Distale bicepspees letsels bij sporters

Dr Pieter Pierreux

Overzicht

- Introductie
- Anatomie
- Klinisch onderzoek
- Beeldvorming
- Operatieve technieken
- Revalidatie

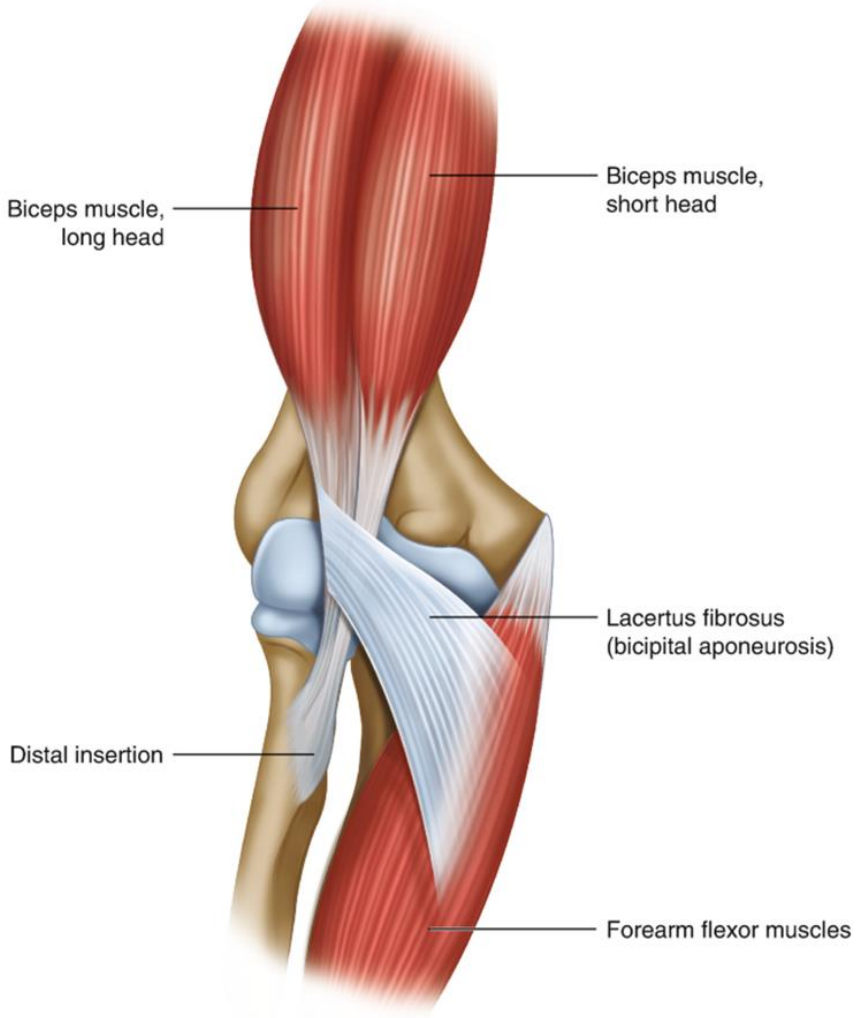
Introductie

Introductie

Anatomie

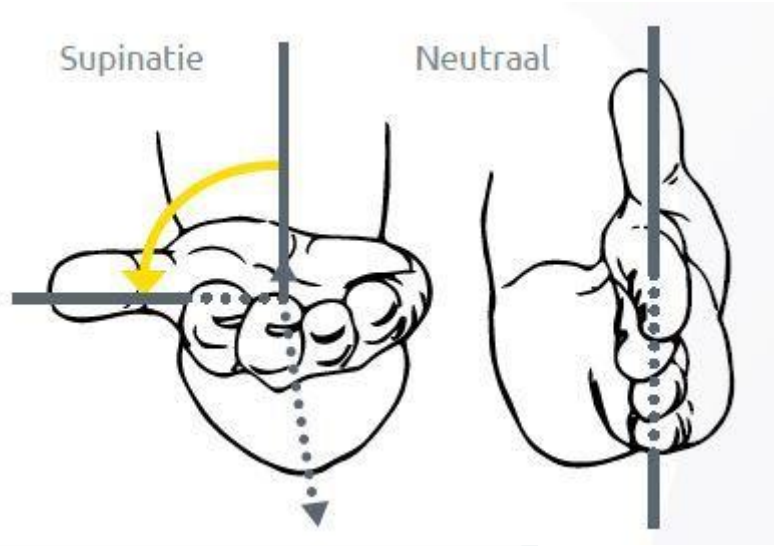
- Distale bicepspees
  - Caput brevis
  - Caput longus
- Insertie: Tuberositas radii
- Lacertus fibrosus.
  - Functie?

