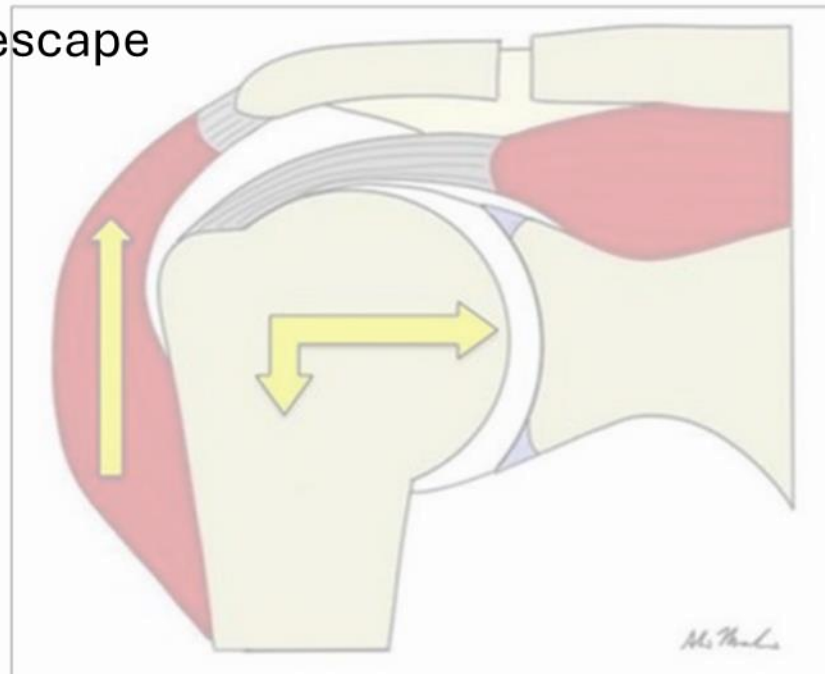


Bij 4% van de
patiënten

ROTATOR CUFF
ARTHROPATHIE

Klinisch onderzoek

- Pijn (Meestal 's nachts)
- Functiebeperking
 - Pijnlijke elevatie met zeer weinig kracht
 - onvermogen om de arm omhoog te heffen 'pseudoparalyse'
 - Anterosuperior escape
 - Lag signs



