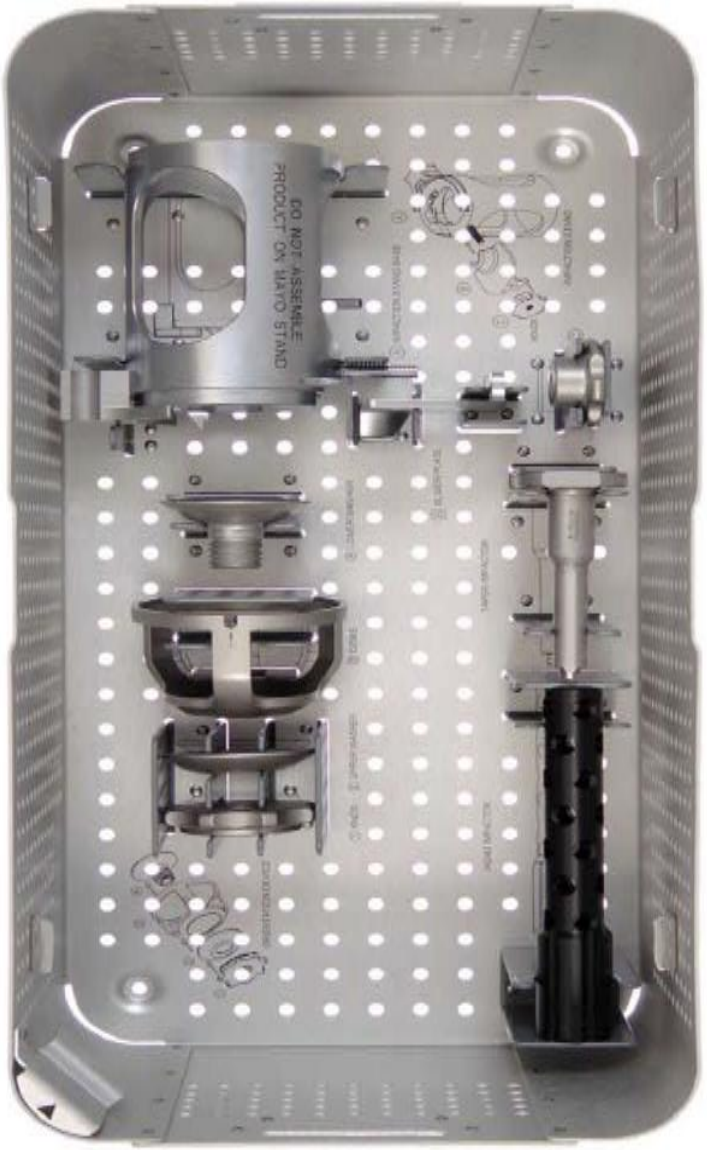


Inverse Schulterprothese

Ausbildungsseminar Salzburg 2011

Rainer Kluger

Indikationen

Cuff Tear Arthropathie

Rotatorenmanschetten-reruptur

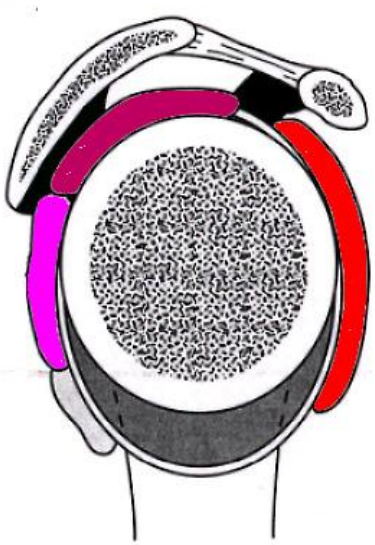
Chronische Luxation

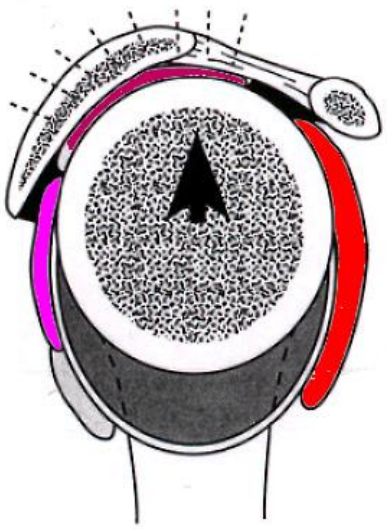
Typ B2 Glenoid mit Retroversion von >15

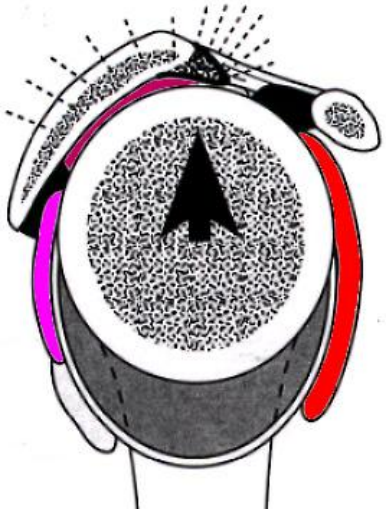
Versagen einer Hemiprothese

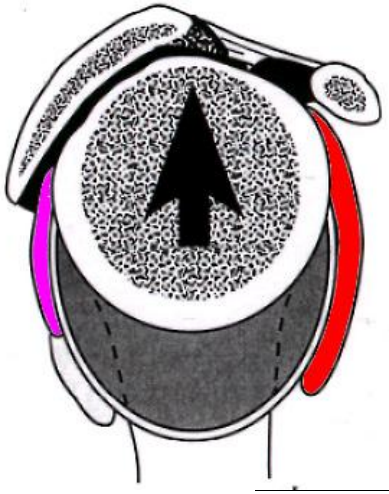
Lockerung oder Instabilität einer TSA

Cuff Tear Arthropathie

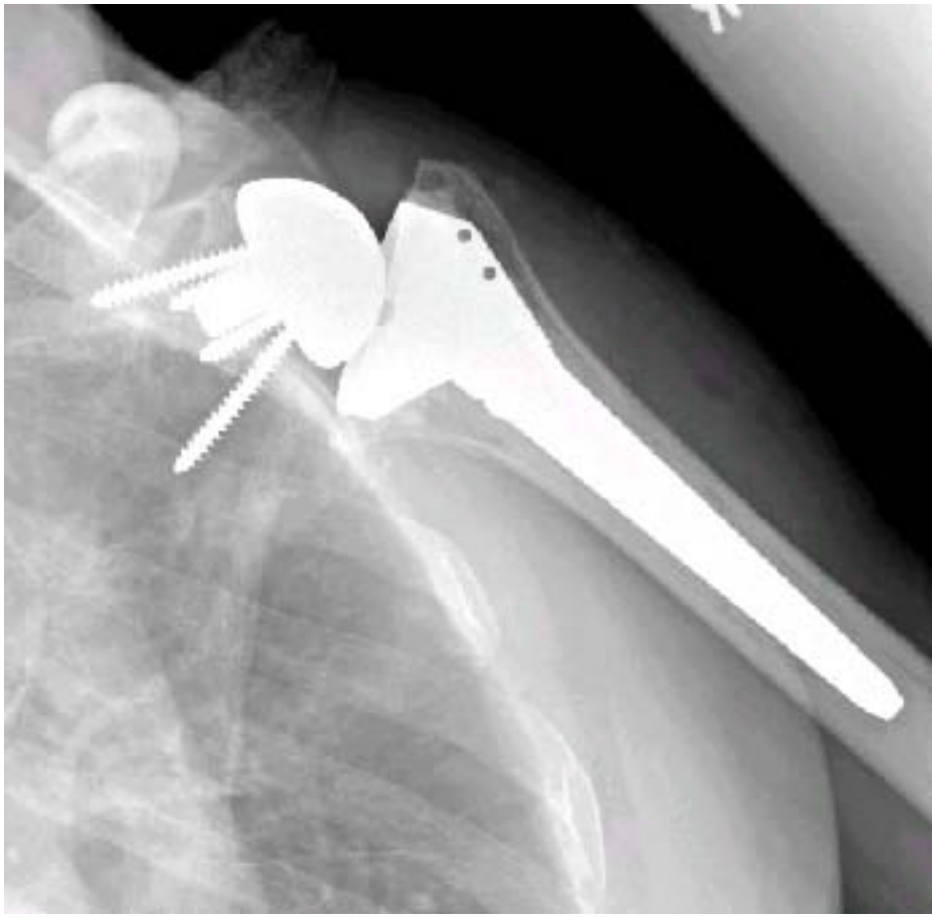




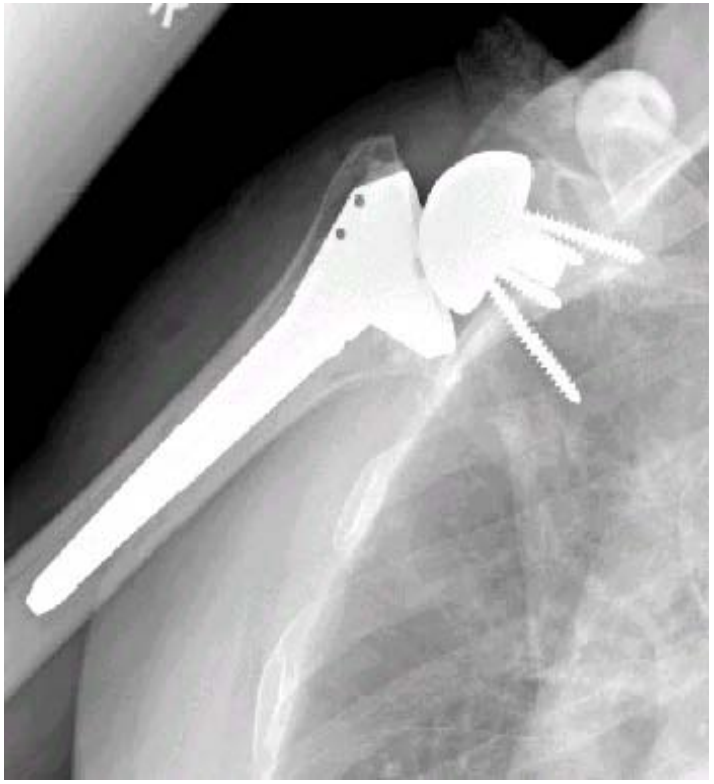




Rotatorenmanschetten-reruptur



Chronische Luxation



Totalendoprothese vs Inverse Prothese bei B2 Glenoid

Complications

TSA 37% (dorsale Dislokation)
RSA 0%

Glenoid loosening or migration
TSA 50%
RSA 0%

Constant Score

TSA 44,5

RSA 76,3

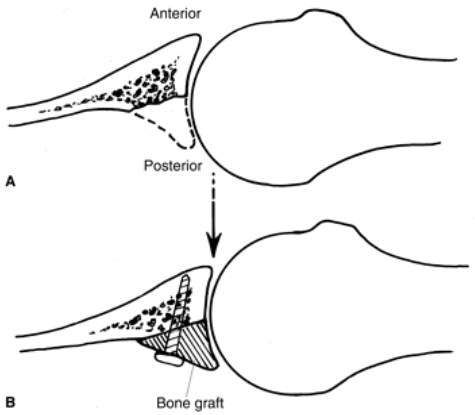
(SECEC 2010 Edinburgh)

Empfehlung:

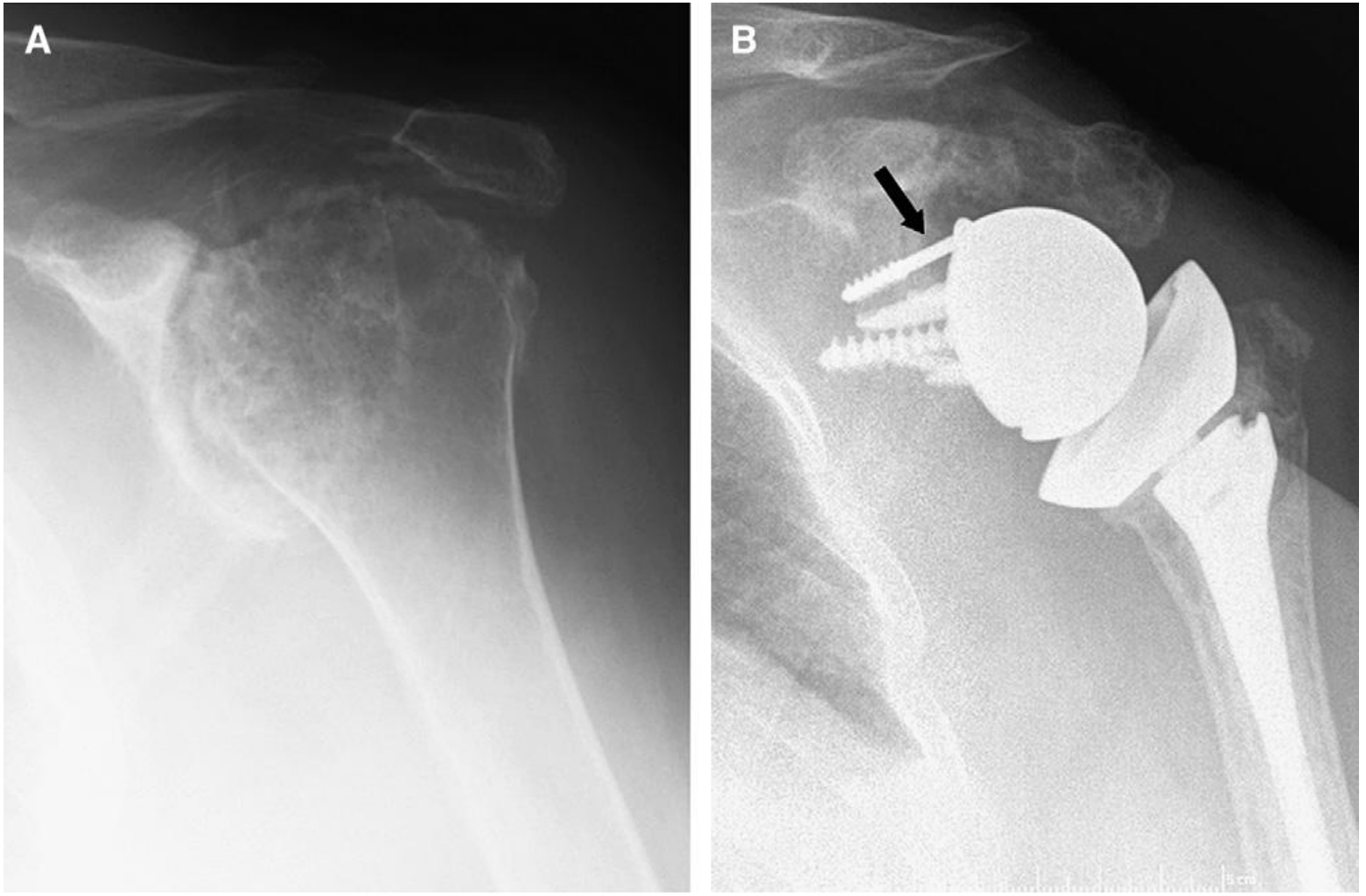
(SECEC 2010 Edinburgh)

TSA und eccentric reaming bei
Retroversion <15°

primär RSA bei Typ B2
retroversion von >15°
mit oder ohne bone block
(norris Technik)