  Stabiliseren/medialiseren van de distale biceps pees



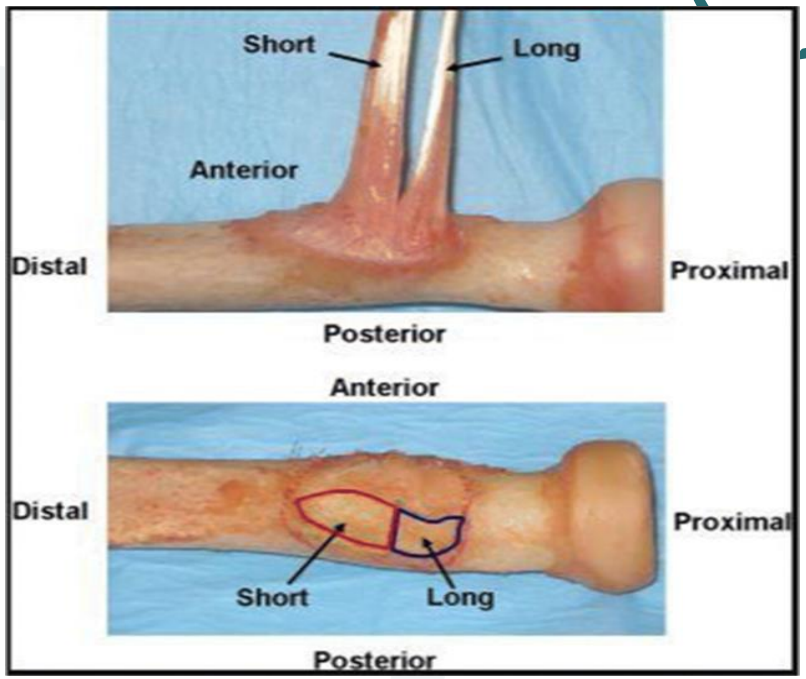
Functie

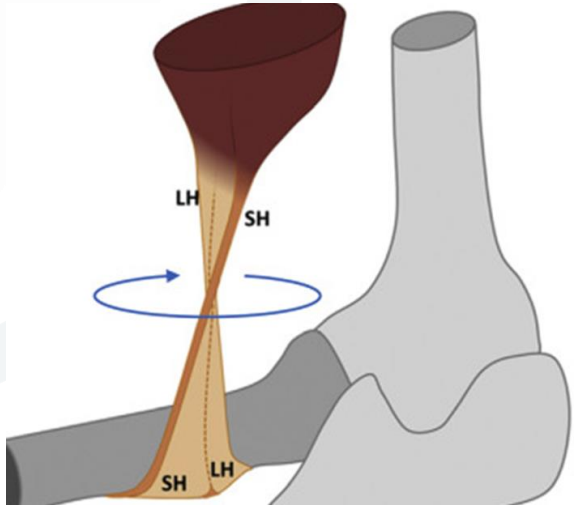
- Supinatie >> flexie van de elleboog



Anatomie

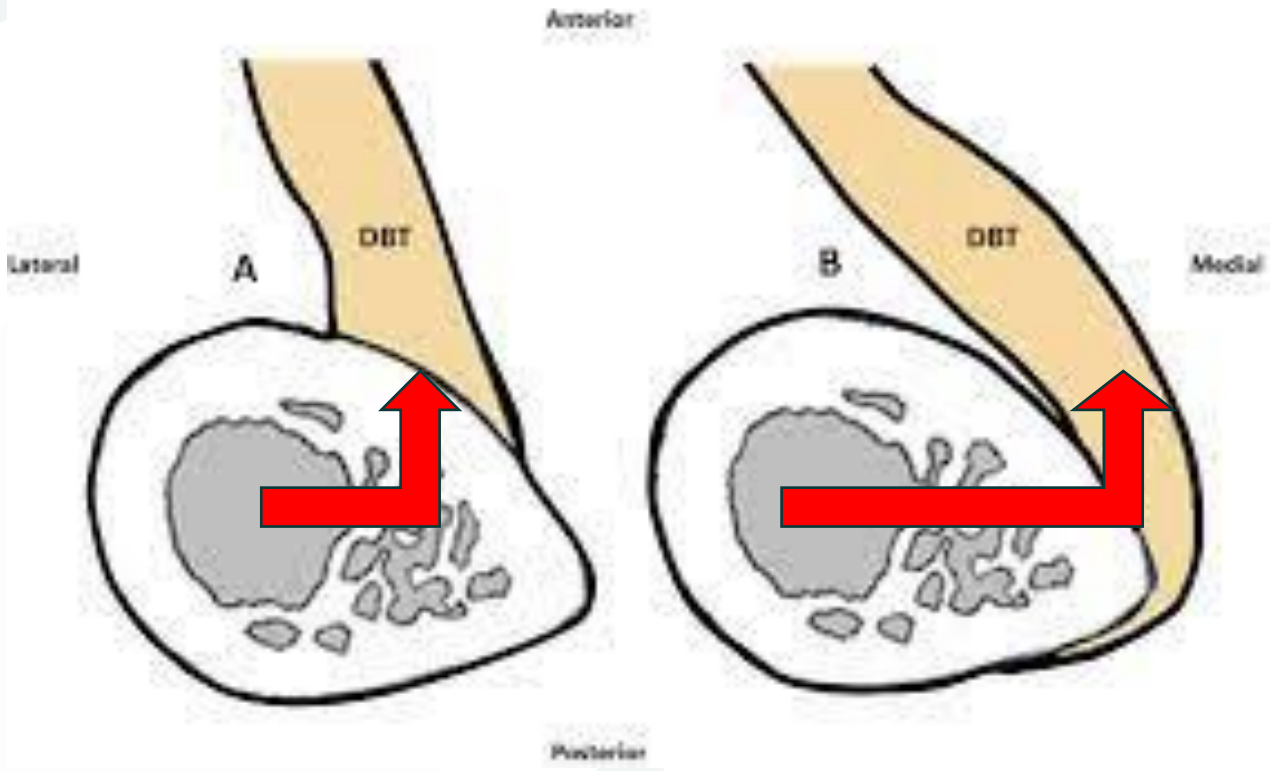
- Insertie