Antero-superior escape

active abduction

the patient attempts to raise his arm to the side



Lag signs

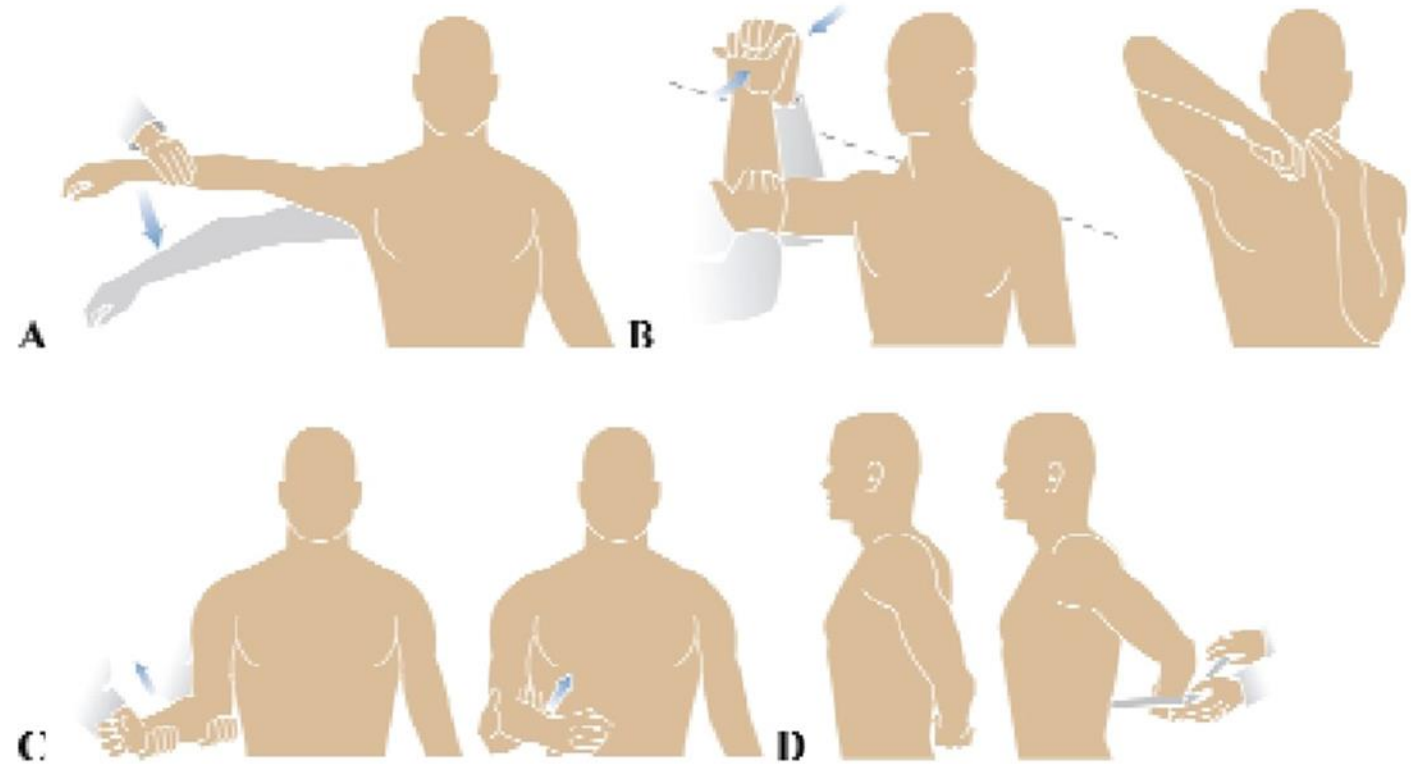


Figure 4. Lag tests in diagnosis of RTC tears. A, drop arm sign, pathologic for supraspinatus insufficiency if the patient cannot hold the passively elevated arm in place or if the arm cannot be lowered slowly without dropping. B, hornblower's sign, pathologic for teres minor insufficiency if external rotation weakness or lag occurs at 90° abduction in the scapular plane or if the patient's elbow rises above hand level, when the hand is raised to the mouth. C, external rotation lag, pathologic for infraspinatus insufficiency if the passively external rotated arm cannot be held in position as shown. D, lift off test, pathologic for subscapularis insufficiency if the passively maximally internally rotated arm cannot be held elevated from the back. If elevation is possible, hand-back distance can be measured and compared to the other side.

Behandeling – conservatief

- Kinesitherapie
- Infiltraties

Review > [J Shoulder Elbow Surg.](#) 2021 Jun;30(6):1431-1444. doi: 10.1016/j.jse.2020.11.002.
Epub 2020 Dec 1.

Nonoperative treatment of chronic, massive irreparable rotator cuff tears: a systematic review with synthesis of a standardized rehabilitation protocol

[Kevin H Shepet](#)¹, [Daniel J Liechti](#)², [John E Kuhn](#)³

> [J Shoulder Elbow Surg.](#) Nov-Dec 2008;17(6):863-70. doi: 10.1016/j.jse.2008.04.005.
Epub 2008 Aug 20.

The role of anterior deltoid reeducation in patients with massive irreparable degenerative rotator cuff tears