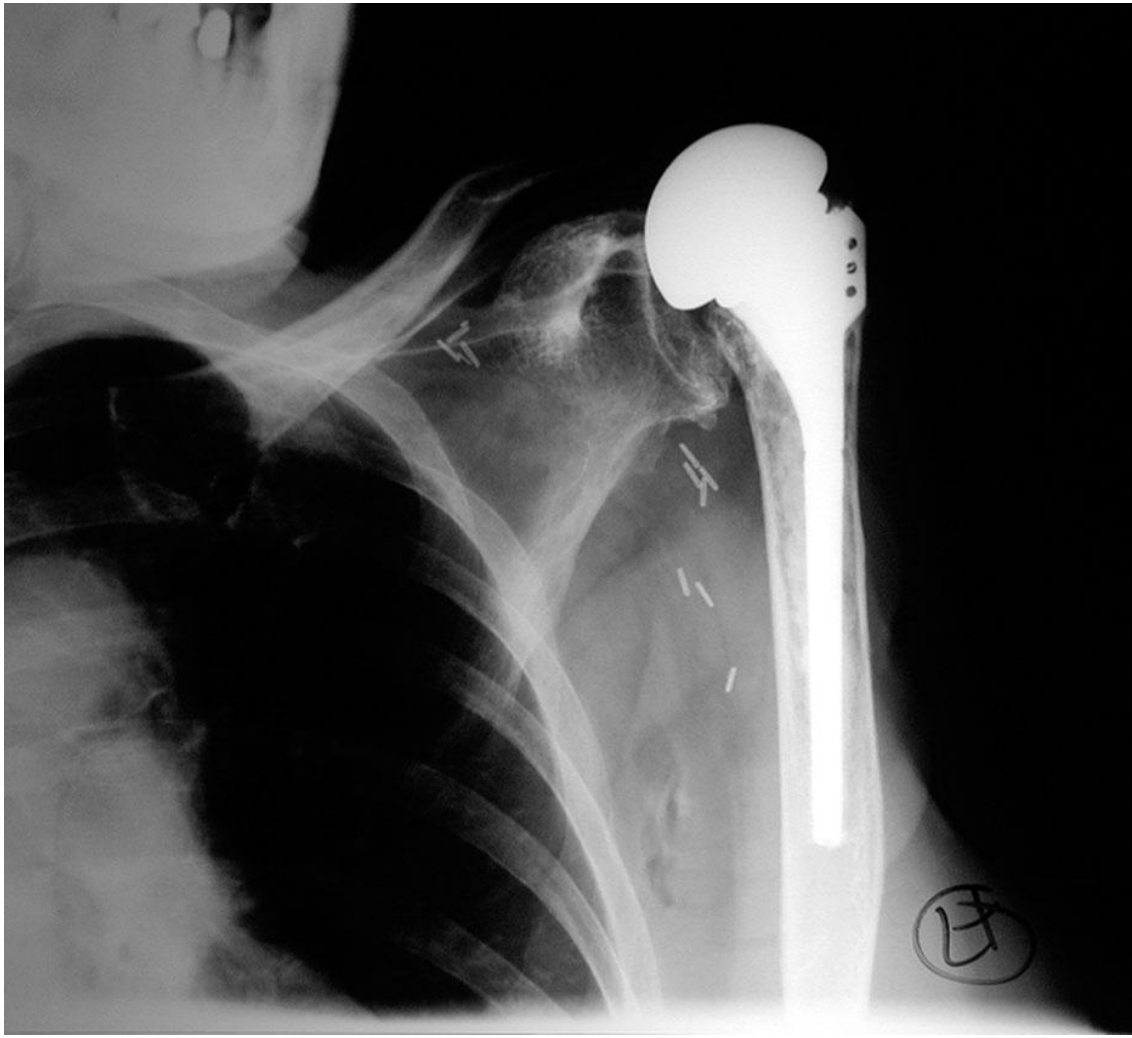


Verwendung eines zusätzlichen Allografts



Versagen einer konventionellen Prothese

Quelle: Boileau et al *JSES 2005*



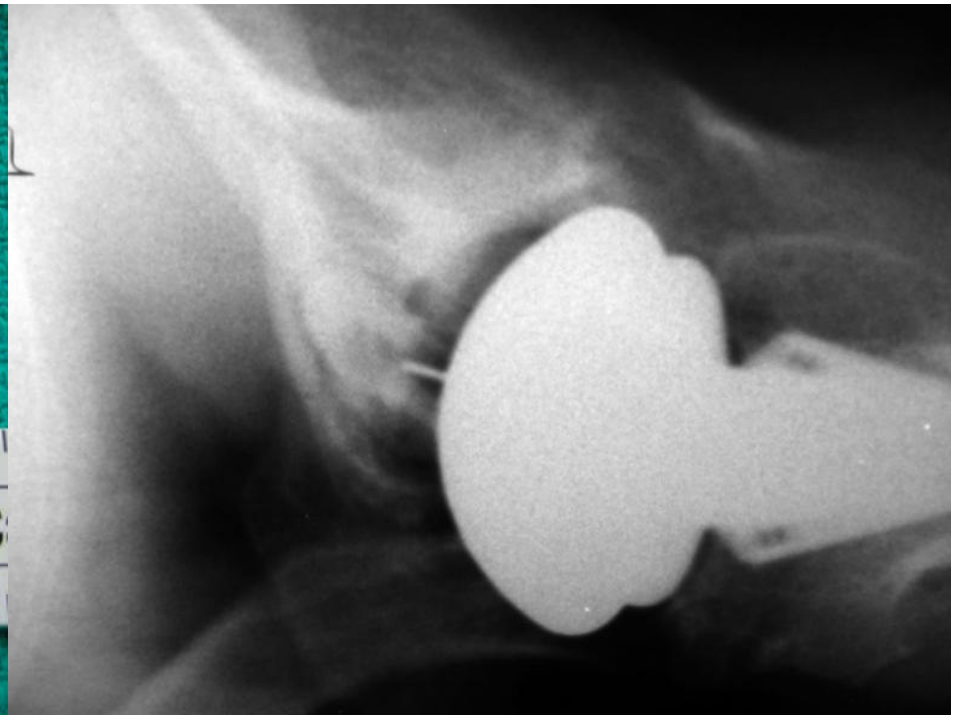
Quelle: Bohsali 2006

Versagen einer konventionellen Prothese

Hintere Subluxation und exzentrische dorsale Glenoiderosion

Quelle: Bohsali 2006

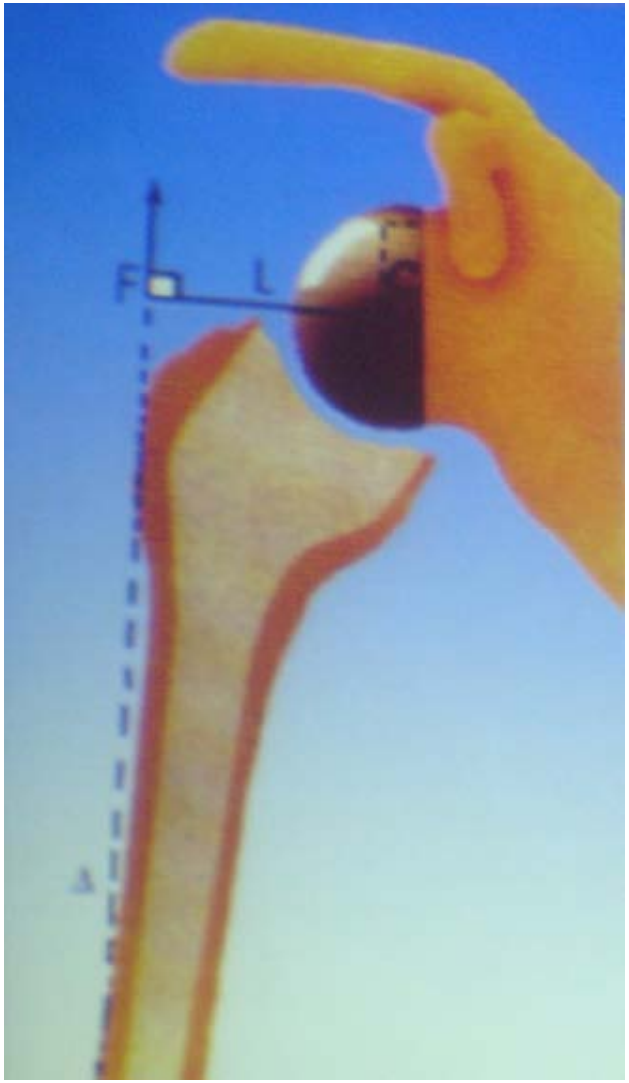
Versagen einer konventionellen Prothese



Massive radioluzente Linien an der Glenoidkomponente

Quelle: Bohsali 2006

Deltaprothese Grundprinzipien

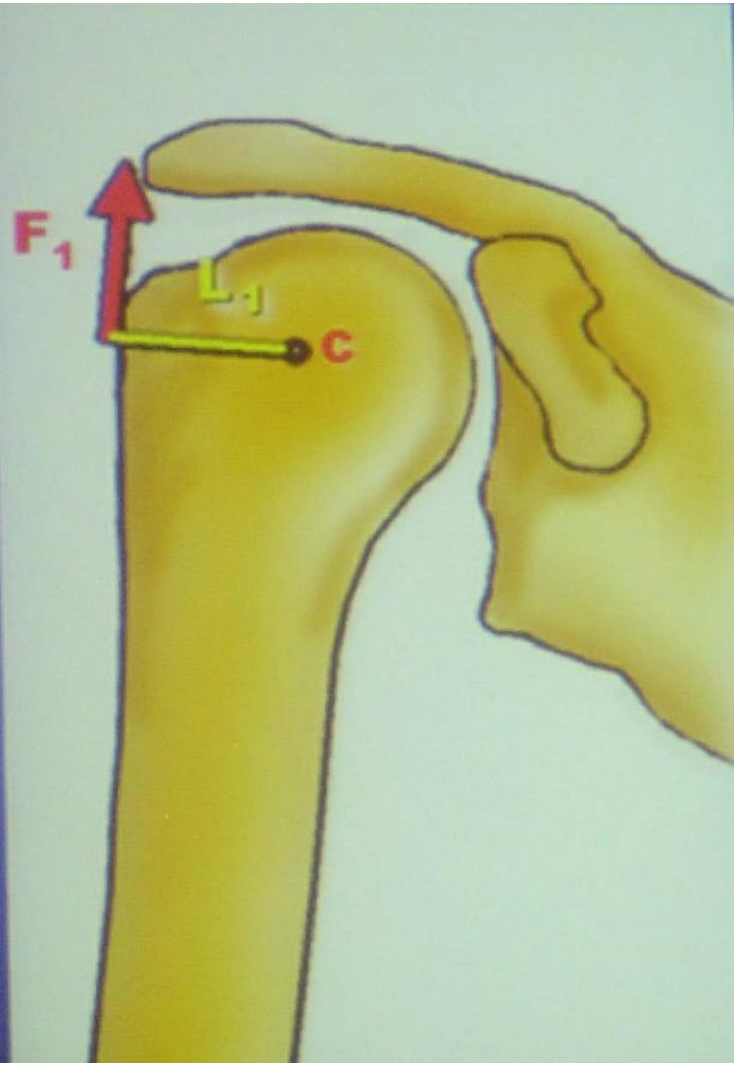


Ein fixes Rotationszentrum mit kongruenten Gelenksoberflächen
um die Stabilität zu erhöhen und
Die RM Insuffizienz zu kompensieren

Ein medialisiertes Drehzentrum
um den Deltoideuslastarm zu vergrößern
und die Scherkräfte auf das Glenoid zu verringern

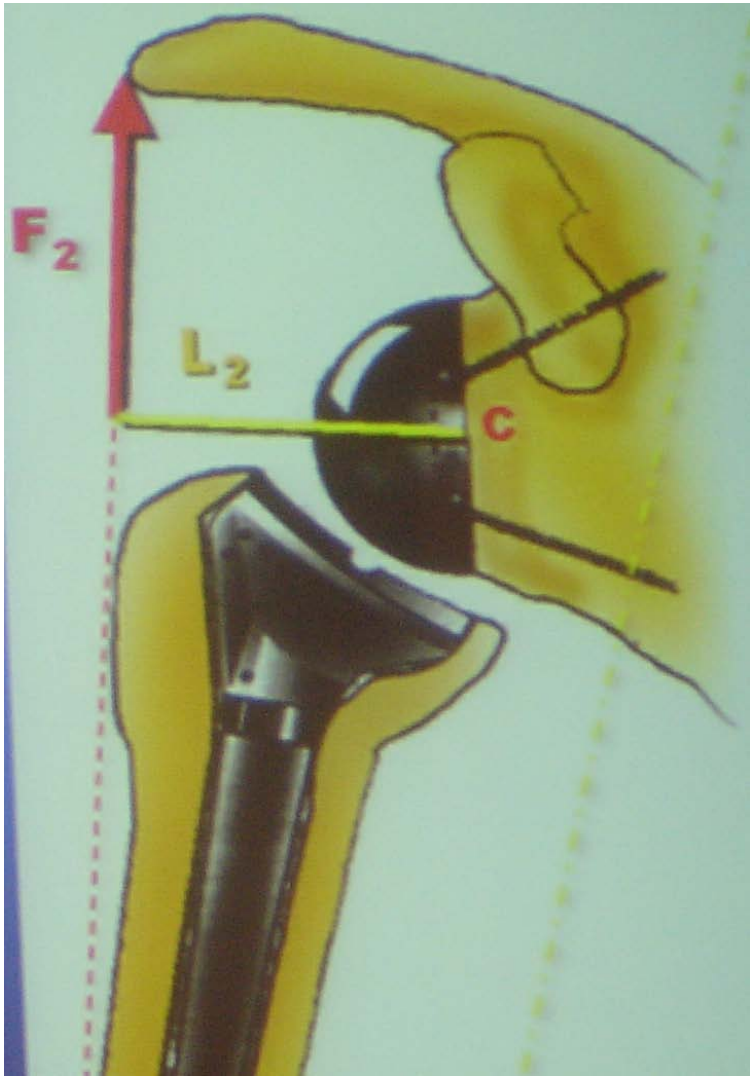
Den Humerus relativ zum Glenoid abzusenken um die Deltoideusspannungwiederherzustellen

Delta Grundprinzipien

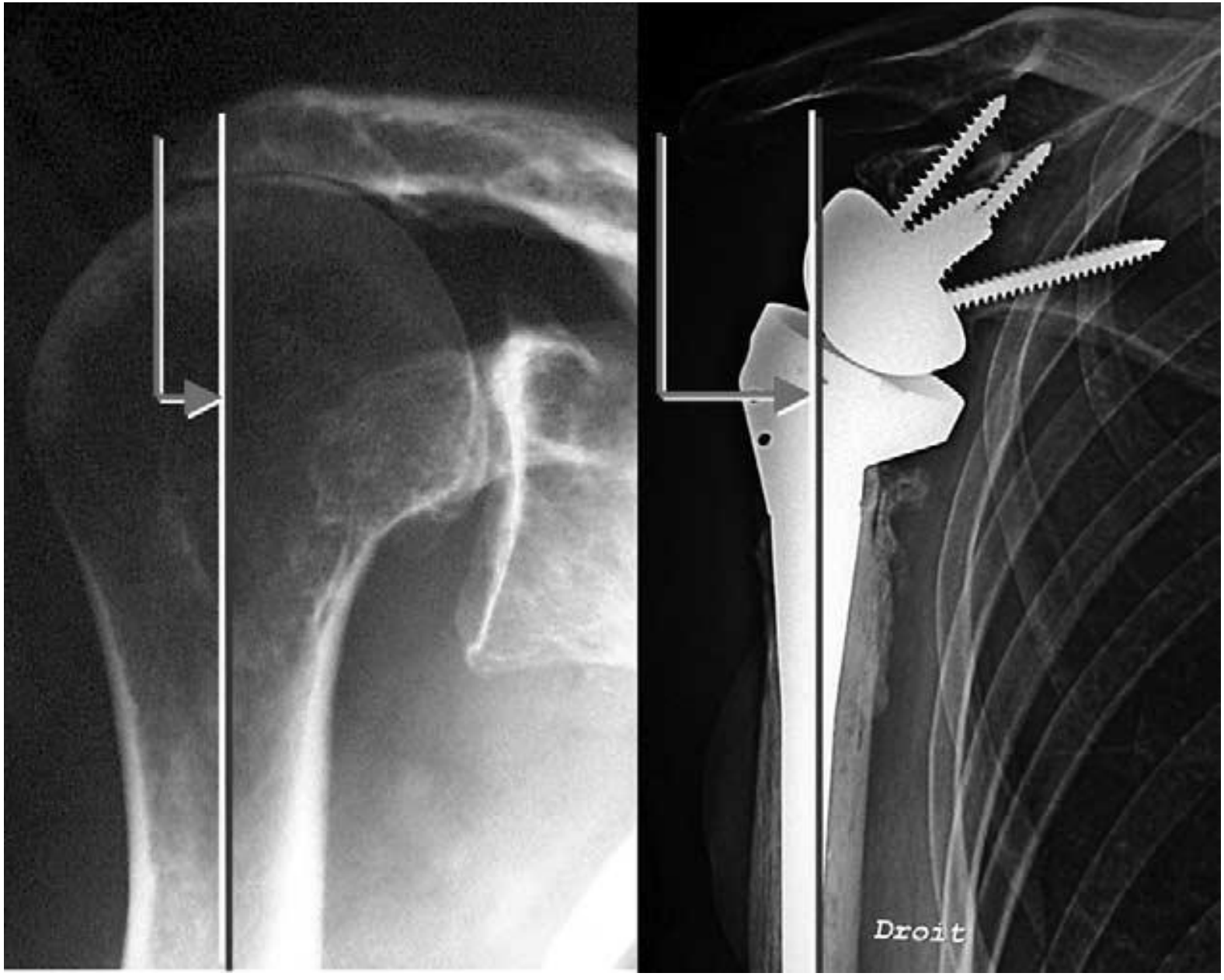


Vergrößerung
des Lastarmes
L2 > L1

Vergrößerung
des Kraftarmes
F2 > F1



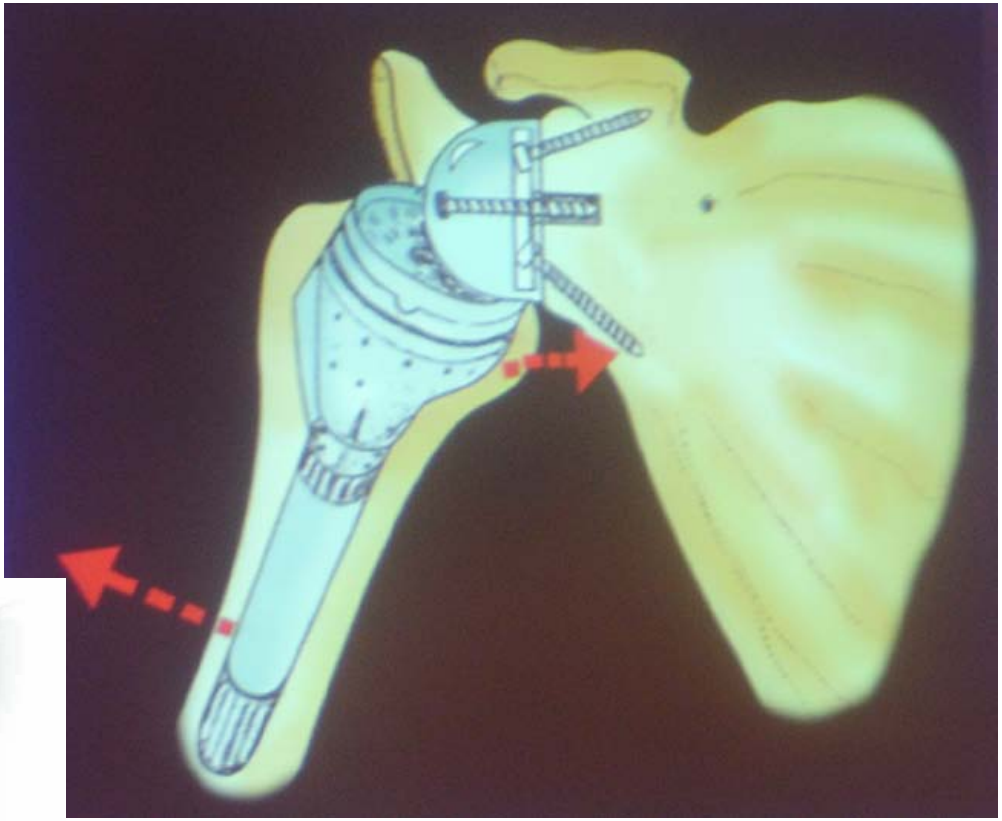
Delta Grundprinzipien

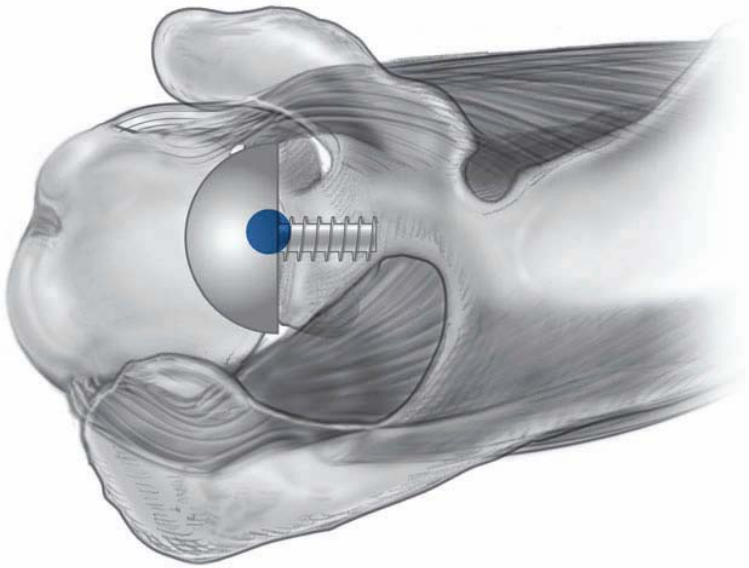


Quelle: Boileau et al JSES

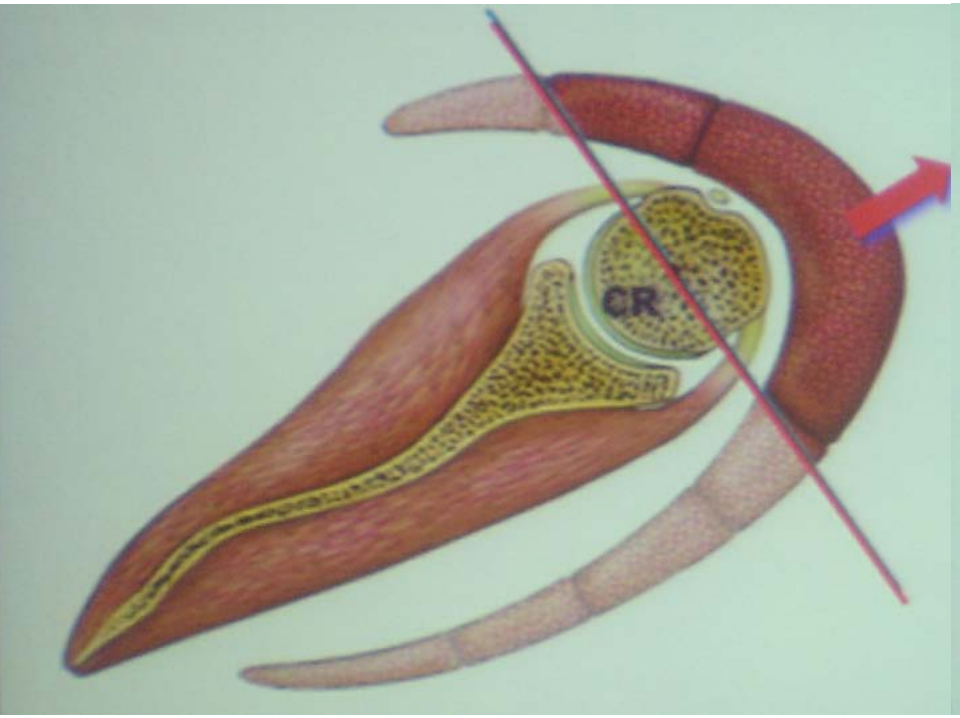
Delta Grundprinzipien

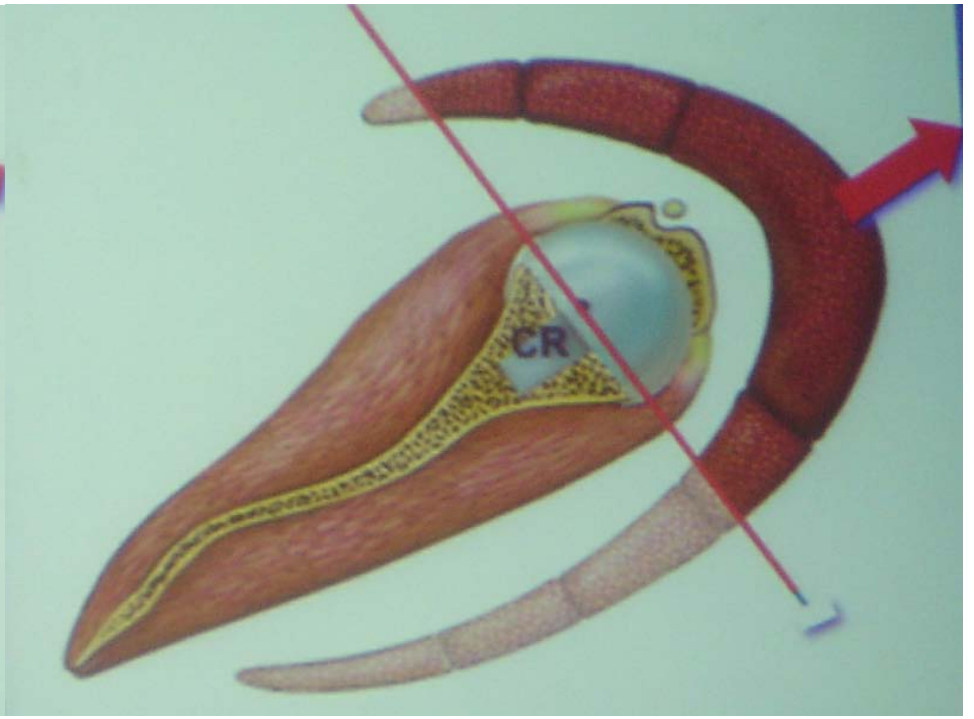
ab 45 Abduktion bestehen hauptsächlich Kompressionskräfte





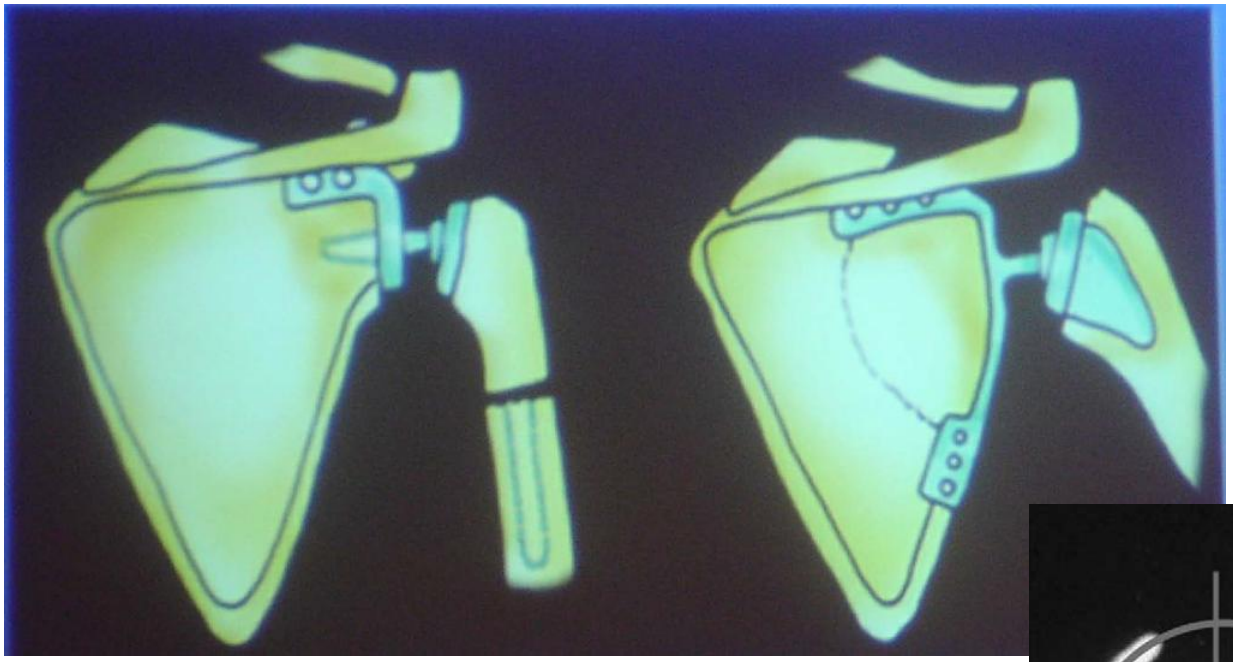
Delta Grundprinzipien



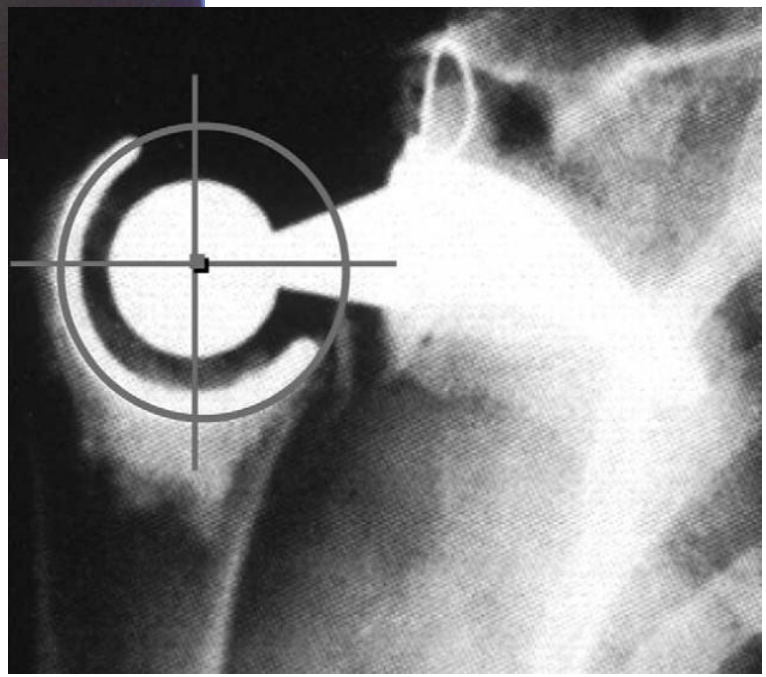


die Medialisierung des Drehzentrums rekrutiert mehr Deltoideusfasern für die Elevation