[Ofer Levy](#)¹, [Hannan Mullett](#), [Sarah Roberts](#), [Stephen Copeland](#)

—————> Van 40° elevatie naar 160°

Welke patienten hebben baat bij kinesitherapie?

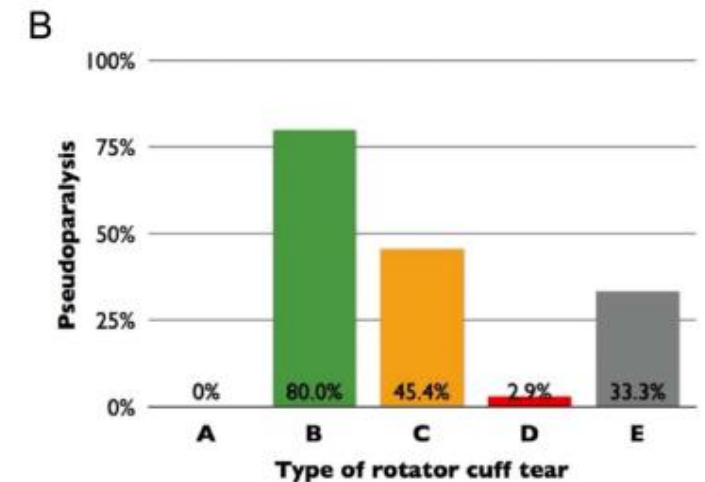
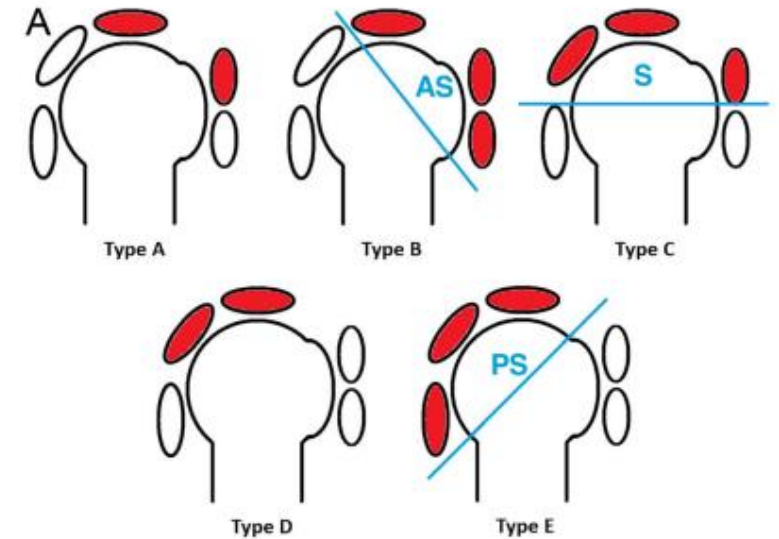
Review > [Int J Environ Res Public Health. 2023 Mar 23;20\(7\):5242. doi: 10.3390/ijerph20075242.](#)

Massive Irreparable Rotator Cuff Tears: Which Patients Will Benefit from Physiotherapy Exercise Programs? A Narrative Review

Eoin Ó Conaire ^{1 2}, Ruth Delaney ³, Alexandre Lädermann ^{4 5 6}, Ariane Schwank ^{1 7}, Filip Struyf ¹

7. Conclusions and Recommendations

Our review of the literature on predictors of response to physiotherapy in patients with MIRCT revealed that the outcomes of physiotherapy in this patient group are highly variable. The reasons for this variability require further investigation. Several biomechanical factors were identified as possibly being related to a successful or unsuccessful outcome following physiotherapy, with complete tear of subscapularis demonstrating the strongest evidence. However, there were no appropriately designed prognostic studies and no randomized controlled trials comparing different physiotherapy programs, or comparing physiotherapy to natural history or surgery. There is a strong emphasis on biomechanical factors as possible predictors of treatment response. However, other domains, such as psychosocial factors and therapeutic alliance, which are important in similar patient populations, have not been explored.