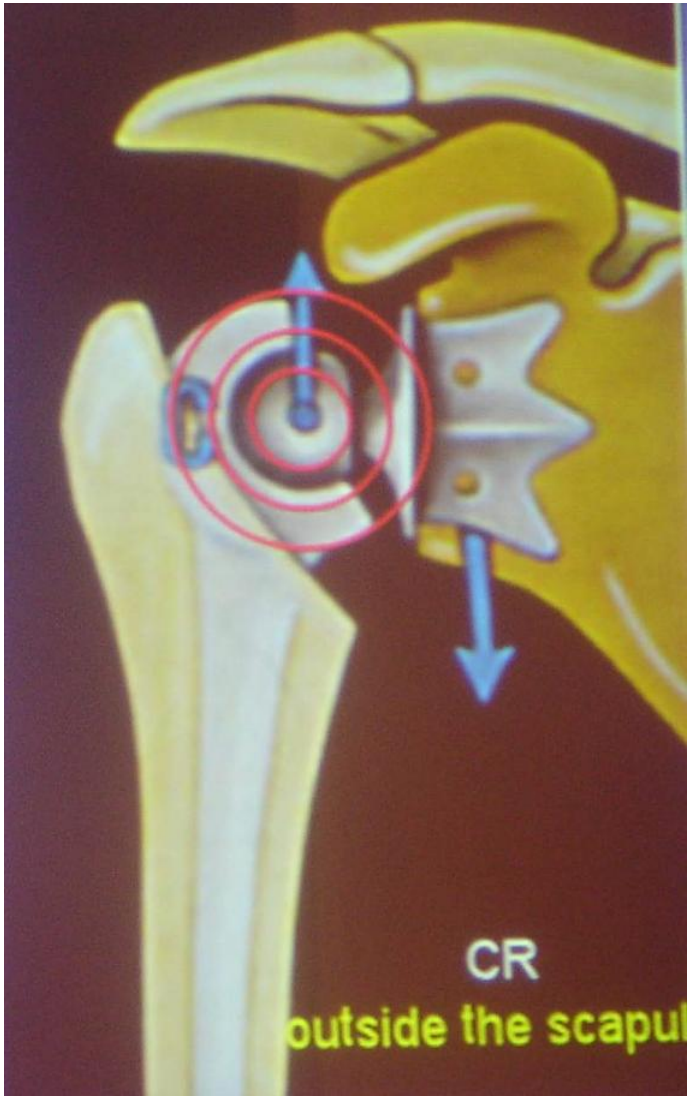
Geschichte der inversen Prothese



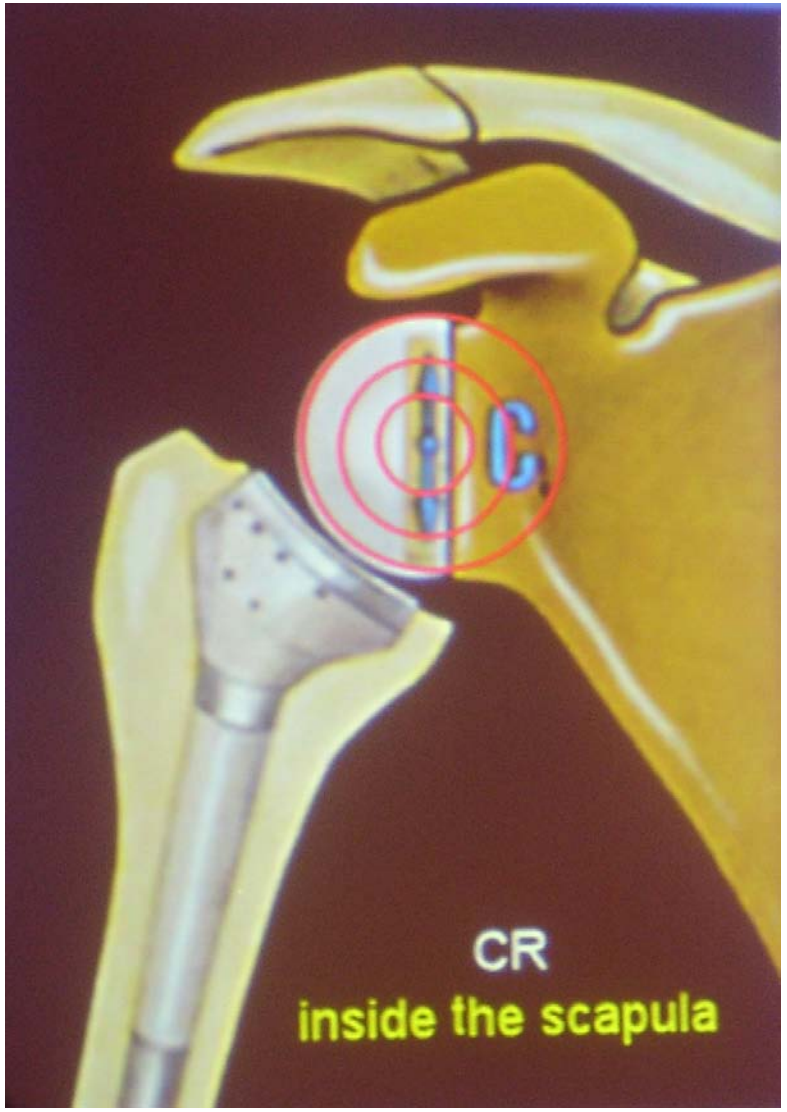
Rotationszentrum war anfangs ausserhalb der Skapula



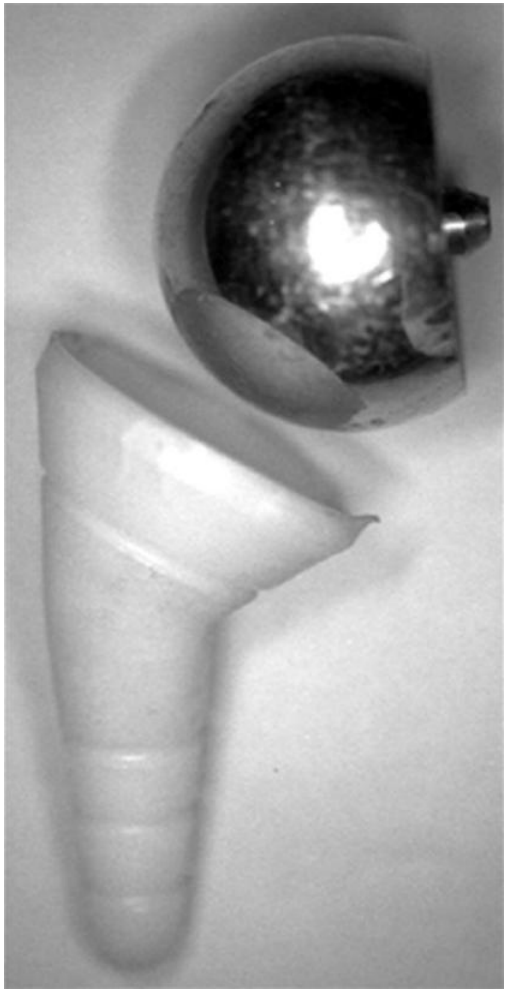
Geschichte der inversen Prothese

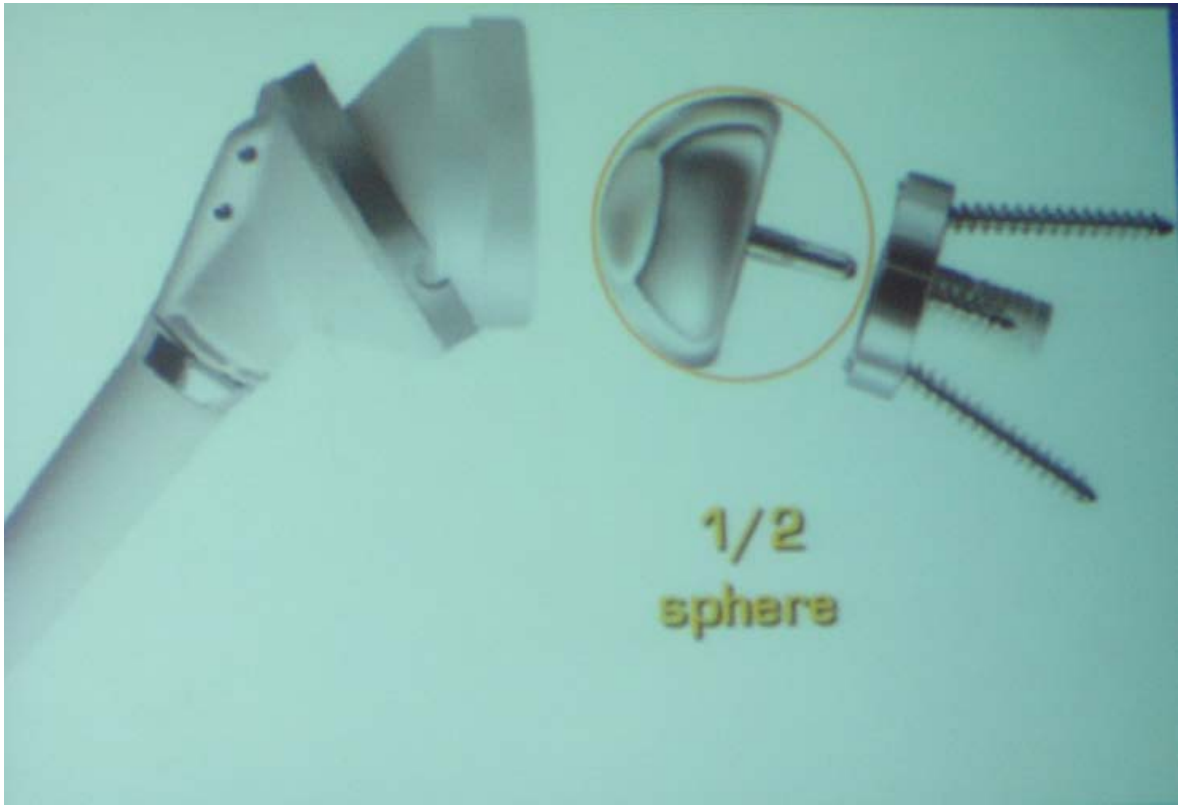


weniger
Scherkräfte
am Glenoid
Durch neues
Design



Geschichte der inversen Prothese

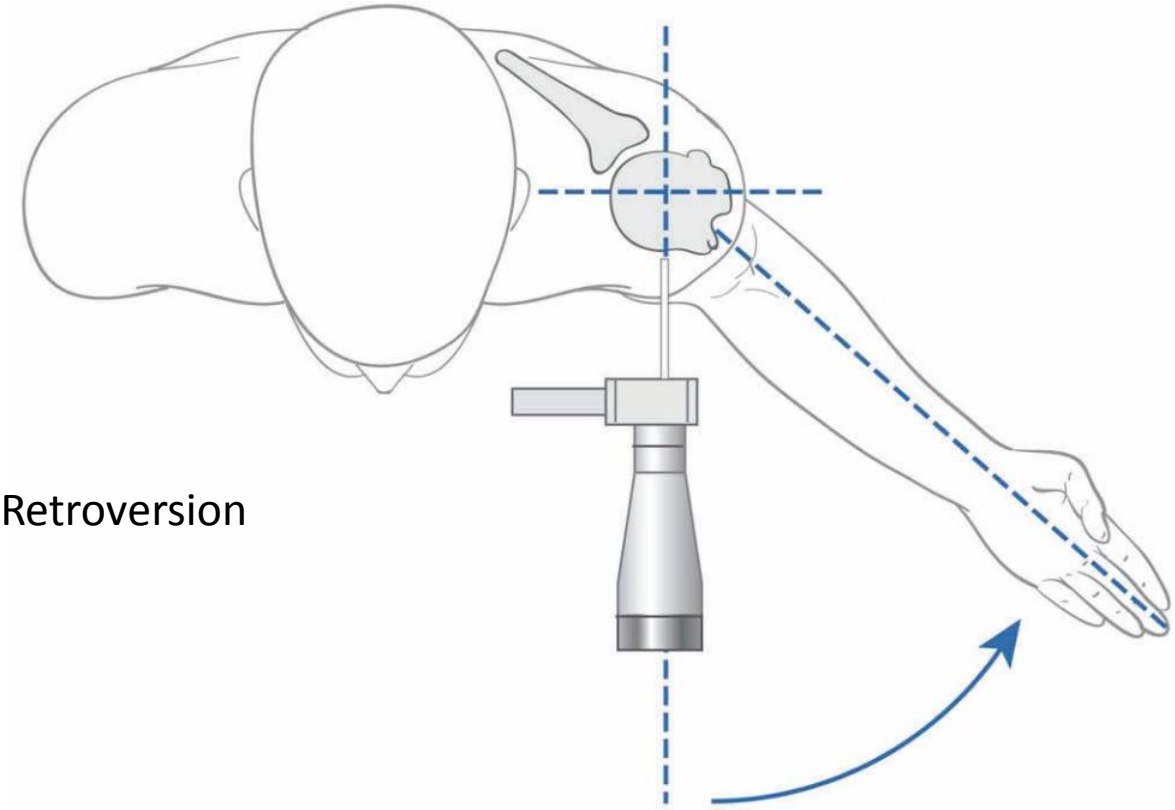




1991: ½ Kugel / 5 Teile

1985 : 2/3 Kugel / 2 Teile

Anatomie und Implantationstechnik

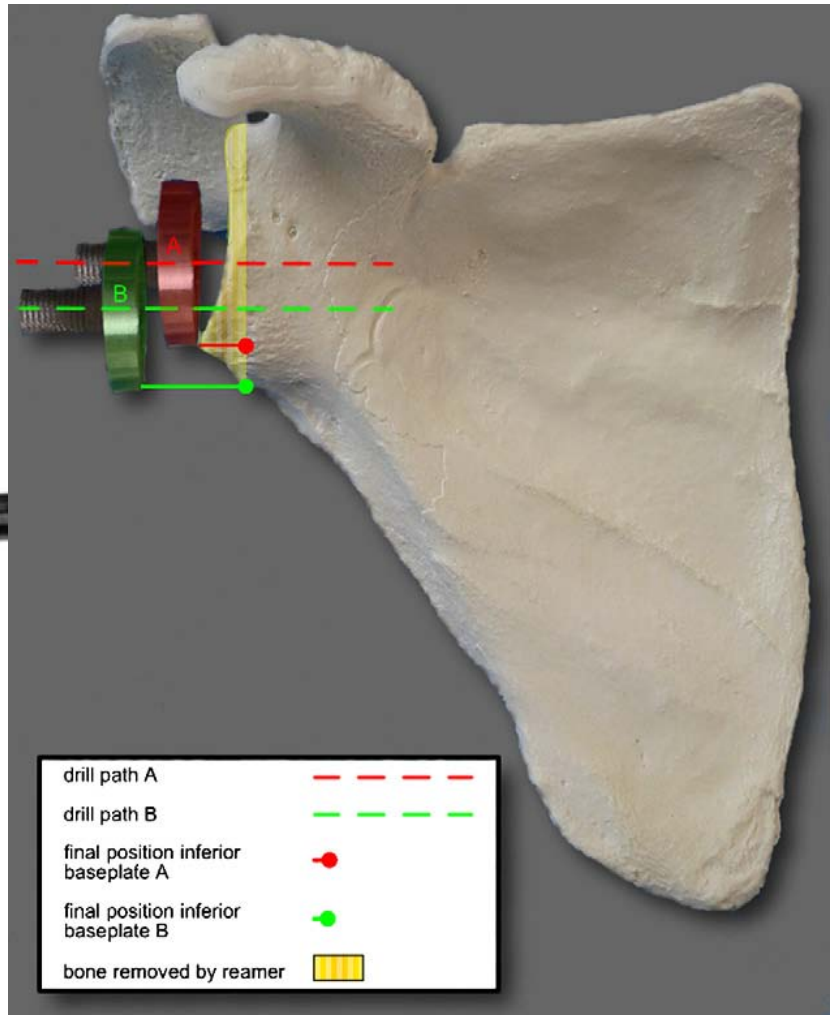


20° Retroversion

Anatomie und Implantationstechnik

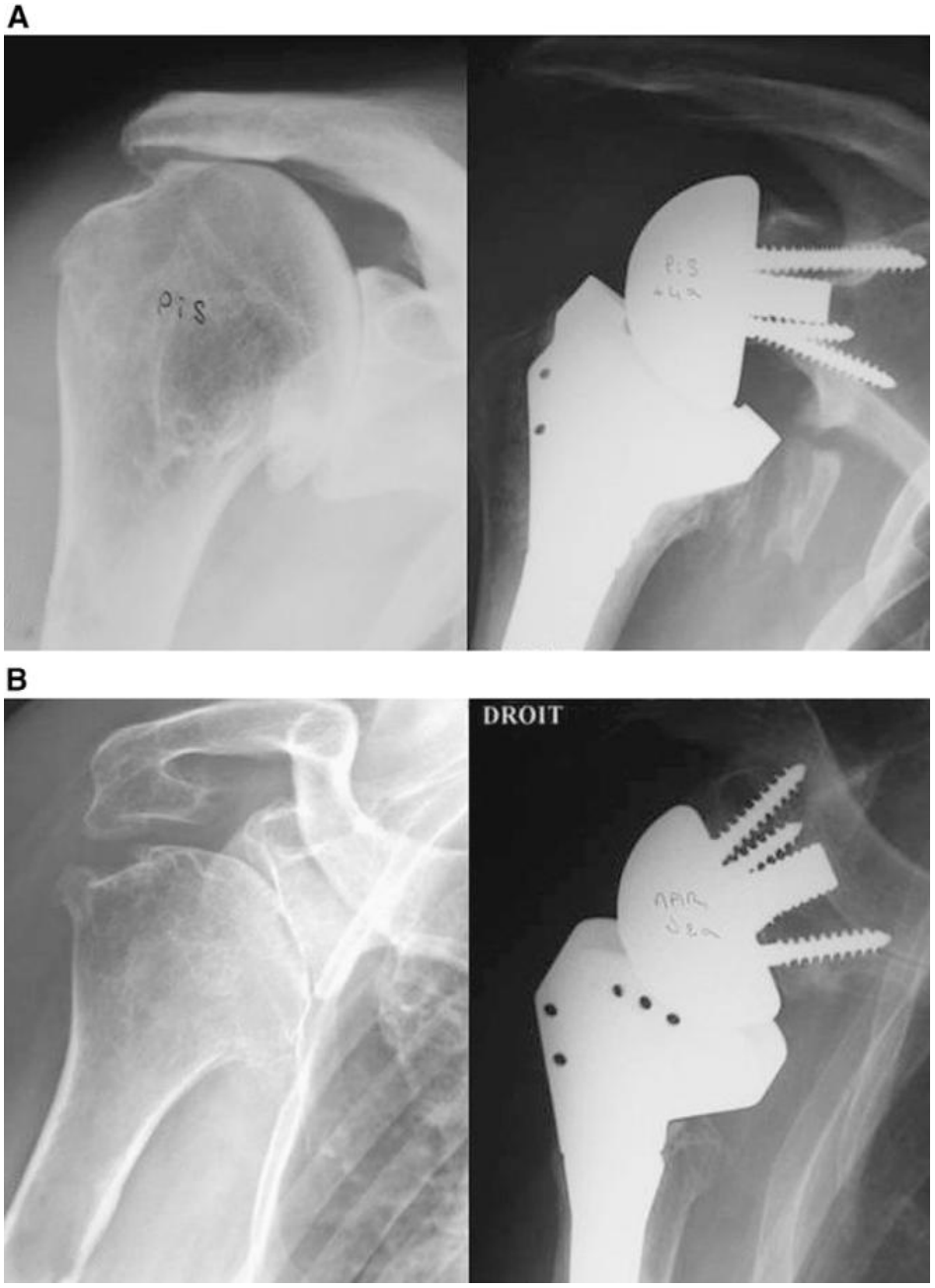
Anatomie und Implantationstechnik

Anatomie und Implantationstechnik



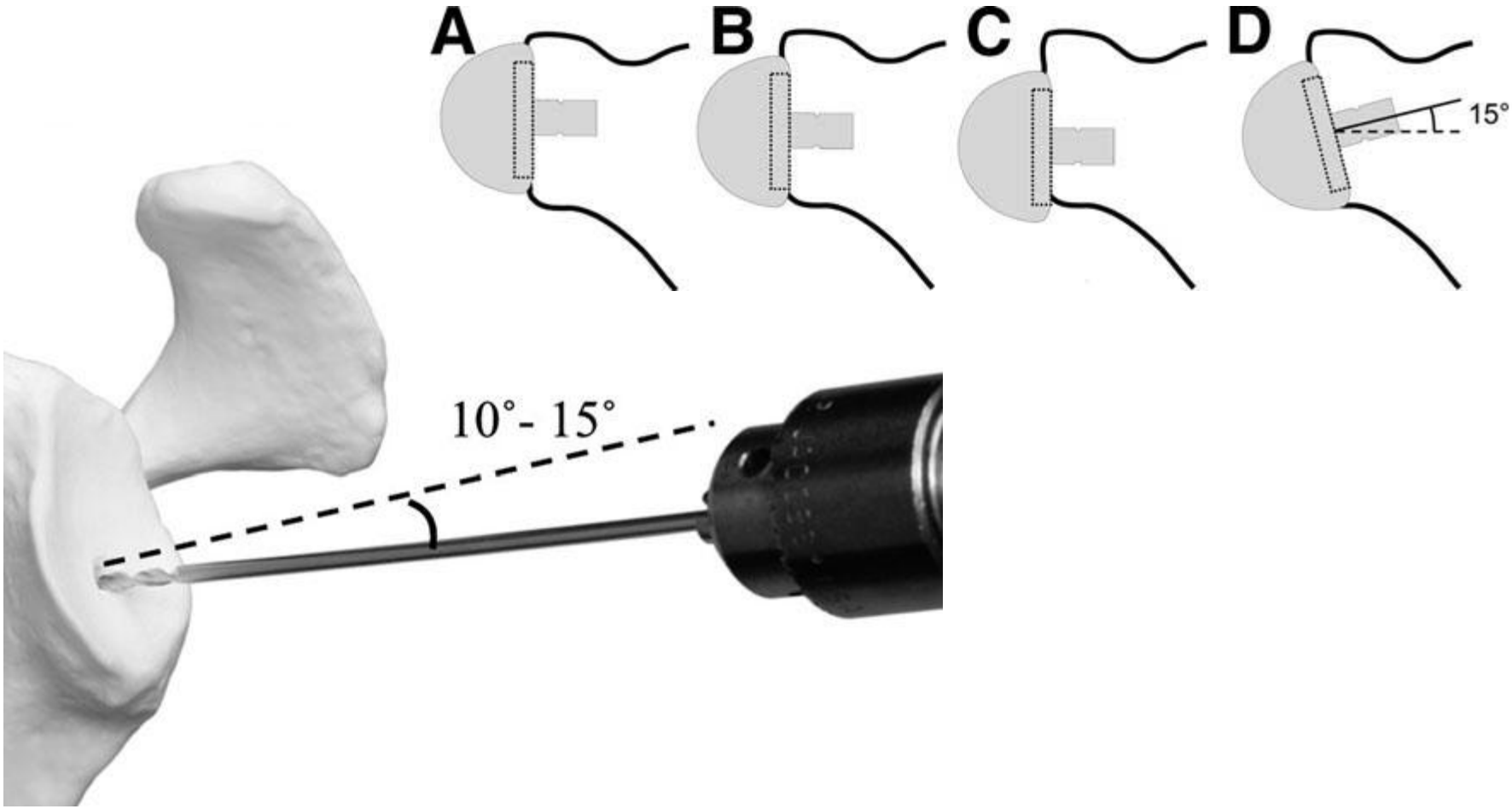
Glenoid inclination is preoperatively oriented upward (type E2), glenosphere is tilted superiorly, and there is grade 4 notching.

Glenoid inclination is preoperatively oriented downward (type E4), position of the baseplate is inferiorly tilted, and there is no notching.

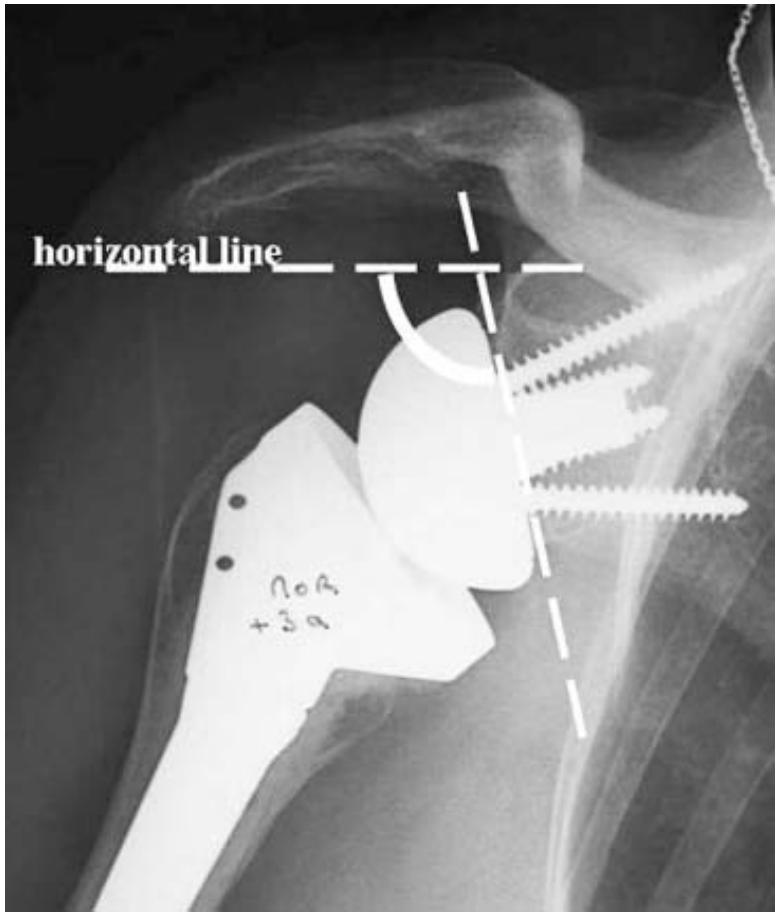


Quelle: Lèvigne JSES 2008

Anatomie und Implantationstechnik

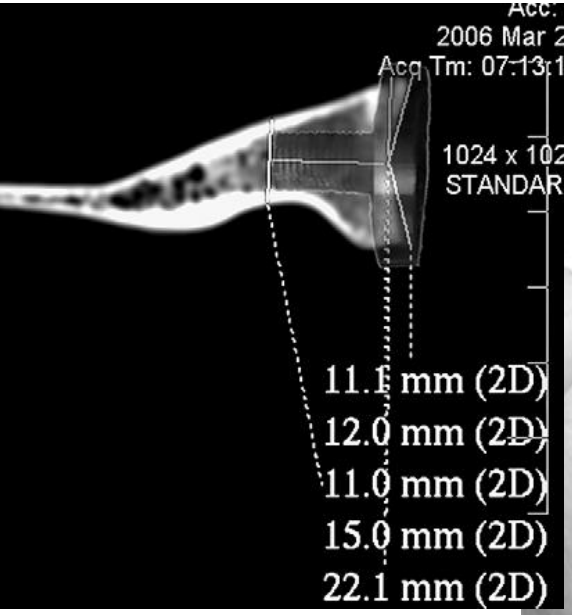


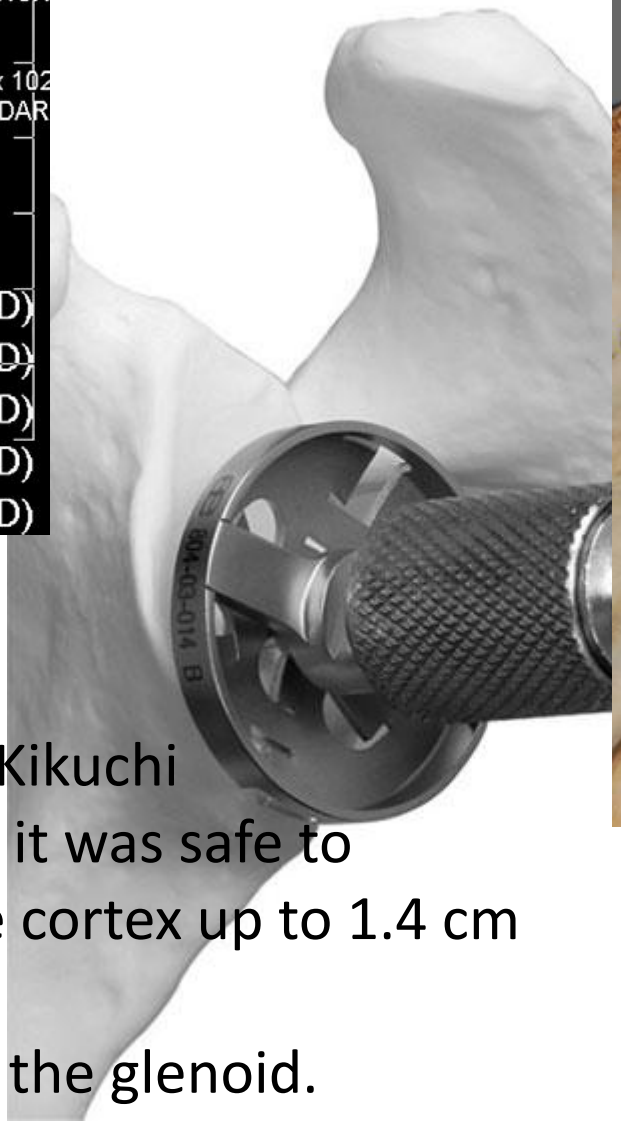
Current method of measuring glenoid inclination: angle
between the line parallel to the baseplate and the horizontal line.
An angle greater than 90 indicates a glenoid with inferior tilt (inclination in varus position), and an angle less than 90 indicates a glenoid with superior tilt (inclination in valgus position).

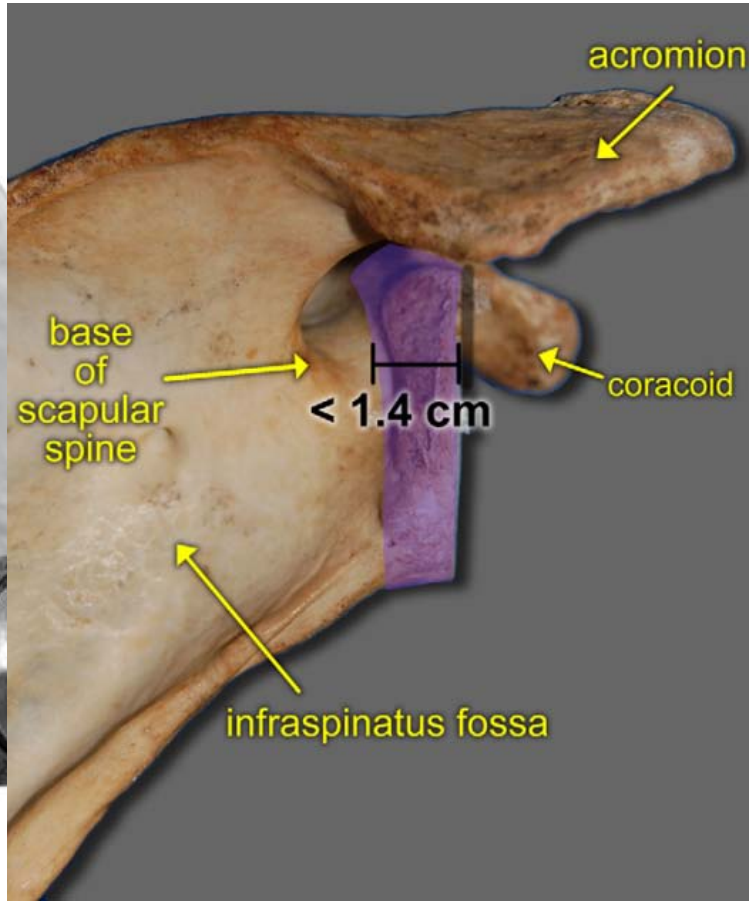


Quelle: Lèvigne JSES 2008

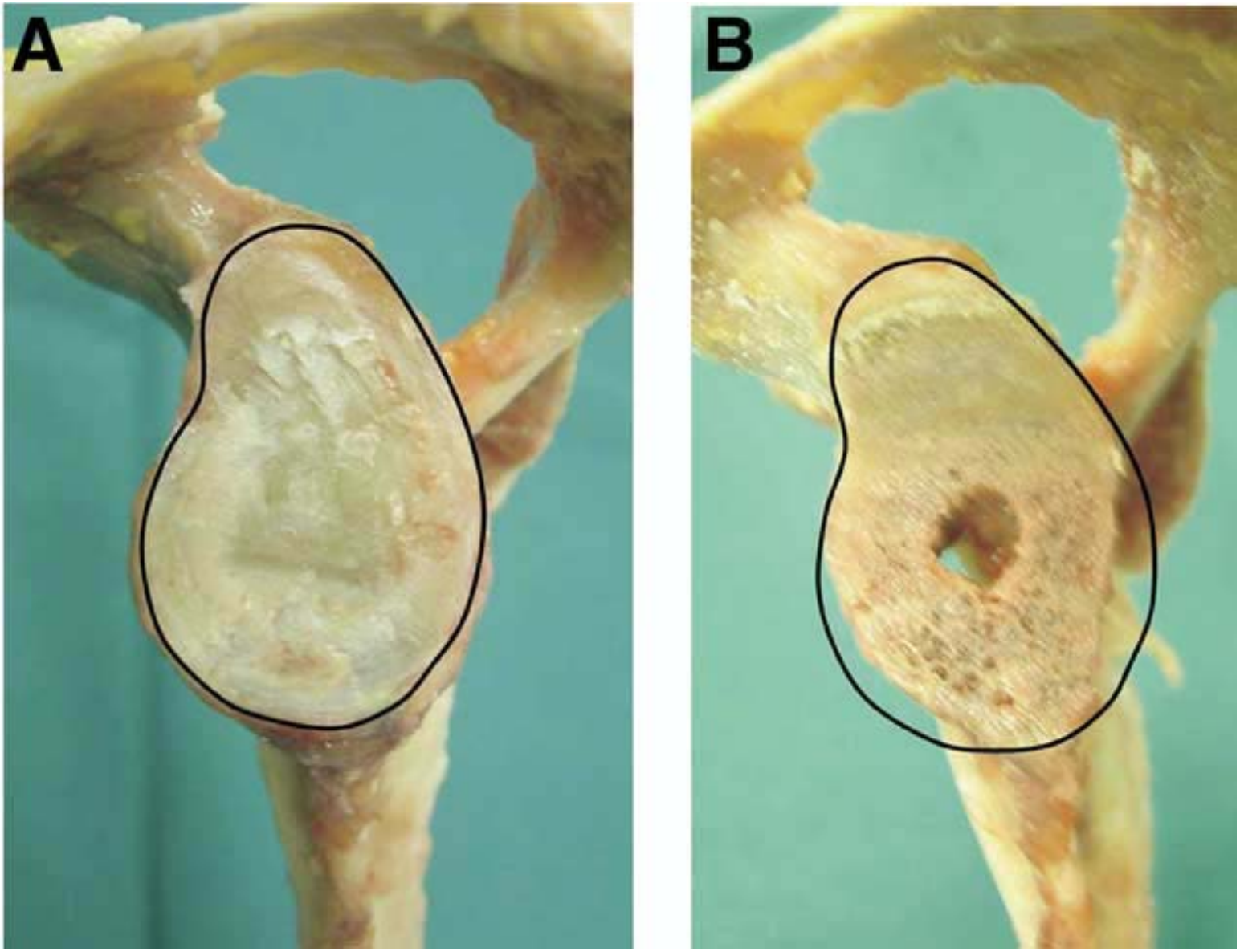
Anatomie und Implantationstechnik



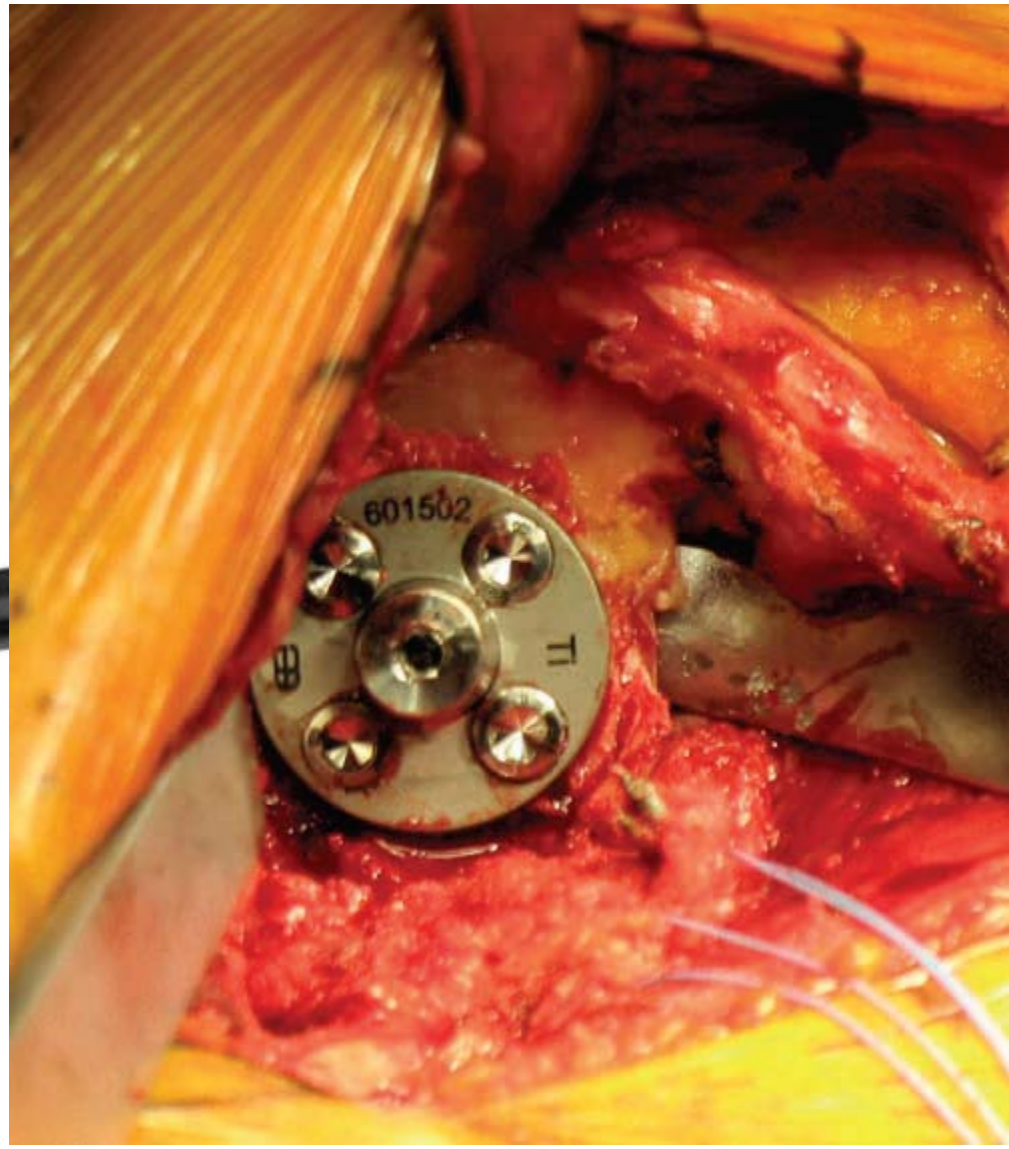


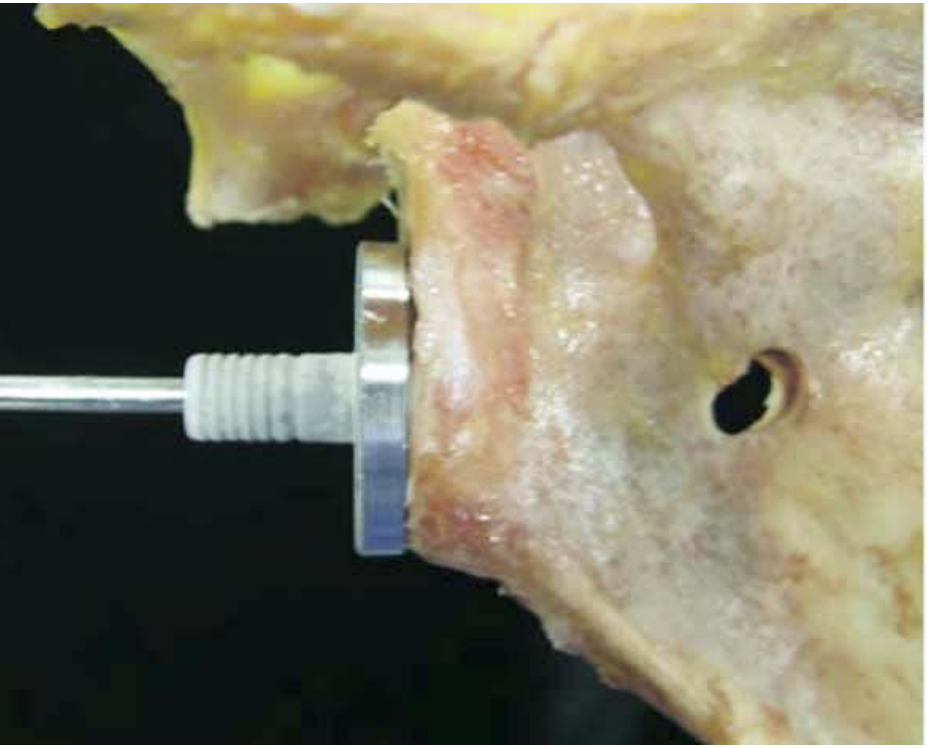


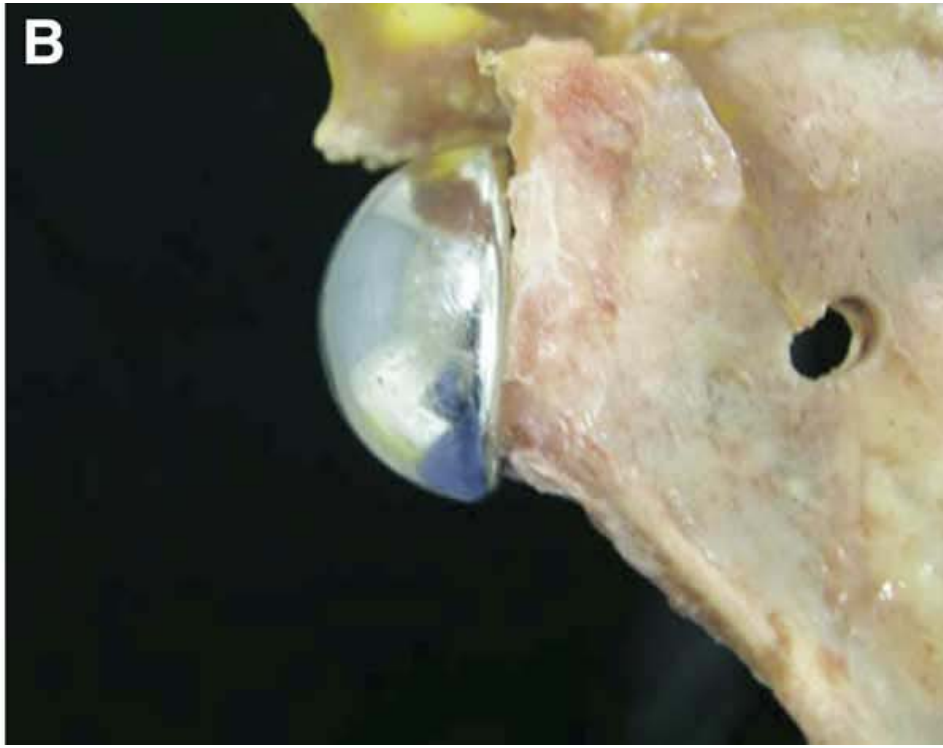
Shishido and Kikuchi
reported that it was safe to
penetrate the cortex up to 1.4 cm
medial
to the face of the glenoid.