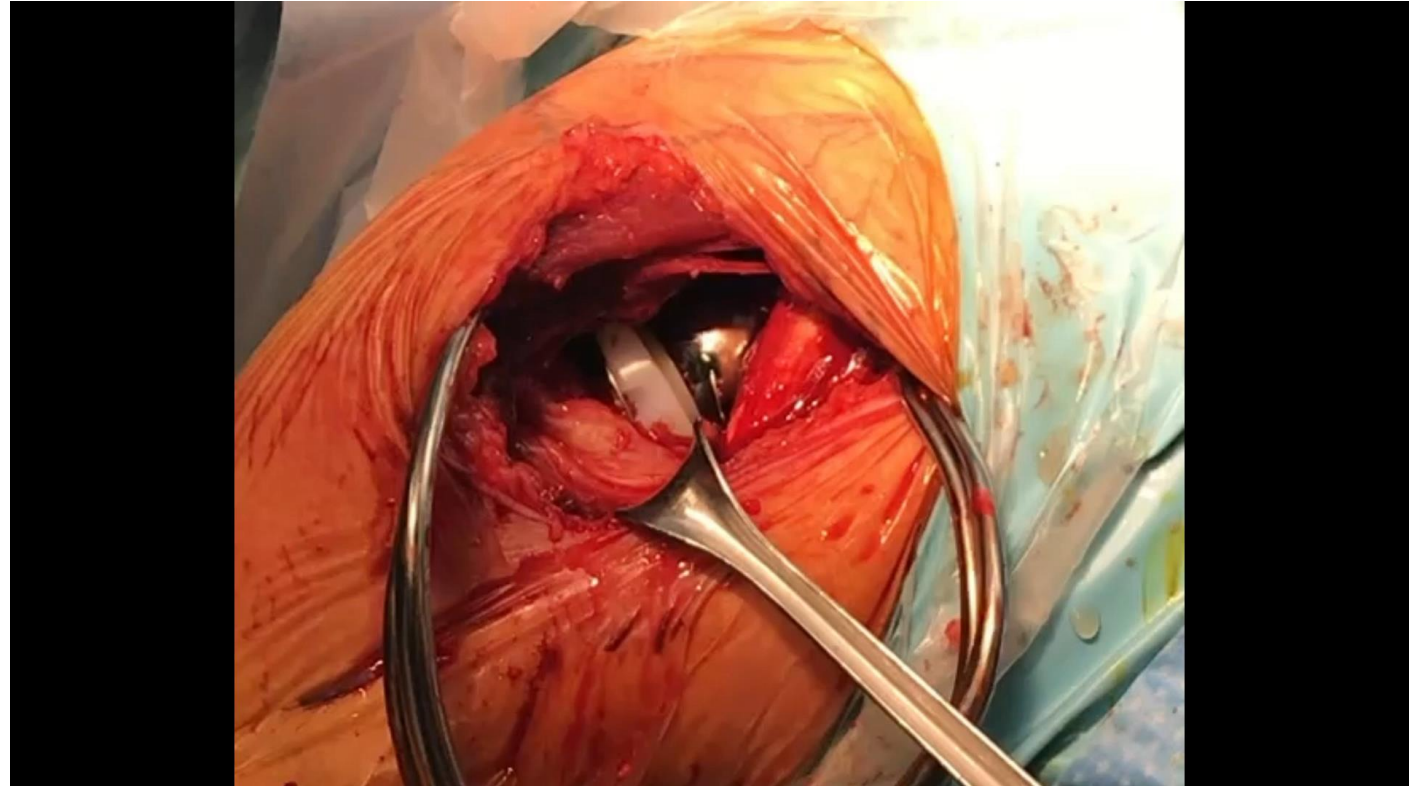
Behandeling – operatief

- Omgekeerde schouder prothese
- 1à2 overnachtingen in het ziekenhuis
- Voor de ingreep krijgt patient een zenuw blok
- Subscapularis on techniek
 - Voordeel : geen immobilisatie postop, betere endorotatie



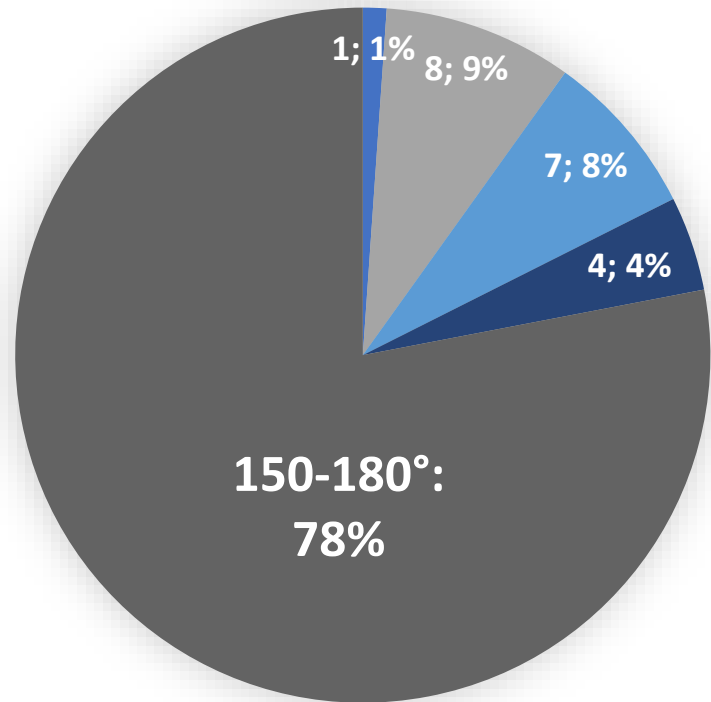
Subscapularis on

- Alternatief voor een tenotomie van de subscapularis pees
- Voordeel
 - Postoperatief geen immobilisatie nodig
 - Minder kans op luxaties
 - Betere endorotatie (hand-rug beweging)
- Studie 105 patienten binnen onze dienst

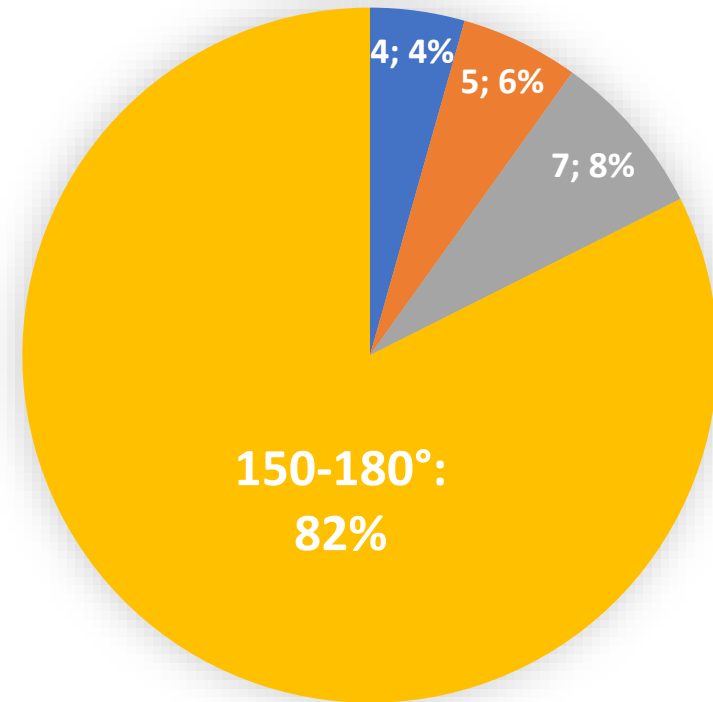


Resultaat omgekeerde schouderprothese

Abductie



Elevatie

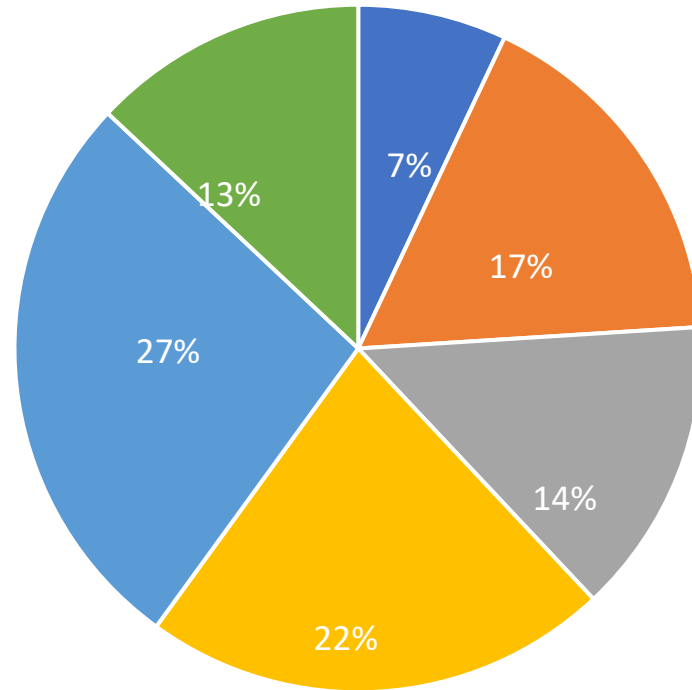


ORTHOCENT GENT

■ 31 - 60° ■ 61 - 90° ■ 91 - 120° ■ 121 - 150° ■ 151 - 180°

■ 61 - 90° ■ 91 - 120° ■ 121 - 150° ■ 151 - 180°

Endorotatie

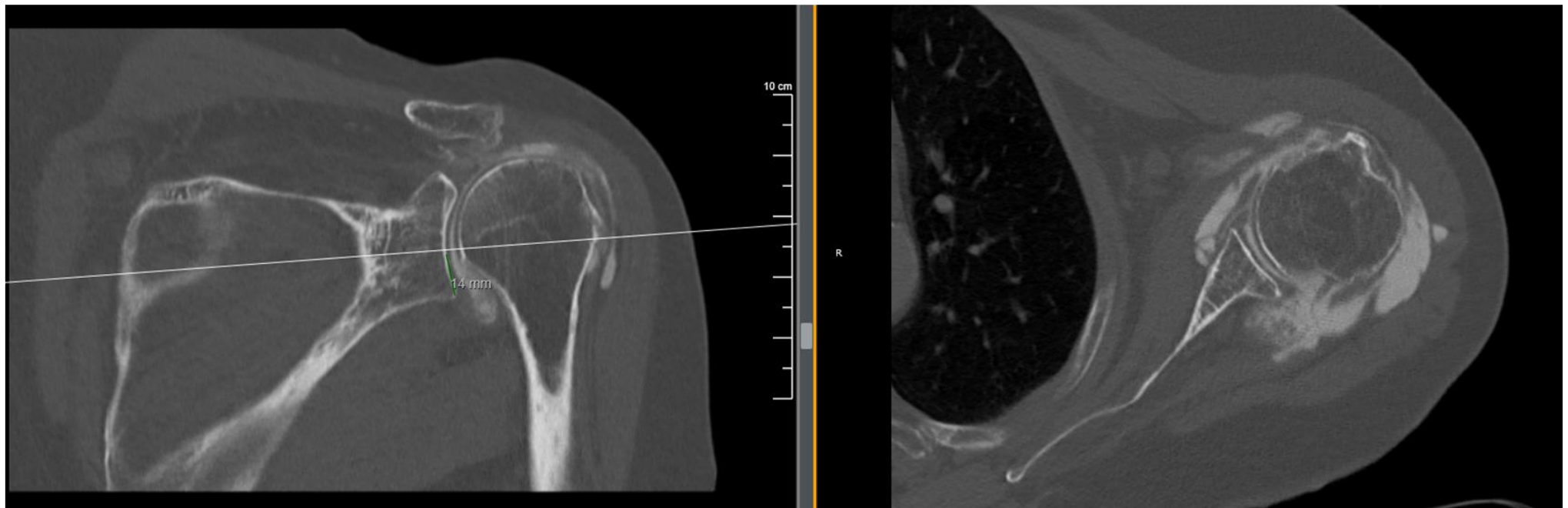


76% -> lumbosacraal of hoger
24% -> bil/dij

- Lateral thigh (7%)
- Buttock (17%)
- Lumbo-sacral junction (14%)
- Twelfth rib (22%)
- Inferiortip scapula (27%)
- Interscapular zone (13%)

Operatieve planning - standaard

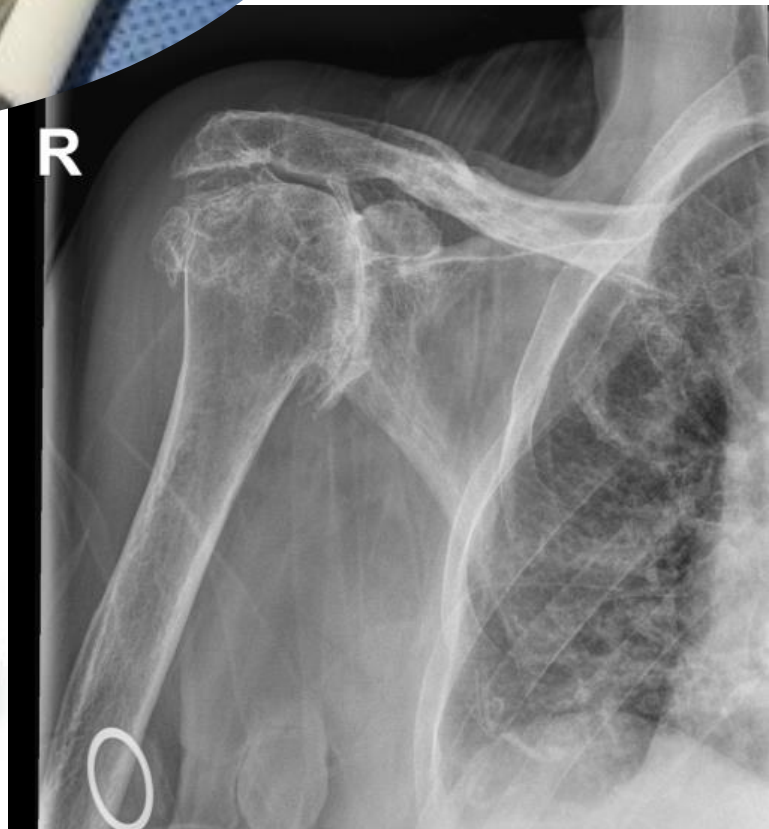
- CT preoperatief nodig
- Uitmeten positie baseplate op CT





Operatieve planning - PSI

- Patiënten met deformiteit van het glenoid
- Planning software met zo nodig **patient specific instrumentation (PSI)** voor een nauwkeurige plaatsing van de baseplate op het glenoid
- Indien groot botdefect thv het glenoid kan een assymetrische of **'augmented'** **baseplate** besteld worden