A
B

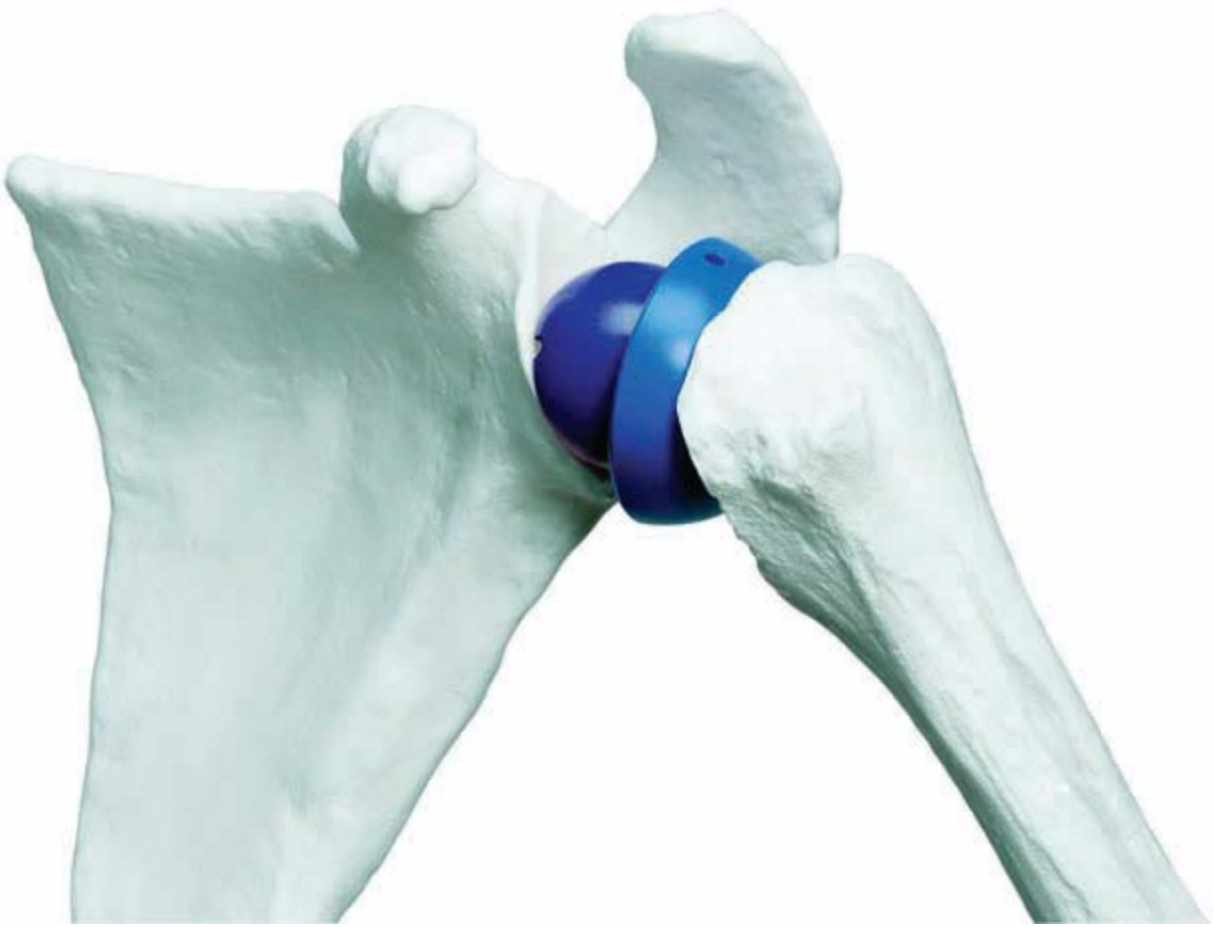
Anatomie und Implantationstechnik

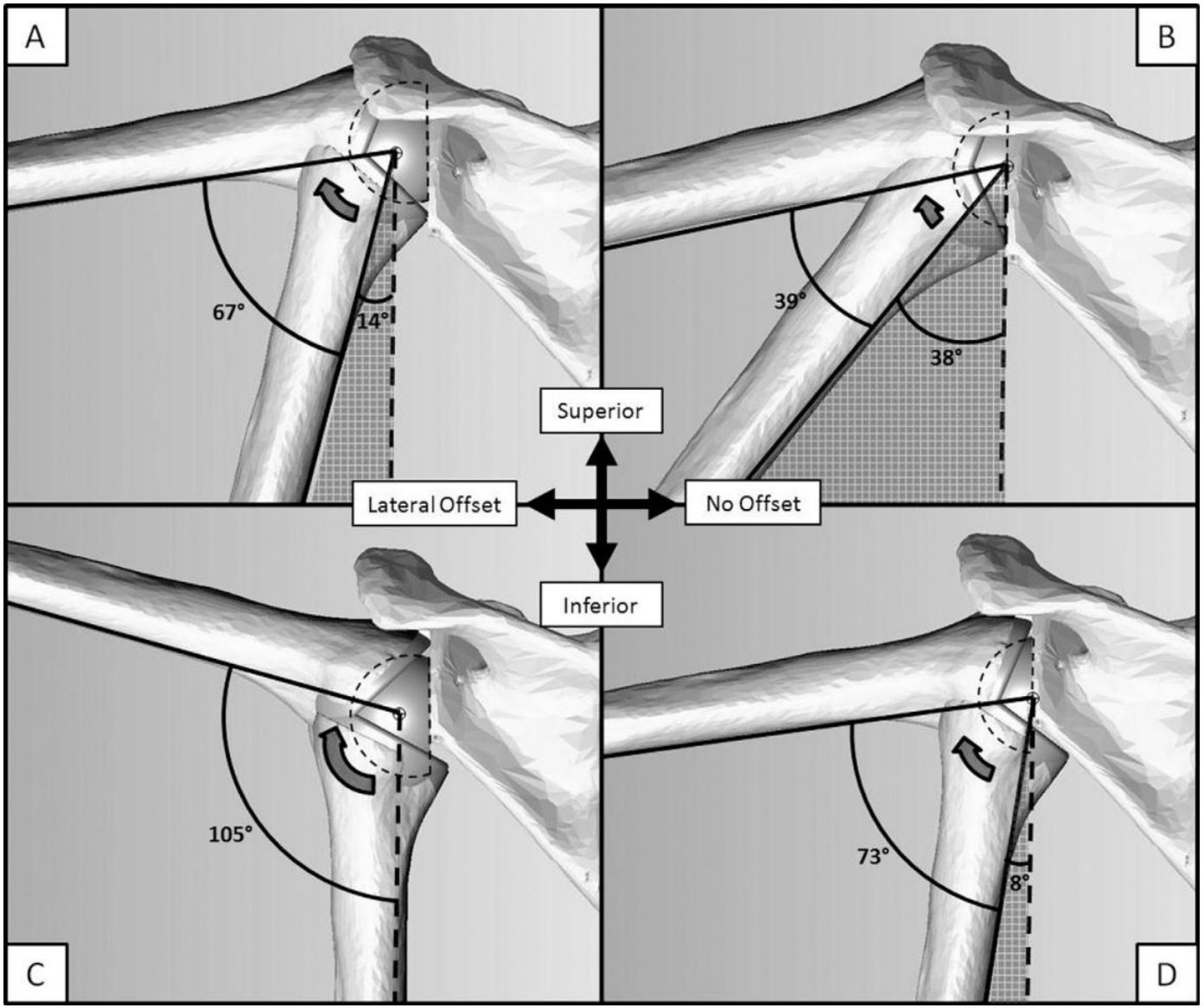




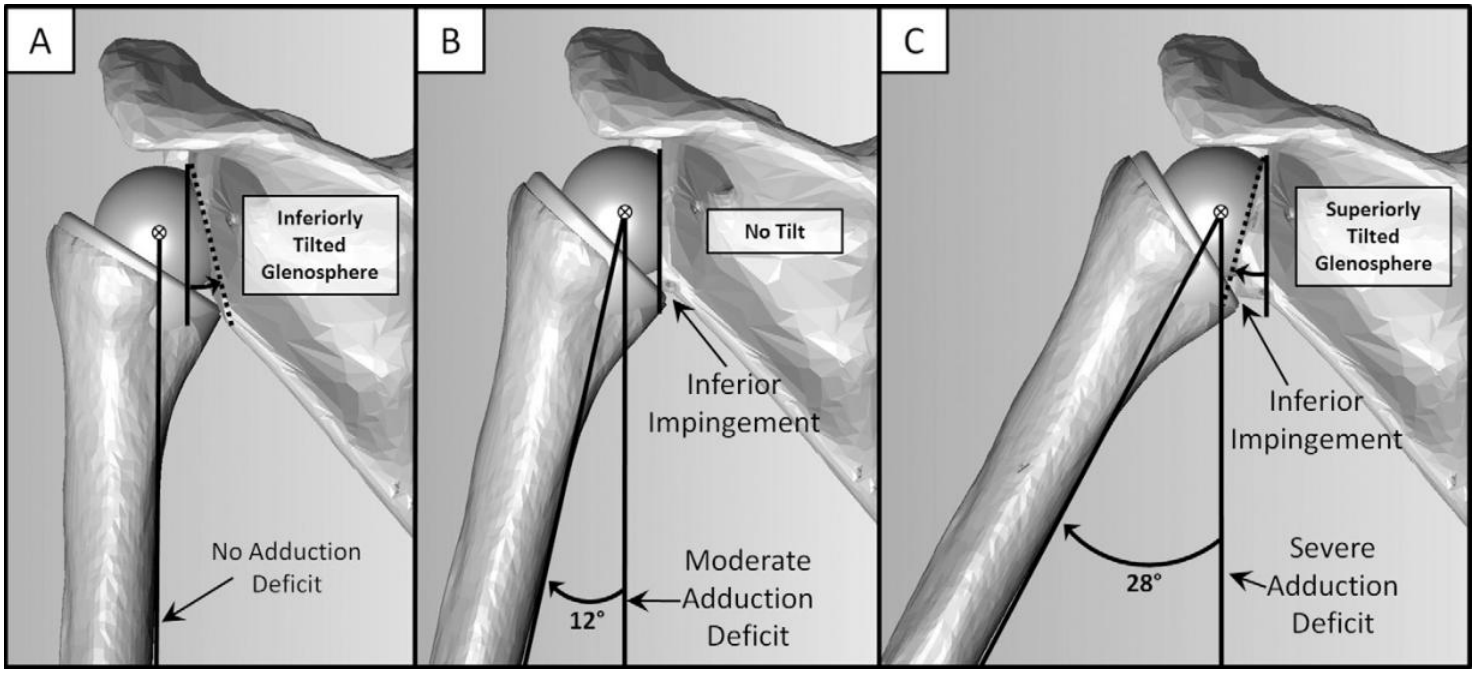

B

Anatomie und Implantationstechnik



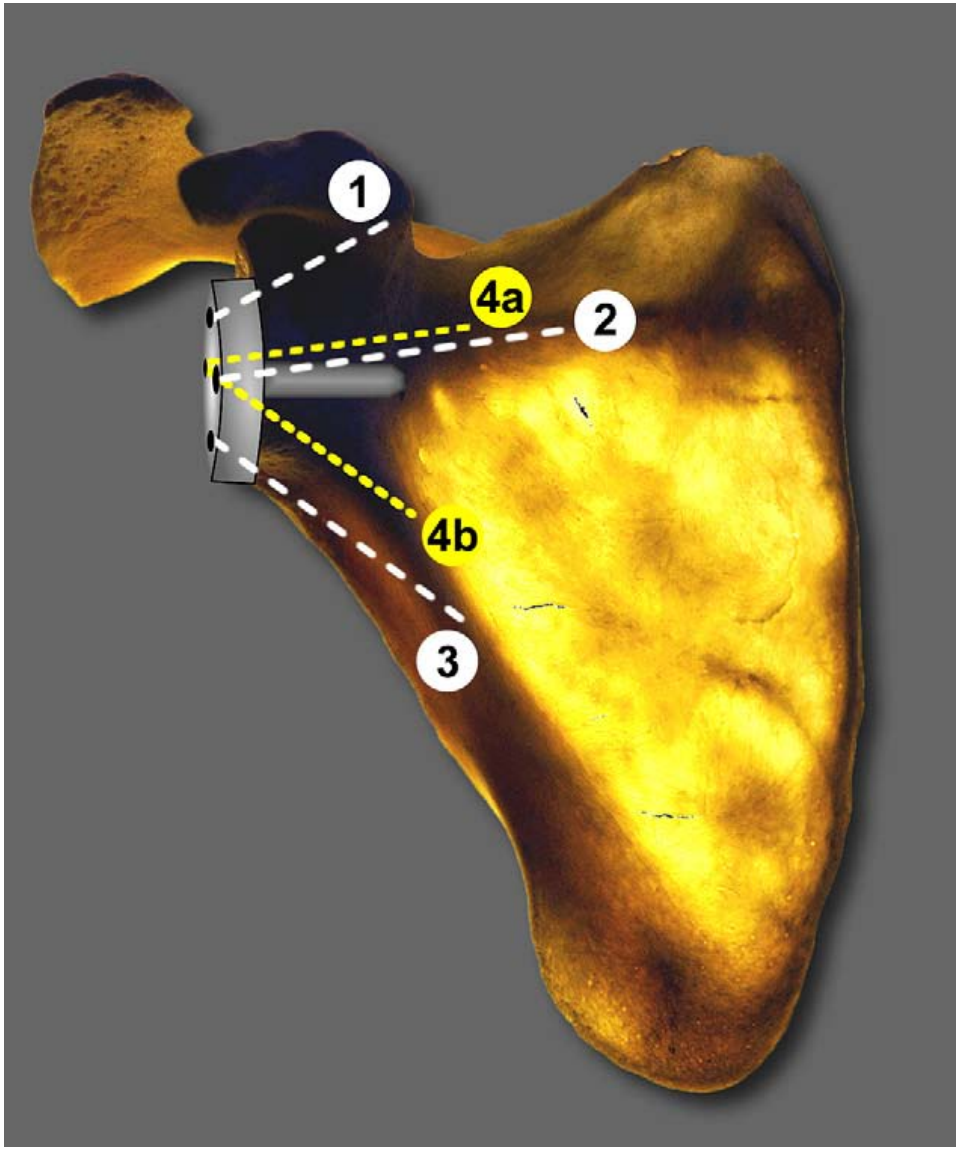


Gutièrrez S 2008



Gutièrrez S 2008

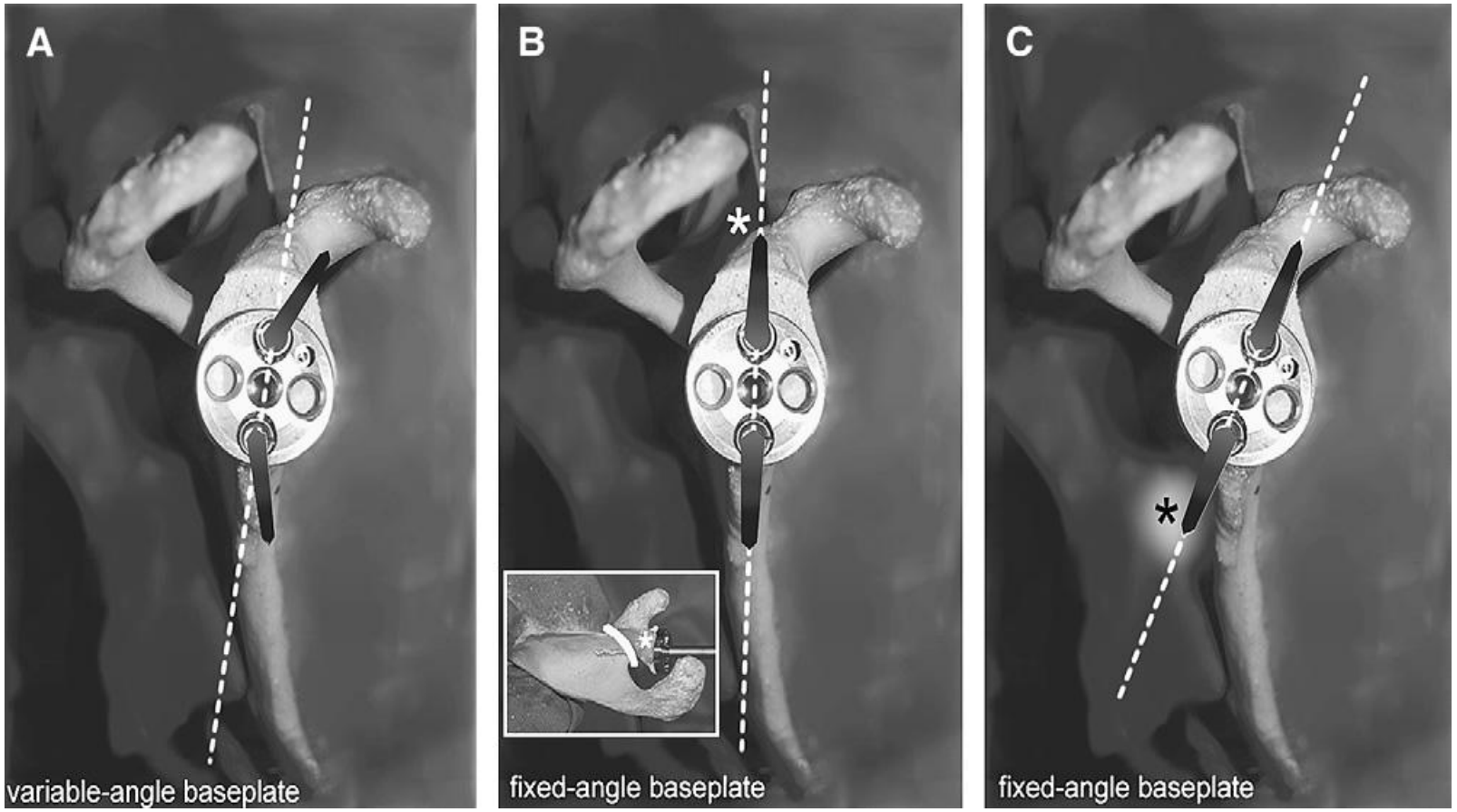
Schraubenplazierung



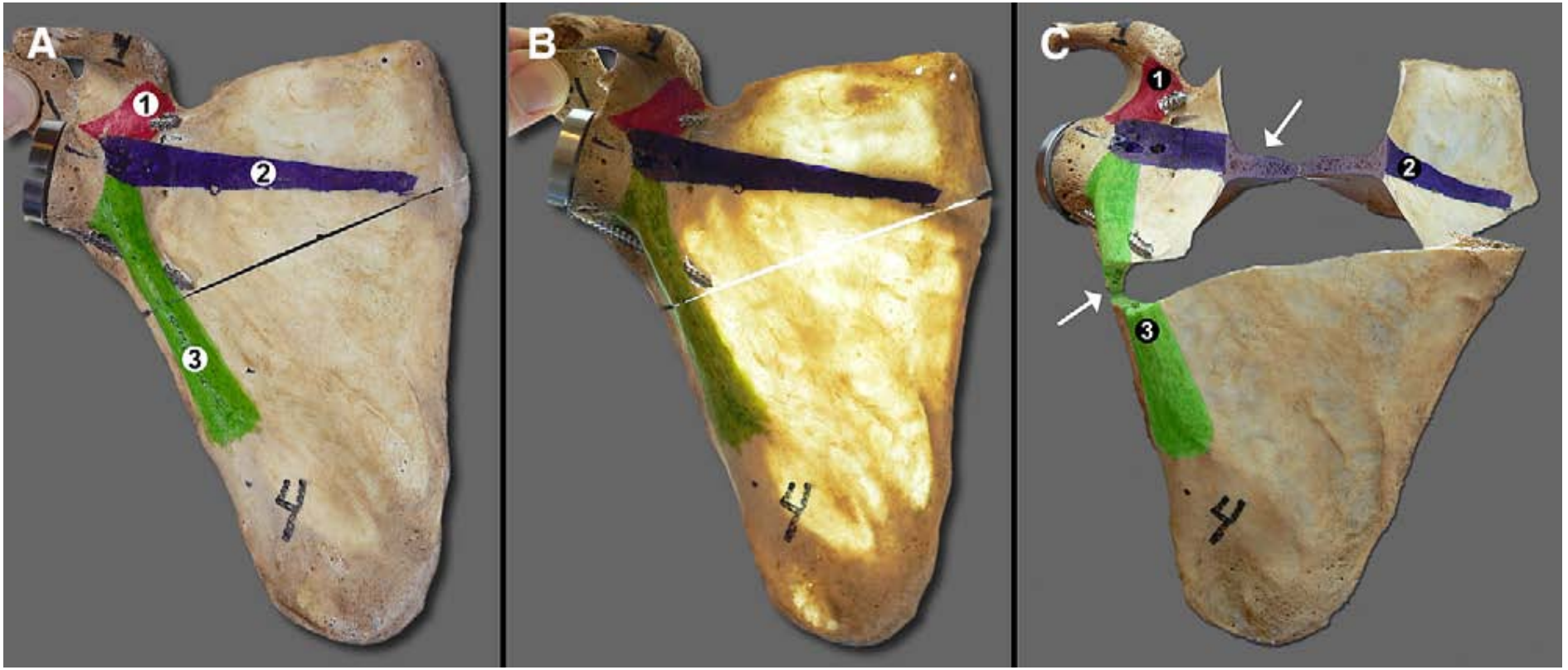
Schraubenplazierung

Schraubenplazierung

Schraubenplazierung

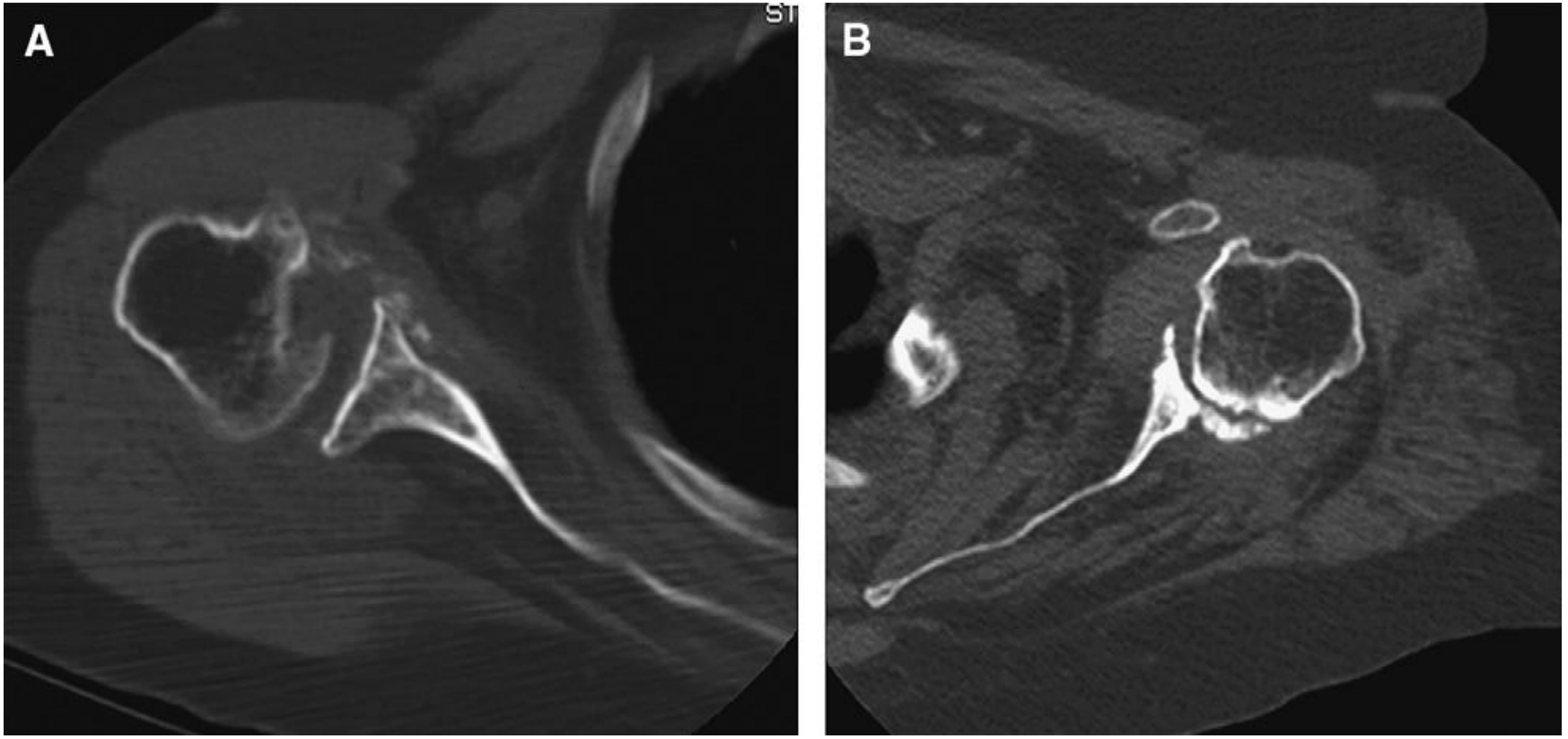


Schraubenplazierung



A, Each column consists of bone that is suitable for achieving strong screw purchase.
The columns are the base of the coracoid (1), the spine of the scapula (2), and the scapular pillar (3). B,
The paucity of bone between the columns becomes evident when the scapula is transilluminated. C,
The bone in between the columns is often paper-thin.

Grenzen der Verankerungsmöglichkeiten




KL
0.16
10.09
:20
C : 00

Problembereiche

Skapular Notching bis zu 68%

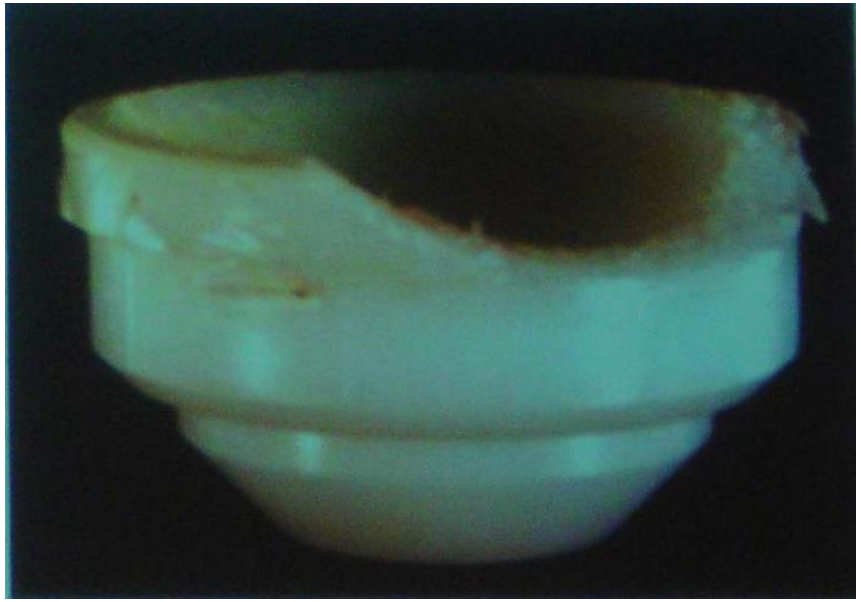
Schlechte Beweglichkeit in Rotation

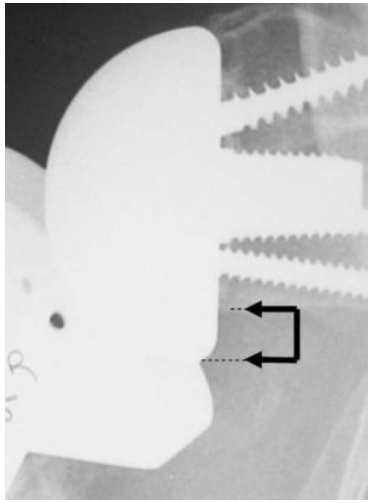
Instabilität bis 4%

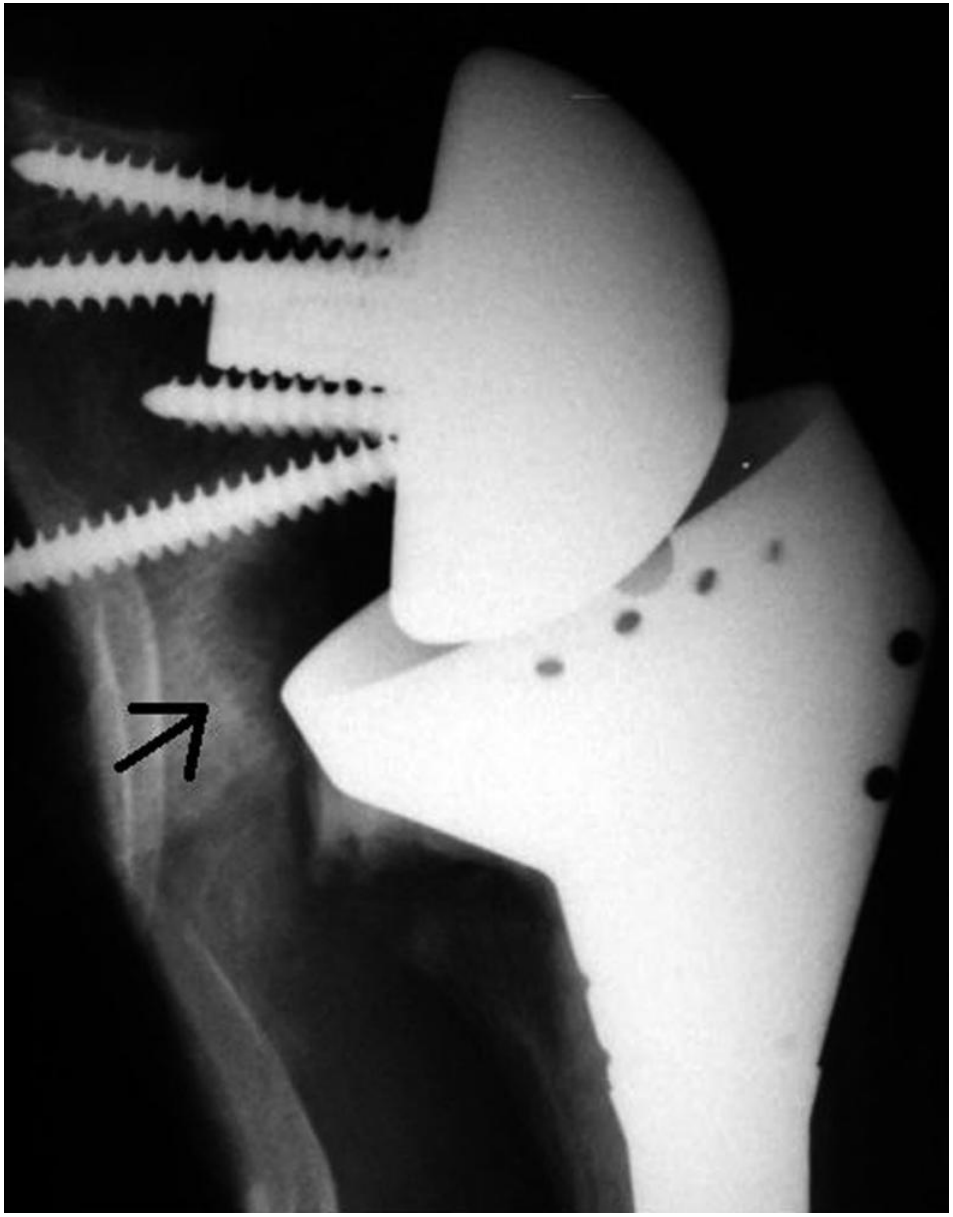
Insuffiziente Aussenrotation

Verlust der Schulterkontur

Skapular notching

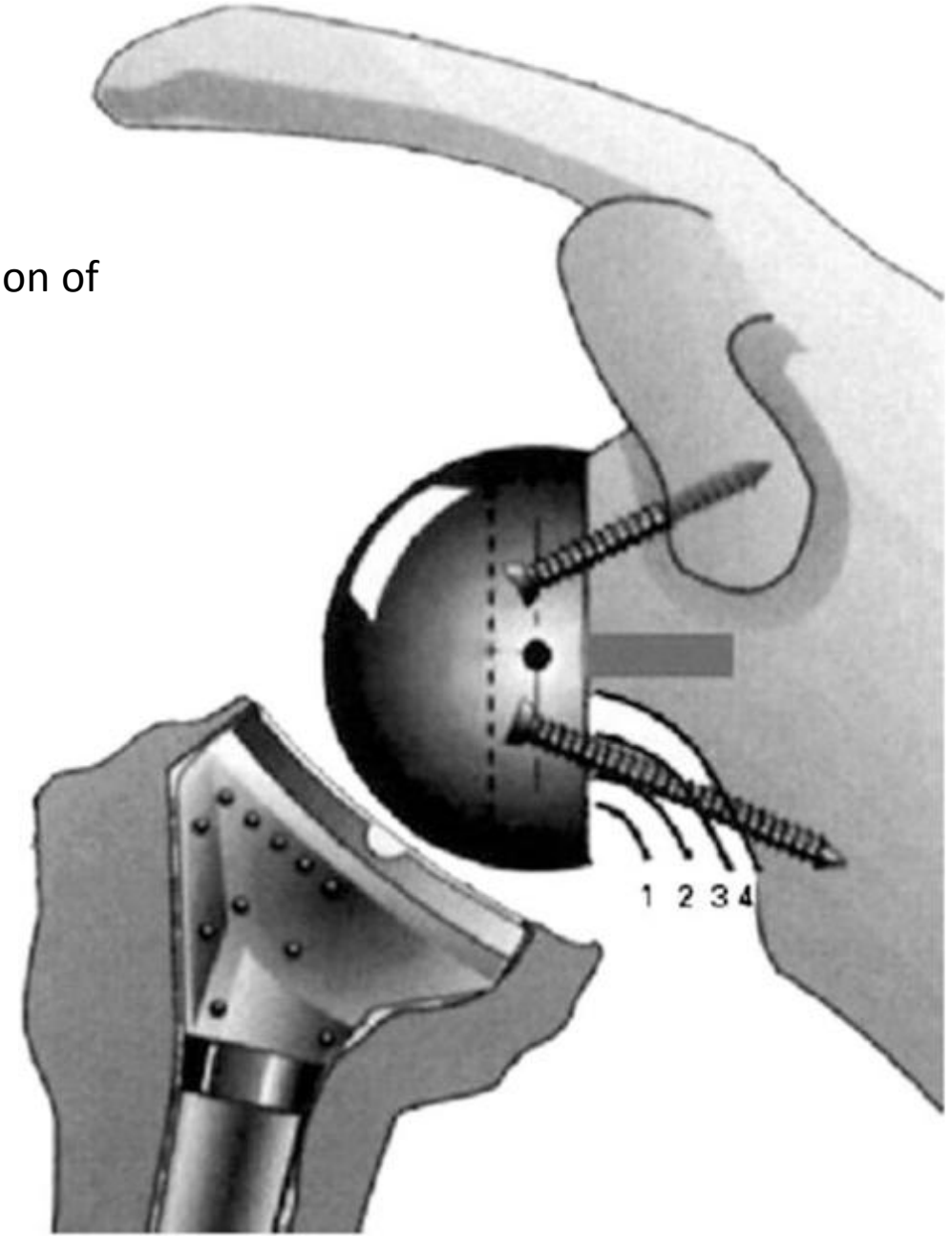






Quelle: Bohsali 2006

Scapular notch: radiographic classification of Sirveaux in
4 grades:
(1) the defect concerns only the pillar;
(2) contact with the lower screw of the baseplate;
(3) extension over the lower screw;
(4) extension under the baseplate.



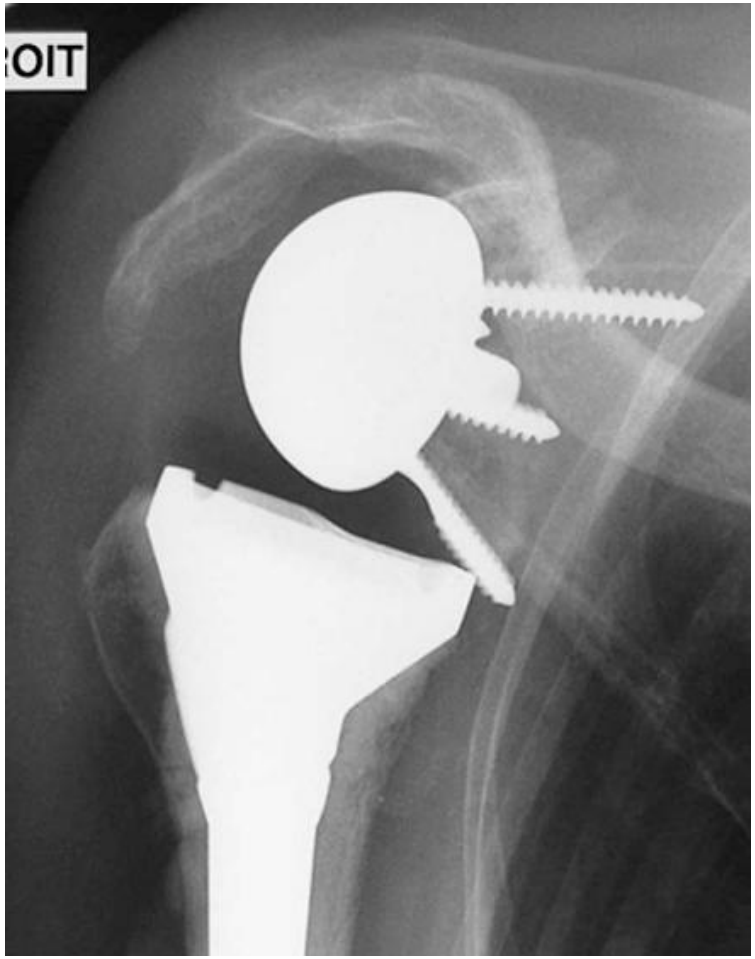
Therapy of grade 3 and 4 glenoidnotching

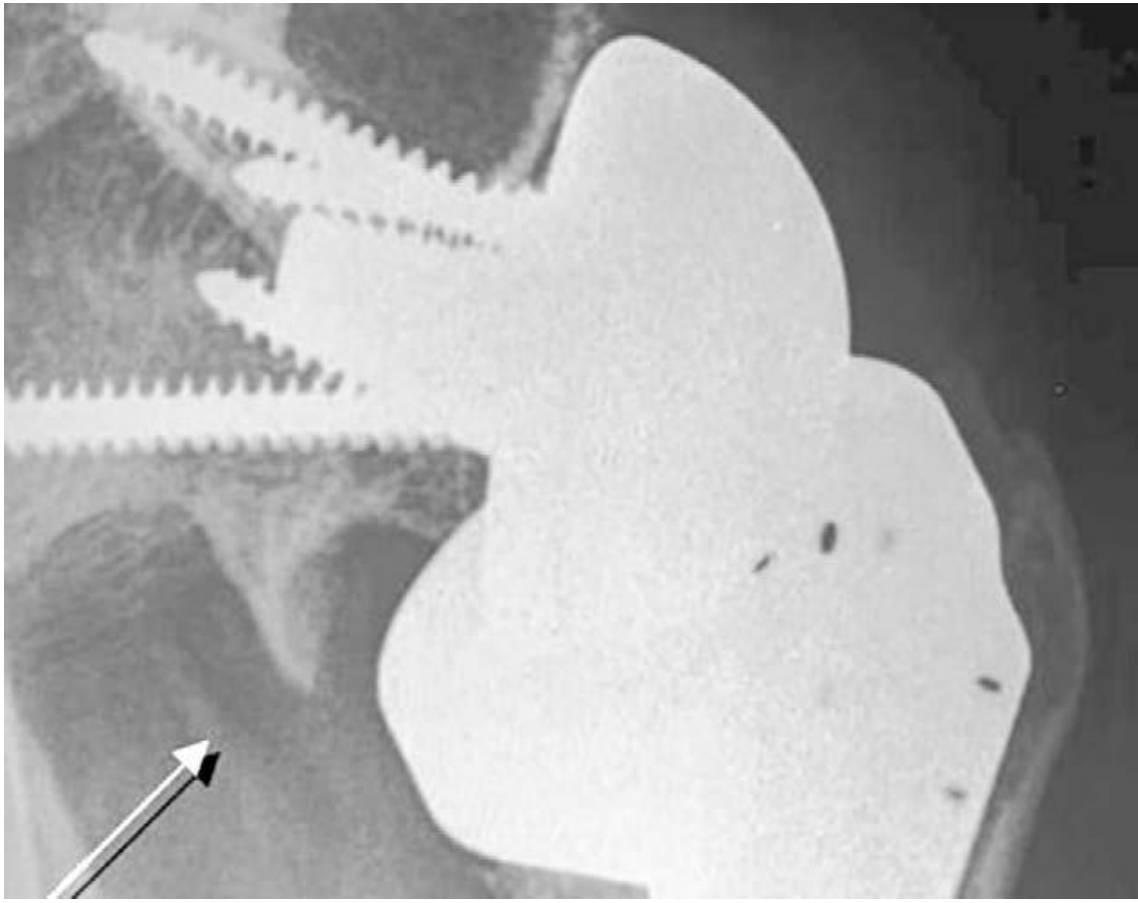
- Symptomless
  - Close radiological follow-up @ grade 3
  - Revision @ grade 4 with progressive RLL humerus