PREVIEW



SCAPULA



READ ONLY



Case ID: MDE392R46LV22EO
Surgeon: Dr. Verstuyft, Lotte

Laterality: RIGHT
Procedure: RSA

LANGUAGE



ABOUT



QUIT



IMPLANT SYSTEM

Comprehensive Reverse

BASEPLATE

AUG LG

CENTRAL SCREW

25mm

GLENOSPHERE

41mm | +3mm | 1.5mm

Restore Pre-Plan

Implant Contact
93%

SHOW



TOOL



Implant
Inferior Inclination
-3.0°



Implant
Anteversion
2.0°



ZIMMER BIOMET

ORTHO.GENT

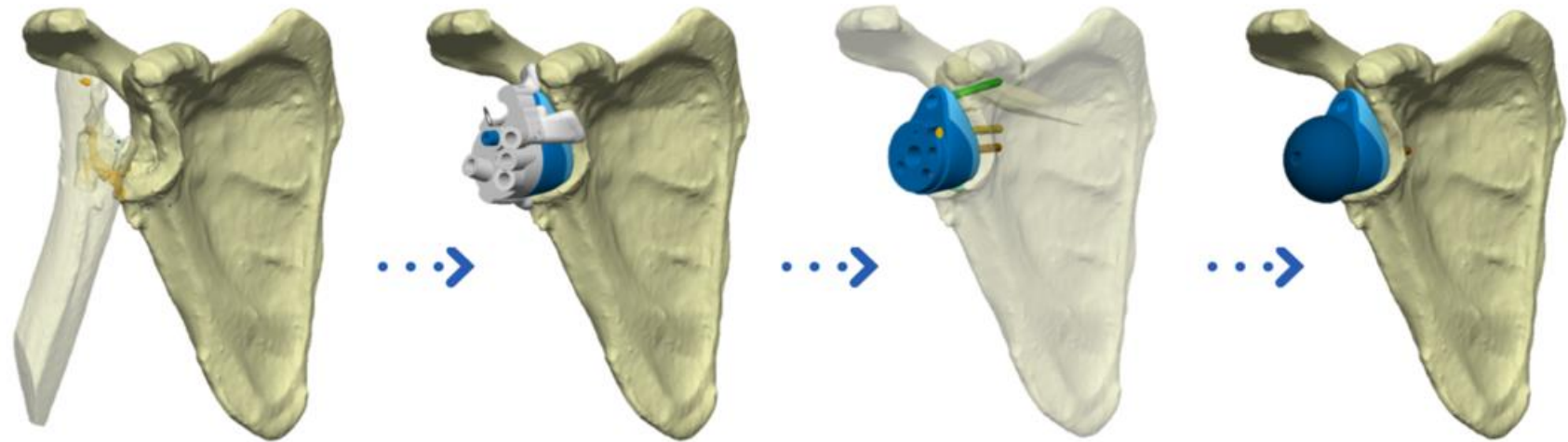
ORTHOPEDIE & TRAUMATOLOGIE

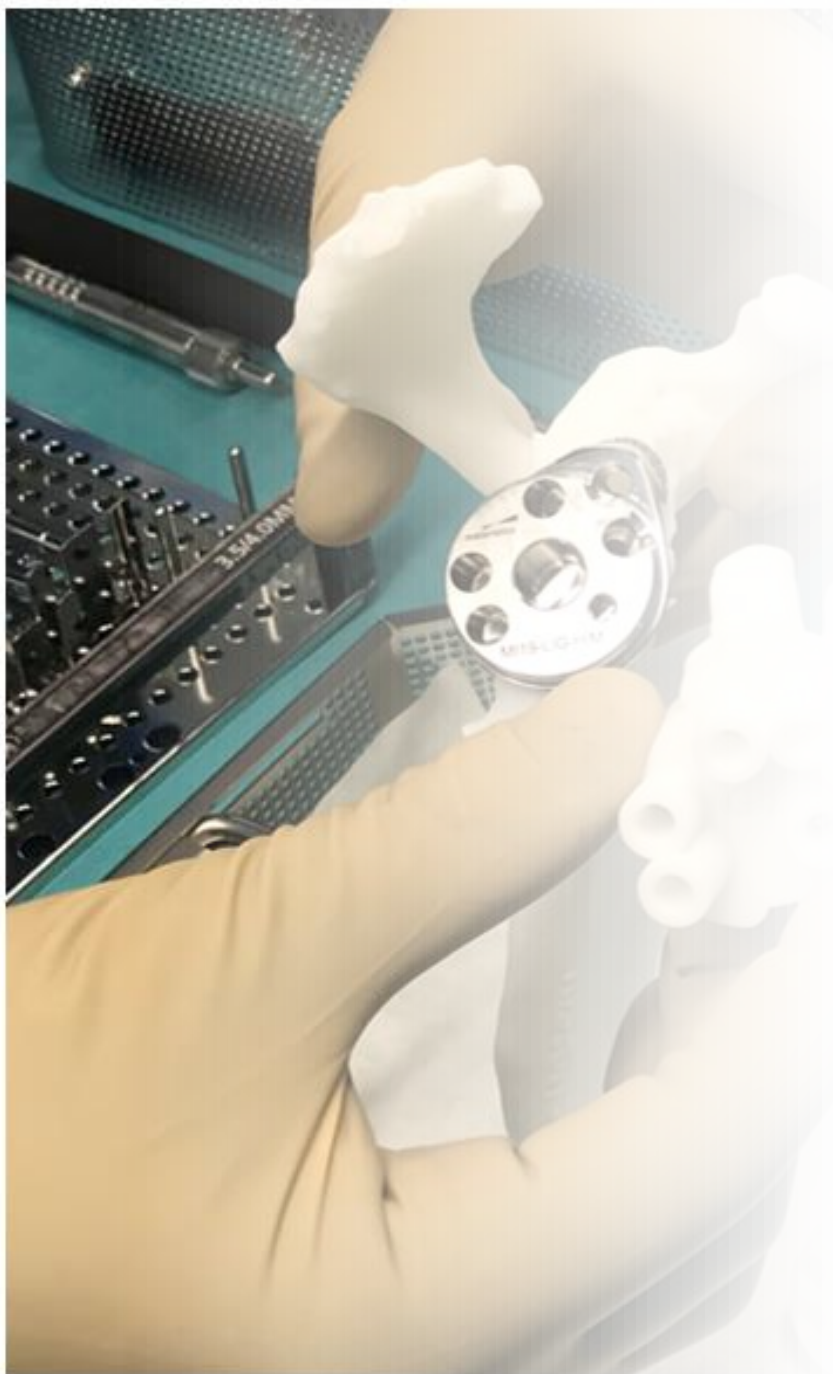


Operatieve planning – glenius (op maat gemaakte prothese)

Als op 3D planning met de augmented baseplate er nog geen goed resultaat bereikt kan worden – glenius