- Symptomatic

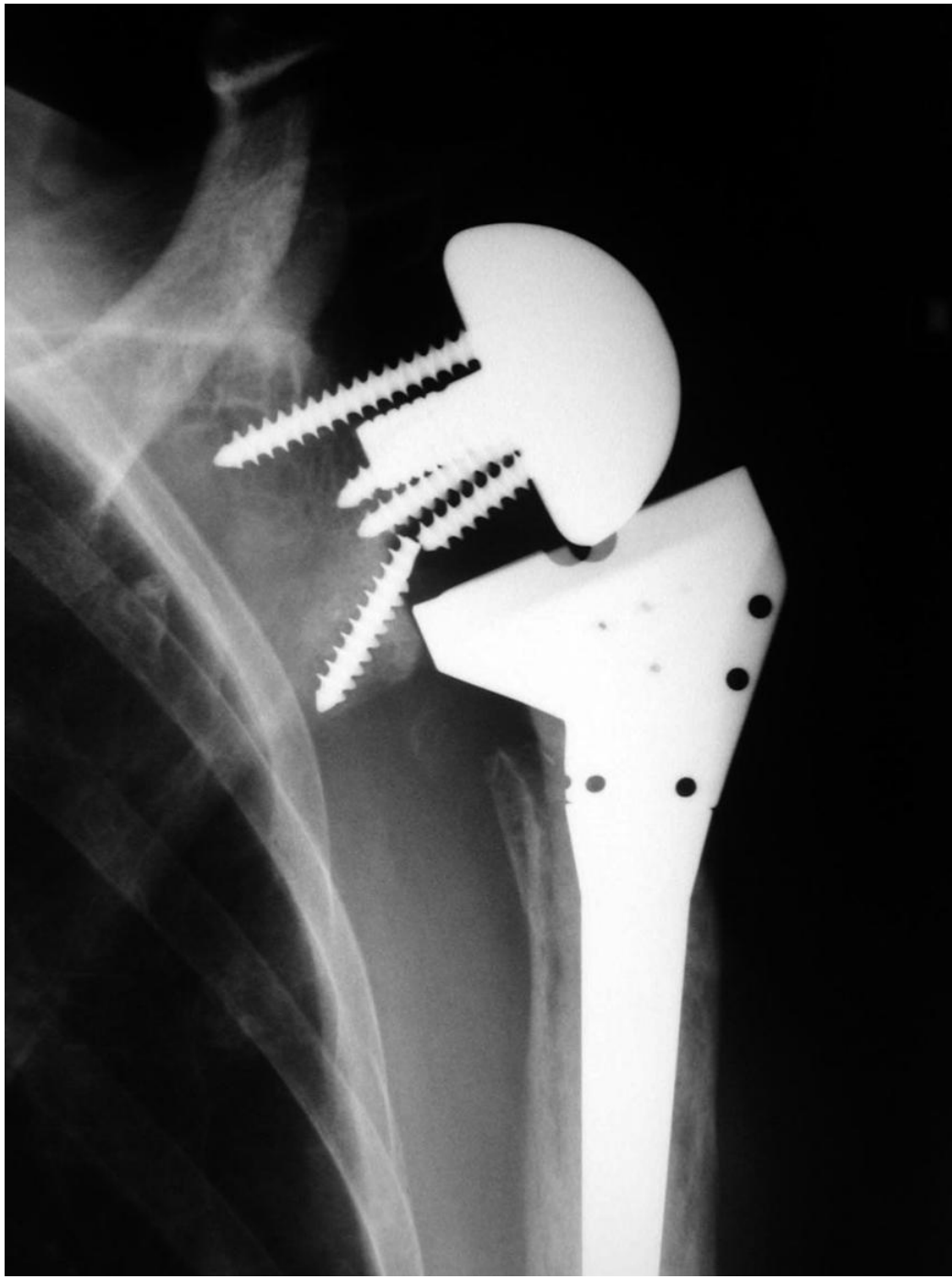
  Always synovectomy & removal of inferior screw, glenosphere and PE

  - Stable metaglene, 3° gl~: Substitution of the inferior screw by a new parallel screw or simple removal of the scew ?
  - Stable metaglene, 4° gl~: Simple removal of the inferior screw
  - Unstable metaglene: One- or twostaged metaglene-exchange with structural bone graft or
    Revision to Delta®-hemiarthroplasty



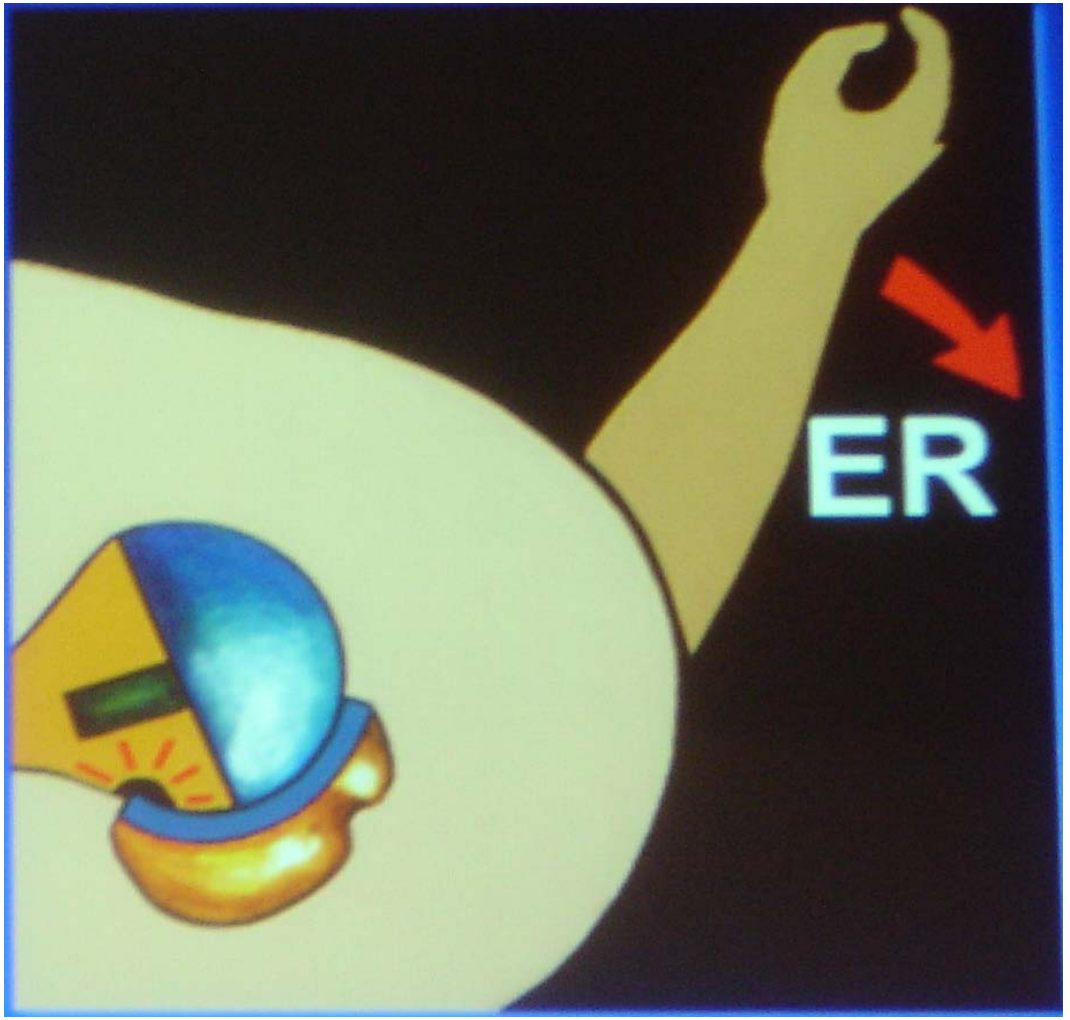


Quelle: Lèvigne JSES 2008



Quelle: Bohsali 2006

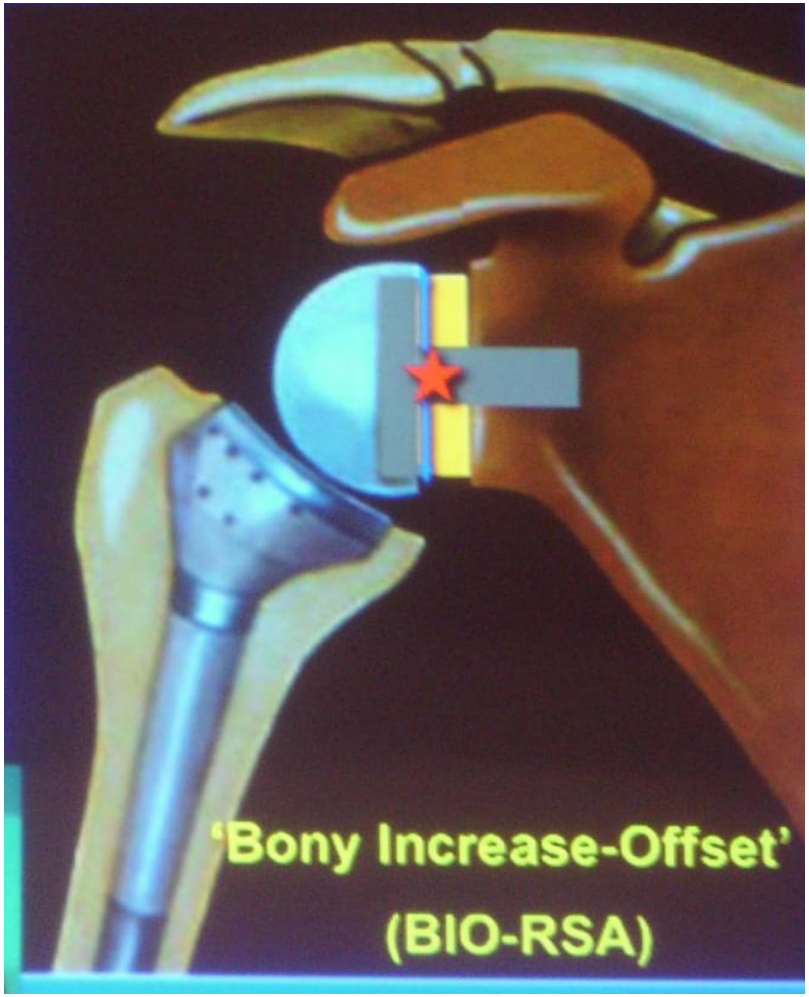
2) limitierte Beweglichkeit in Rotation



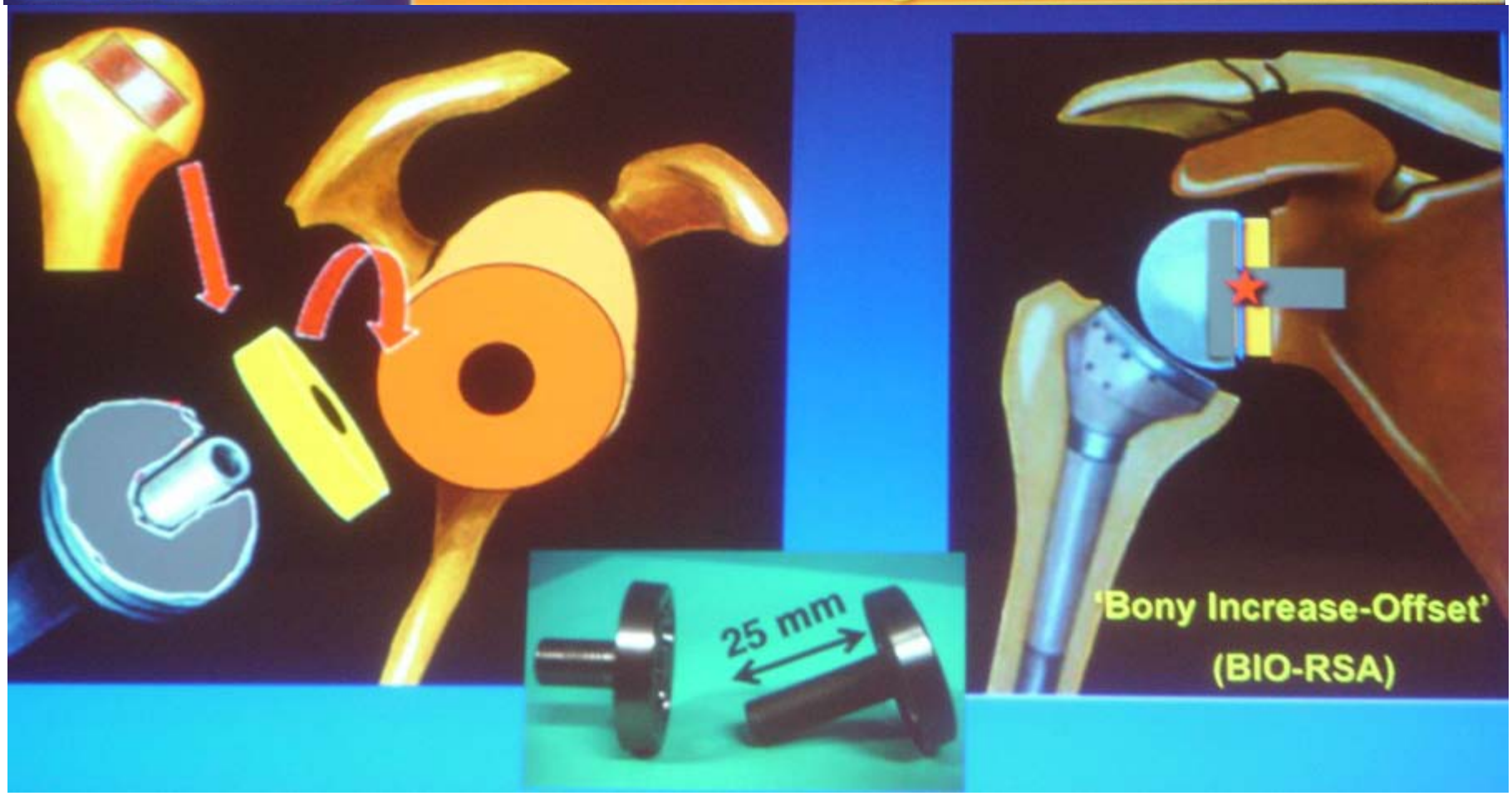
3) Instabilität

zu wenig Deltoideusspannung

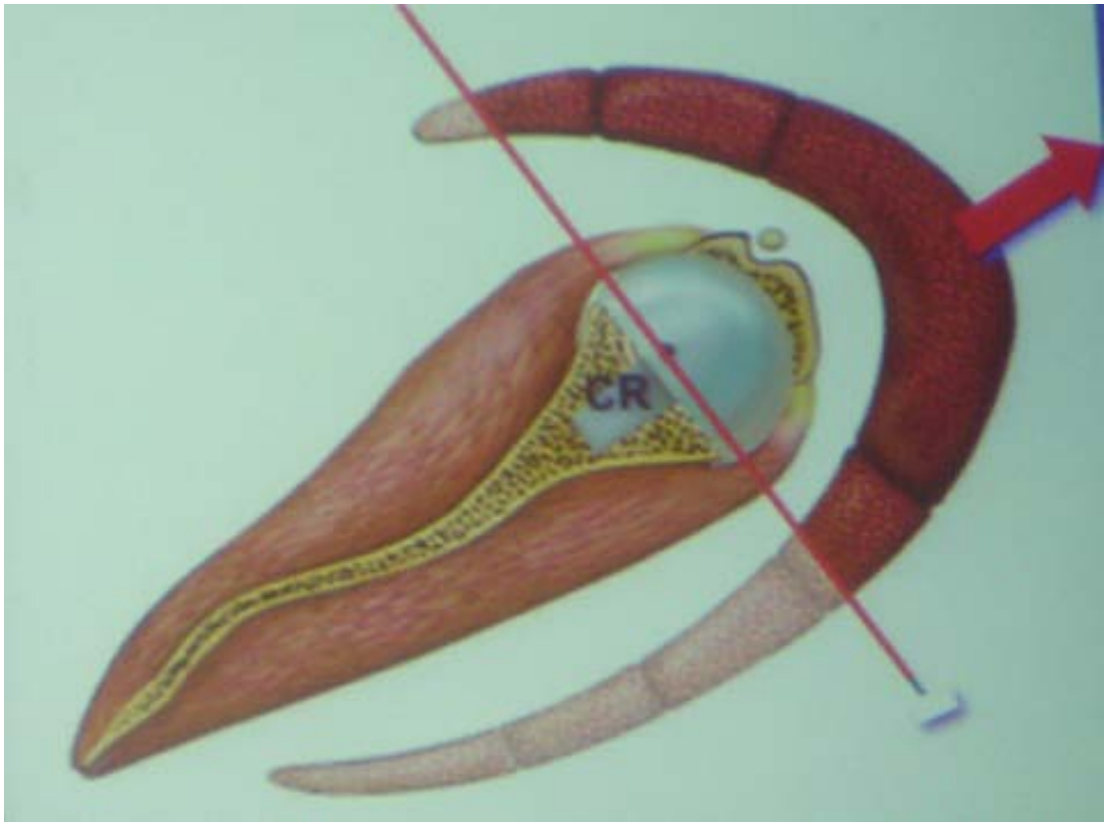
Gegenstrategie bei der Revision (P. Boileau)

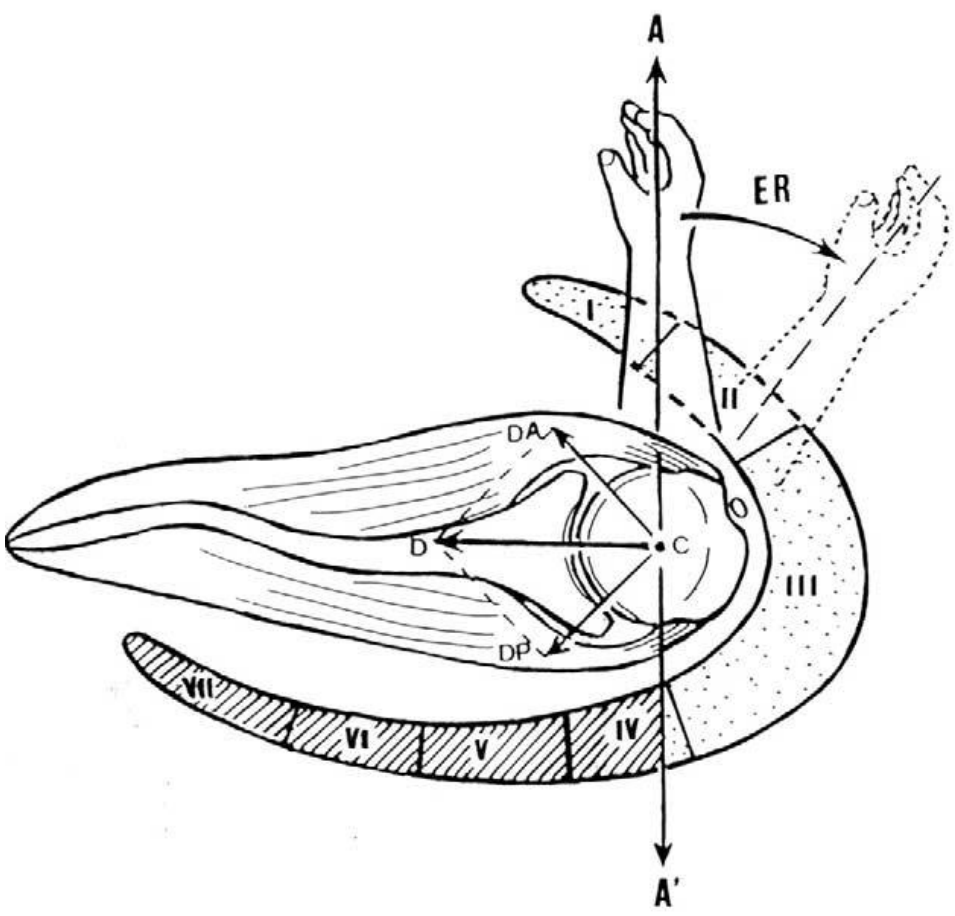


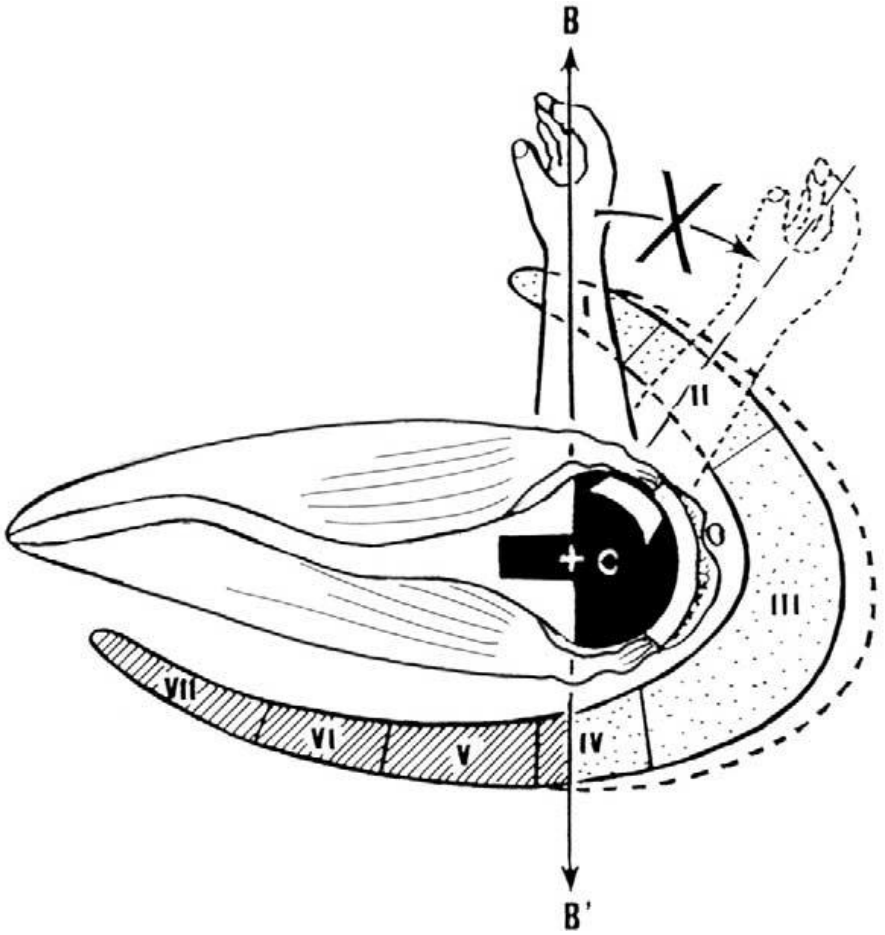
Our Option : Glenoid Bony Lateralisation



4) Insuffiziente Aussenrotation




A
ER
I
II
DA
D
C
III
DP
VII
VI
V
IV
A'


B
I
II
+ C
III
VII
VI
V
IV
B'

Cuff Deficient Shoulder

Internal Rotators

Subscapularis

Pectoralis major

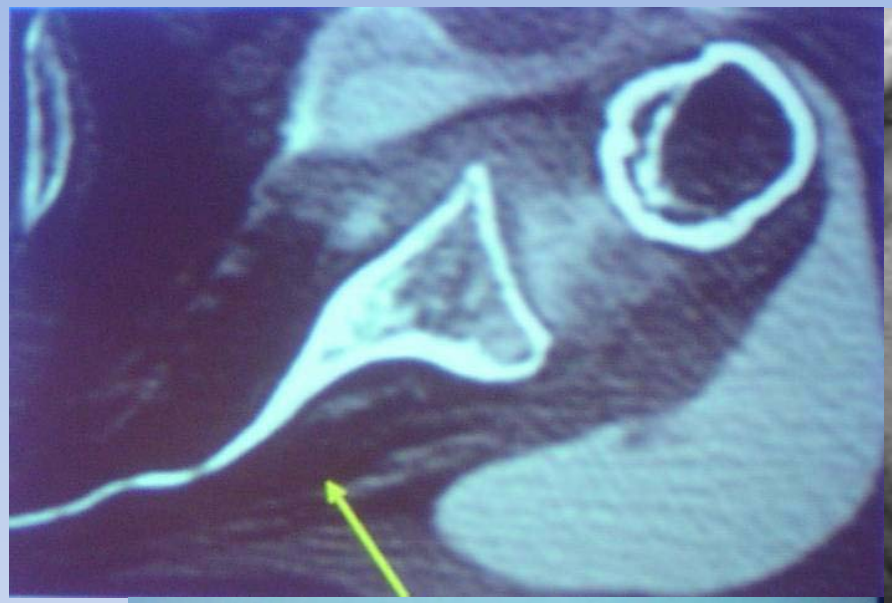
Teres major

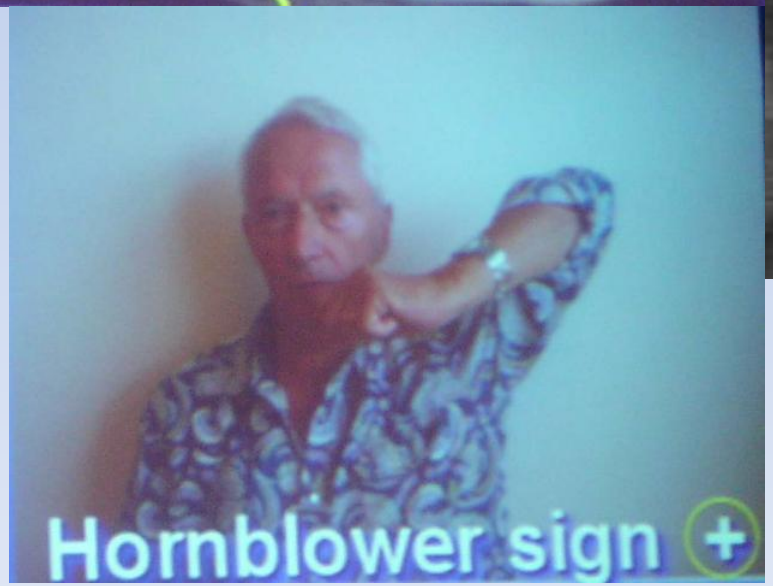
Latissimus dorsi

External Rotators

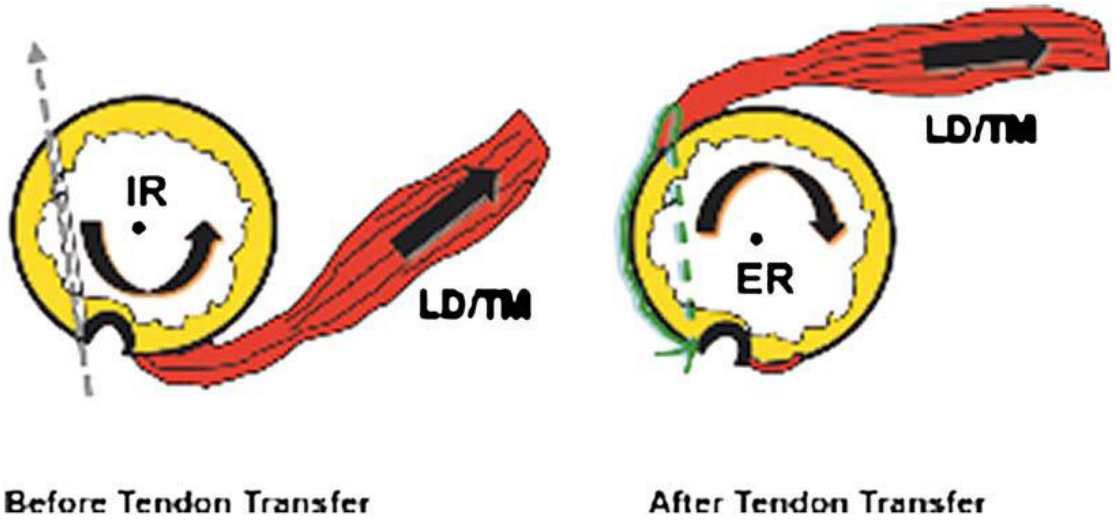
4 Vs 0 !!

Wichtigkeit des M.Teres minor



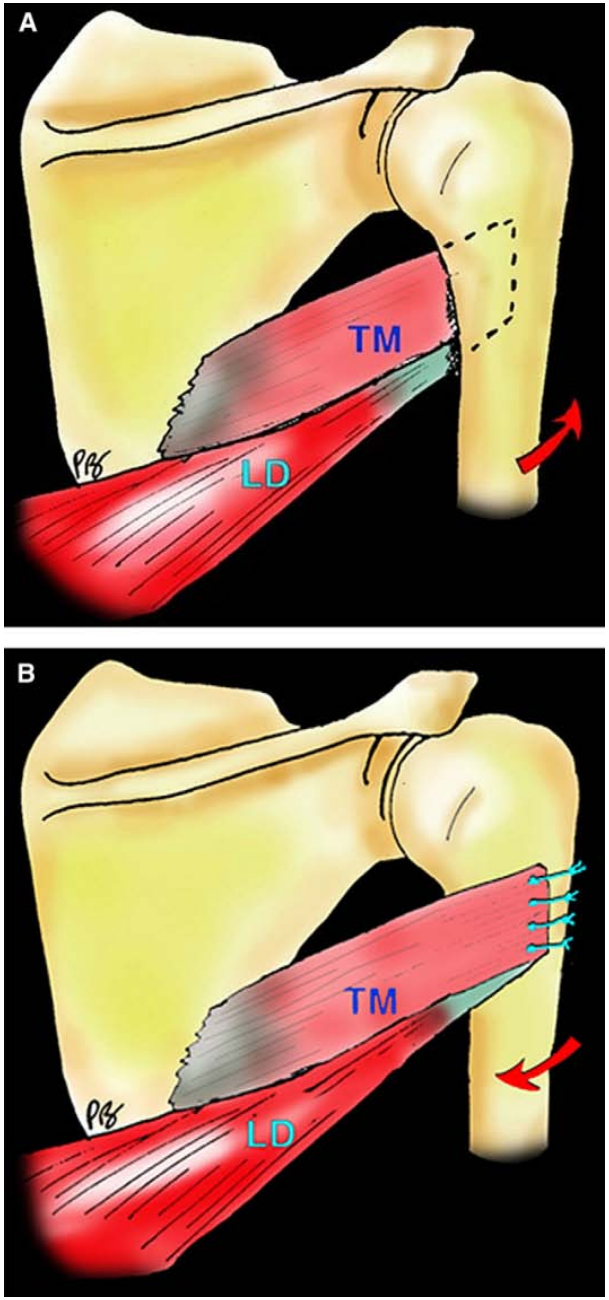


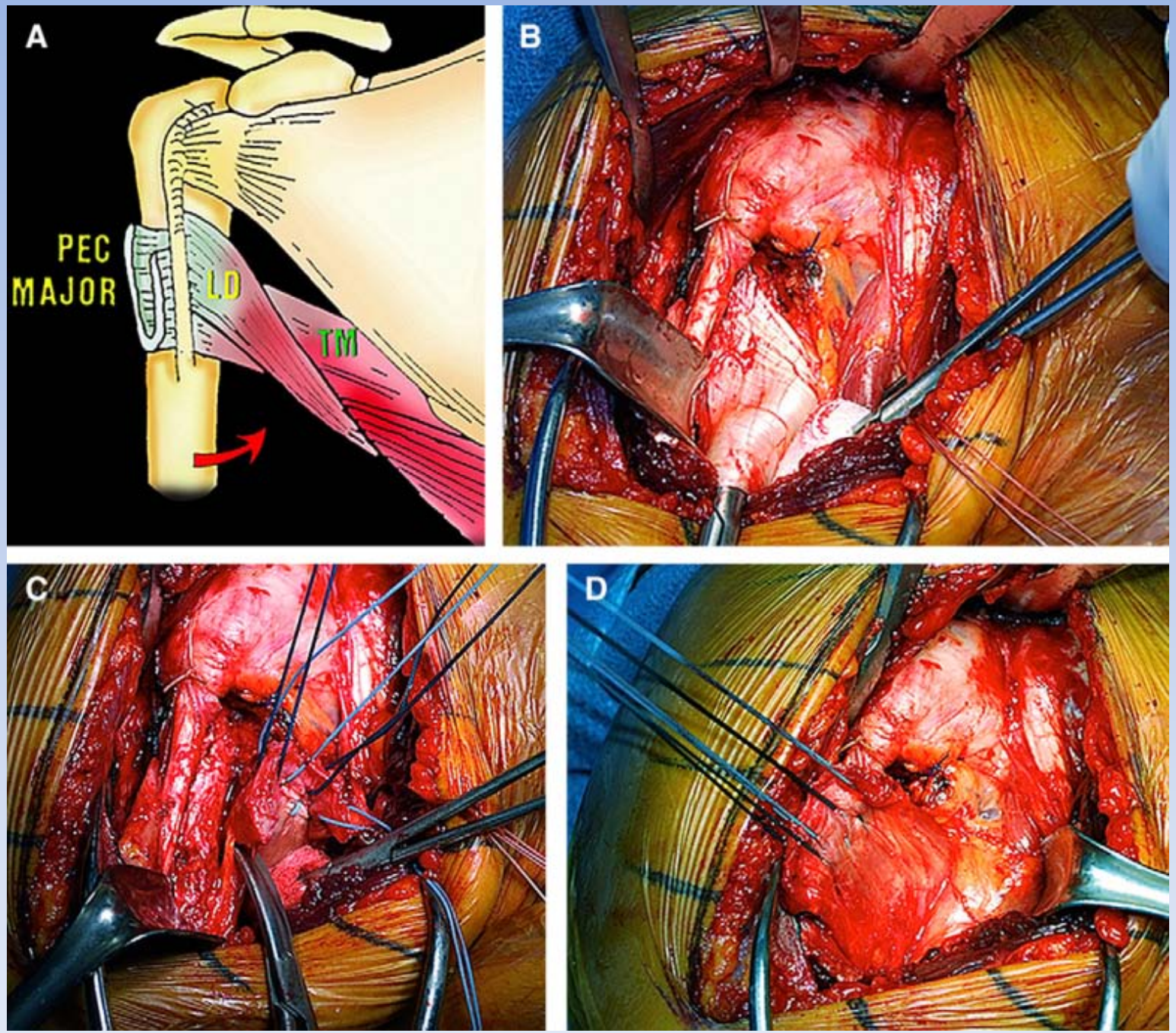
Gegenstrategie bei AR Defizit

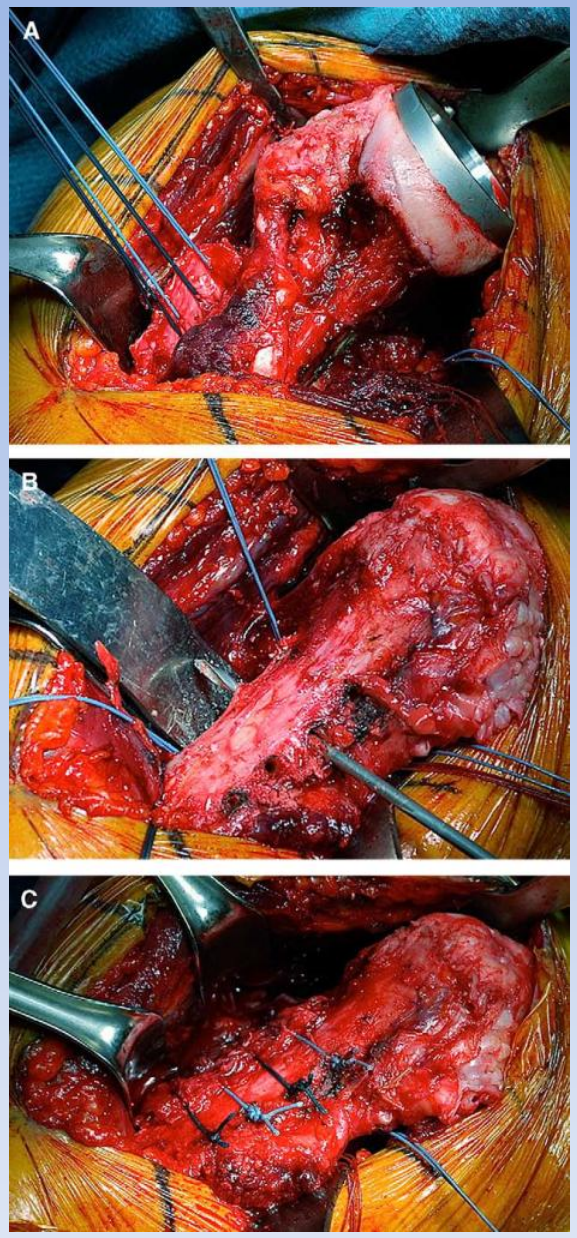


Before Tendon Transfer

After Tendon Transfer




A
PEC
MAJOR
LD
TM
B
C
D


A
B
C

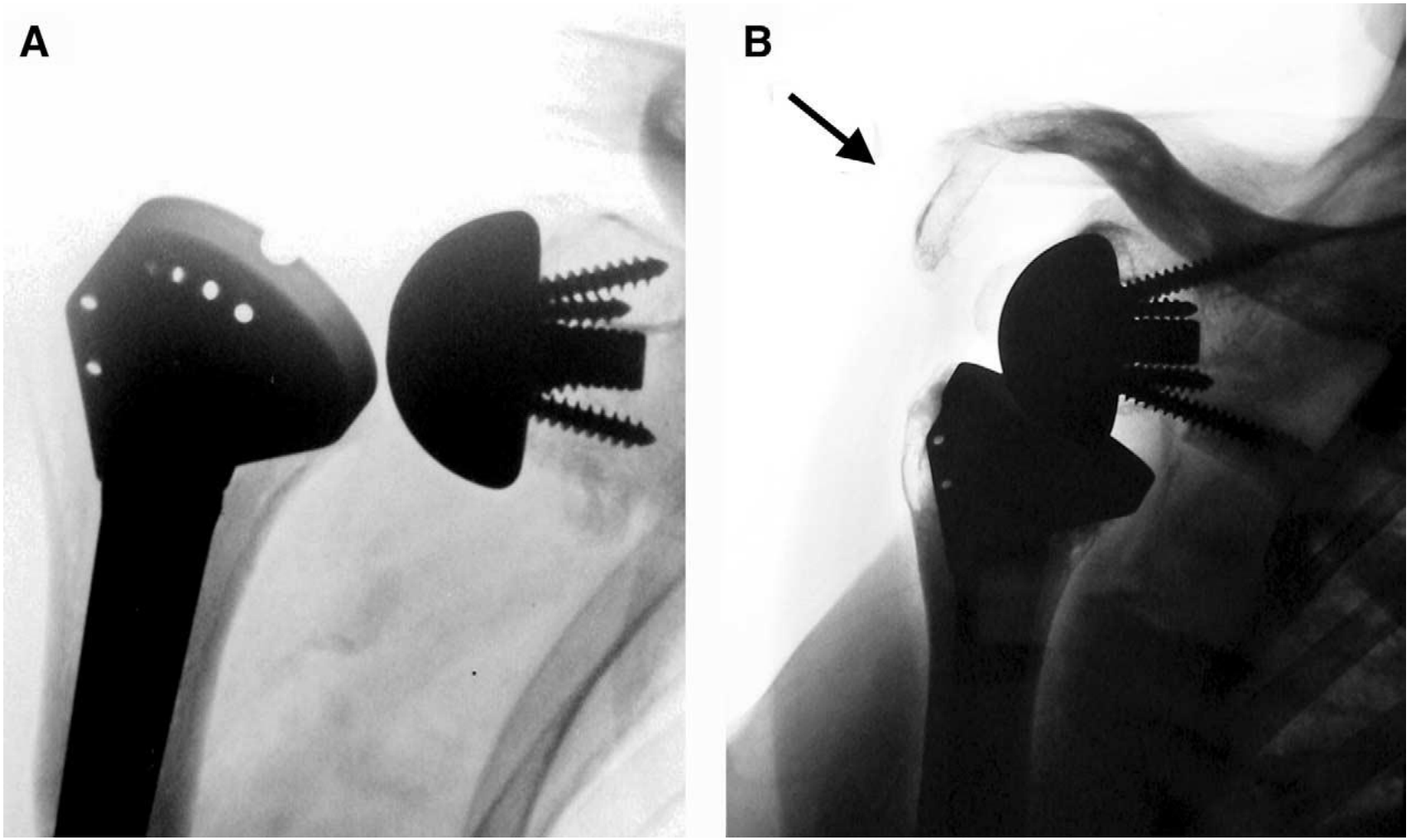
Delta Komplikationen:

Acromion oder Skapulafraktur
Glenospherendislokation
Infektion
PE Liner Dislokation
Nervenverletzung

Komplikation:
Acromion oder Skapulafraktur
z.B. durch zu große Deltoideusspannung

Problem:
relaxierter Patient,
Narbengewebe,
conjoined Tendon

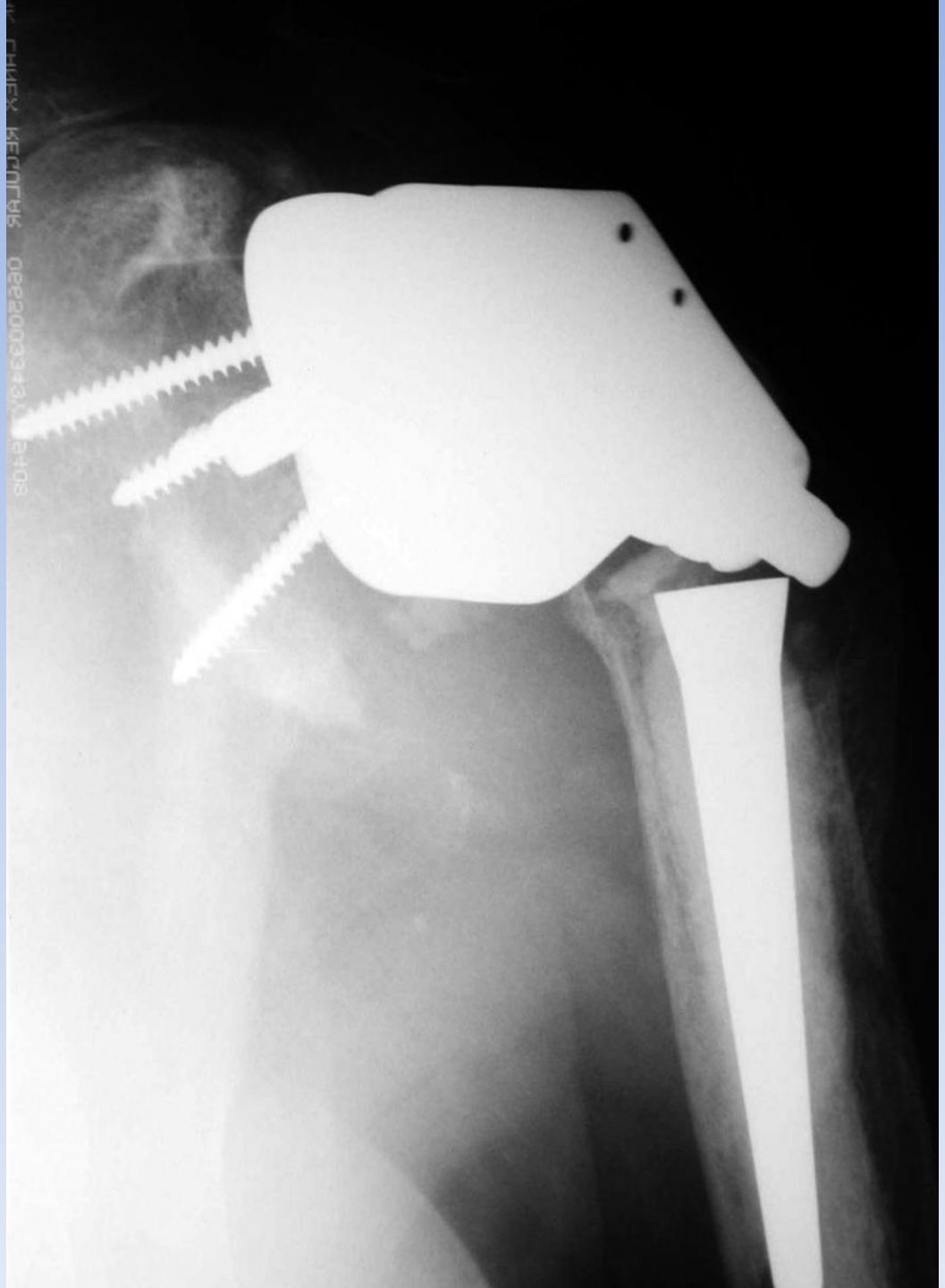
Länge des Humerus an der Gegenseite messen



Quelle: Boileau et al *JSES 2005*

Zu wenig Vorspannung führt zur Luxation

Zu viel Vorspannung führt zur Fraktur, neurologischen Läsion, permanente Armabduktion



Verminderung von Komplikationen durch neue Prothesendesigns

Bohsali 2006