= op maat gemaakte prothese



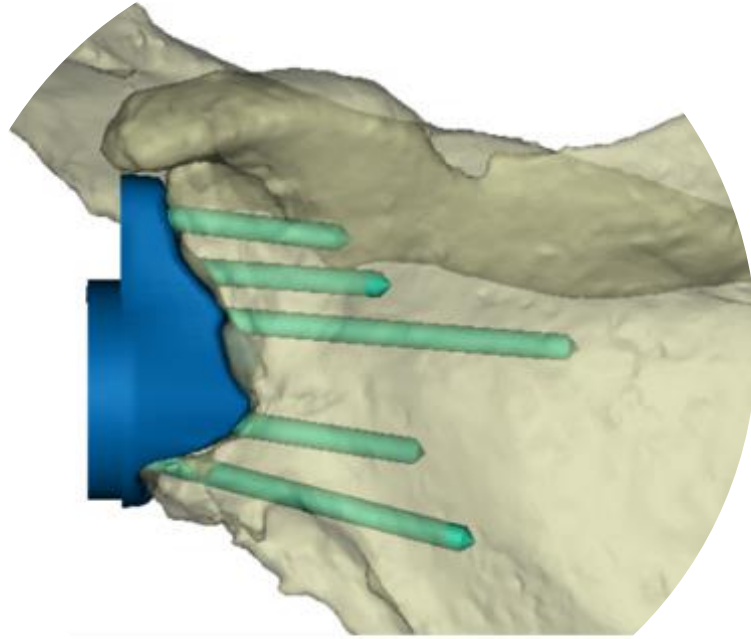


Glenius

Botmodel

Guide (schroef positie en
lengte worden op voorhand
bepaald)

Op maat gemaakte prothese



Glenius proces



CT Scan



Design sessie



Goedkeuring



Delivery

1 week

1 week

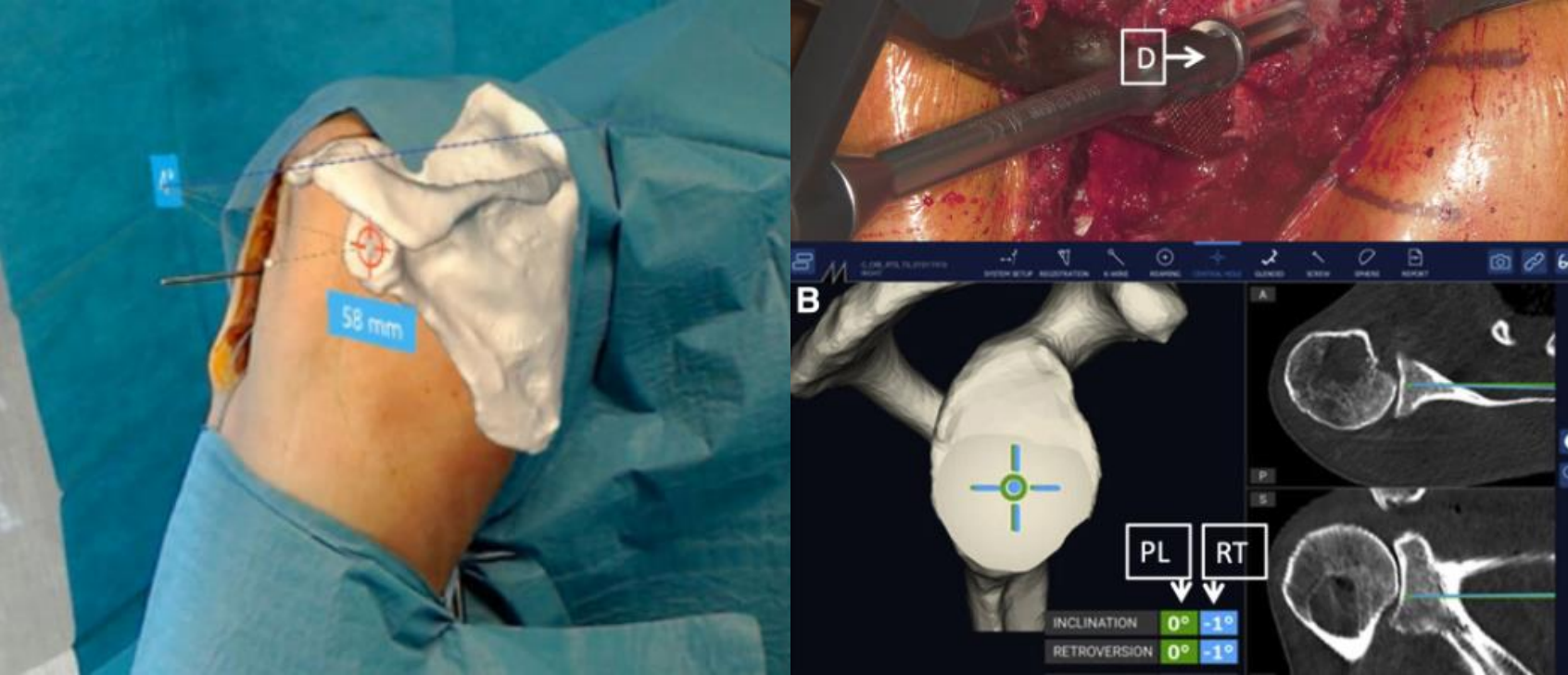
± 5 weken

1 week buffer

3D Planning

Finale afwerking en productie







Future?

Virtual reality

- Peroperatief
- Assistenten training

Virtual reality for shoulder arthroplasty education

[Abdulaziz Ahmed MD^a](#), [Danny Goel MD, MSc, MBA, FRCSC^b](#), [Ryan Lohre MD^a](#)  

Augmented reality and shoulder replacement: a state-of-the-art review article

[Mohammad Daher, BSc^{a,*}](#), [Joe Ghanimeh, MD^b](#), [Joeffroy Otayek, MD^b](#), [Ali Ghoul, MD^a](#), [Aren-Joe Bizdikian, MD^a](#), [Rami EL Abiad, MD^a](#)

Revalidatie

- Zelfde dag nog uit bed
- Gezien subscapularis sparend onmiddellijke mobilisatie toegestaan
- Vroege revalidatie beter (lee 2021, hagen 2020)



Optimizing Outcomes After Reverse Total Shoulder Arthroplasty: Rehabilitation, Expected Outcomes, and Maximizing Return to Activities

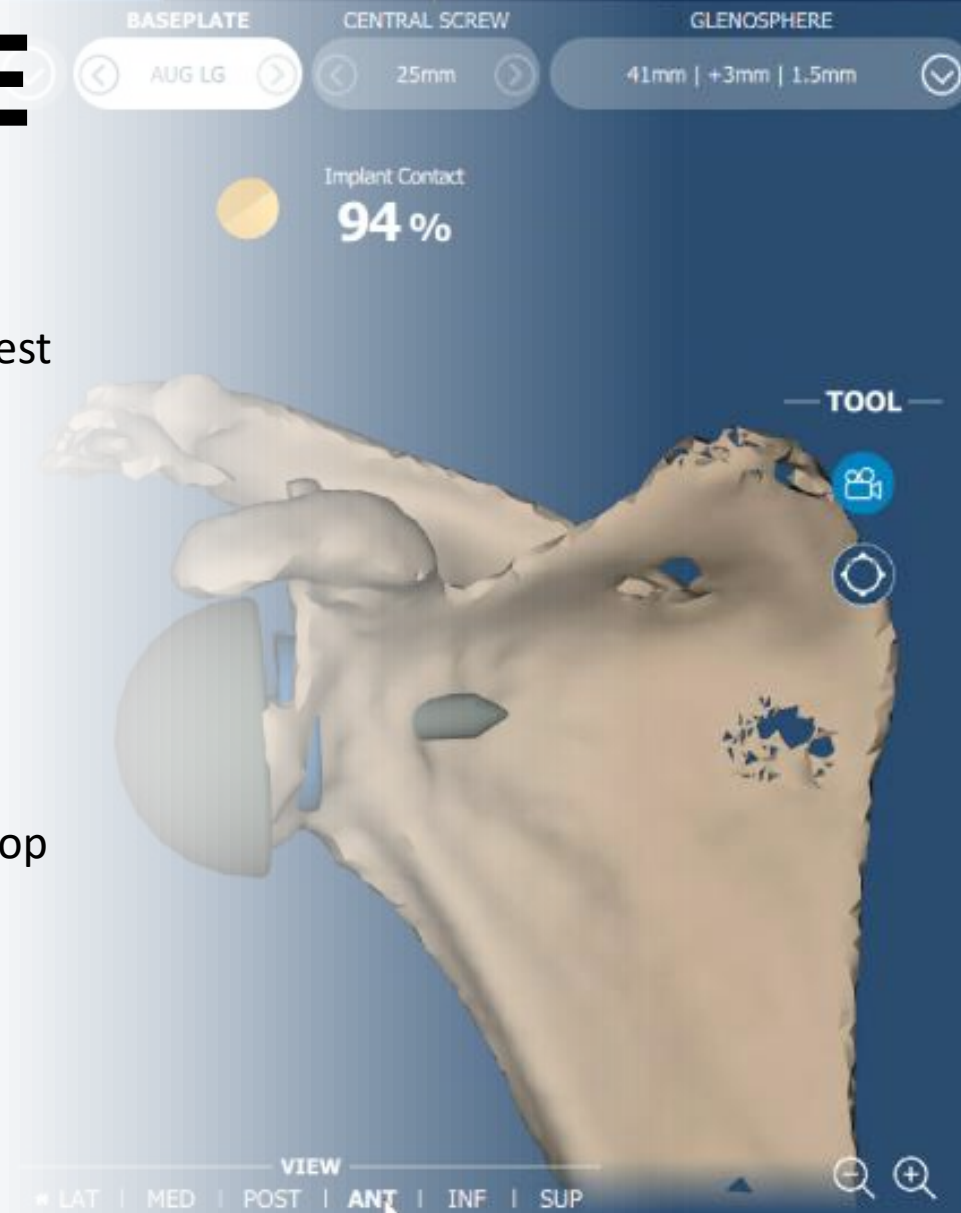
[Mark C. Howard](#), [Nicholas A. Trasolini](#), and [Brian R. Waterman](#)[✉]

Given the rotator cuff deficient nature of post-operative RTSA patients, functional outcomes rely large upon deltoid recruitment. With the newer design advances of the reverse shoulder arthroplasty, there is improved biomechanical efficiency of both the deltoid and the preserved posterior rotator cuff. The combination of these muscle groups allows superior recovery of active motion and patient function [38–40]. An observational prospective cohort study by Pelletier-Roy et al. measured muscle activity in 21 patients following RTSA and found statistically significant recruitment of the upper trapezius in all directions, latissimus dorsi in internal rotation, and posterior deltoid in external rotation compared to normal shoulders [41]. New rehabilitation protocols targeting those muscles could demonstrate better and more homogeneous results and increase patient satisfaction.



TAKE HOME

- Rotator cuff arthropathie is de meest frequente indicatie voor een omgekeerde schouderprothese
- Goede resultaten: elevatie boven 150° in 82% van de patiënten
- Onmiddellijke mobilisatie postoperatief toegestaan
- Meestal is een CT voldoende preoperatief, 3D planning, PSI en op maat gemaakte prothese soms noodzakelijk



Implant
Inferior Inclination
 -3.0°



Implant
Anteversion
 2.0°





ORTHO.GENT

ORTHOPEDIE & TRAUMATOLOGIE

HARTELIJK DANK