  - Verschillend voor caput brevis en longus
  - Externe rotatie distale bicepspees
  - Partiele ruptuur > caput brevis
- Tuberositas radii ➔ CAM effect
  - Supinatiekracht





Anatomie

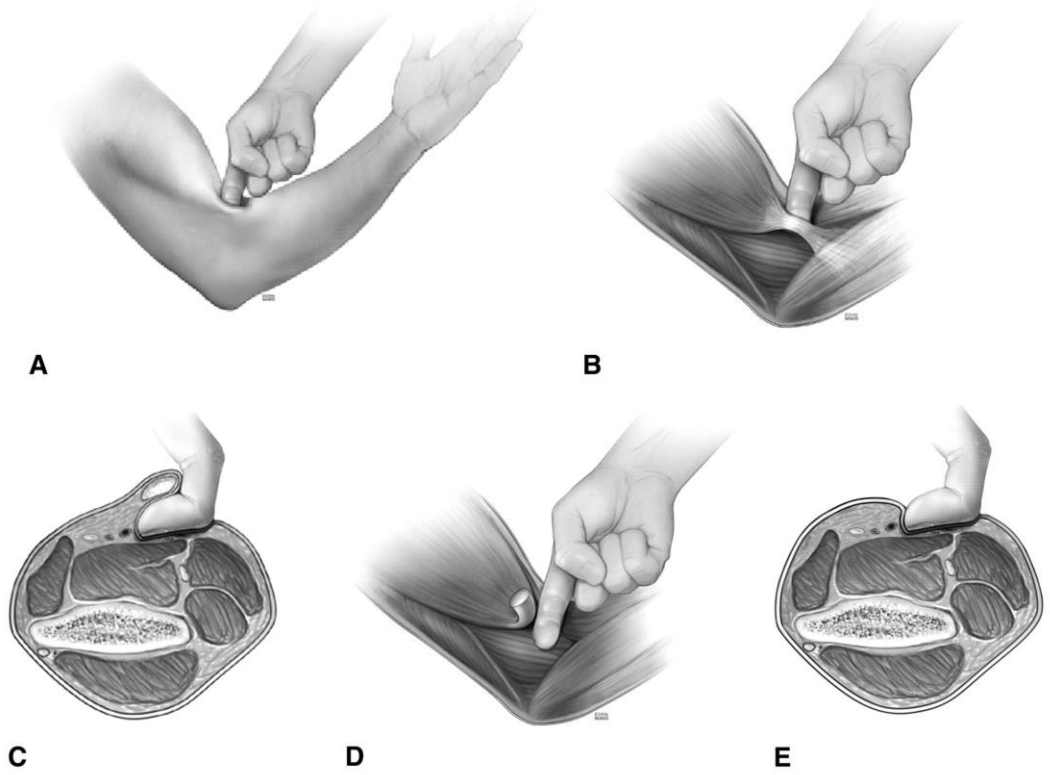
- CAM = LEVER ARM



Klinisch onderzoek

Klinisch onderzoek

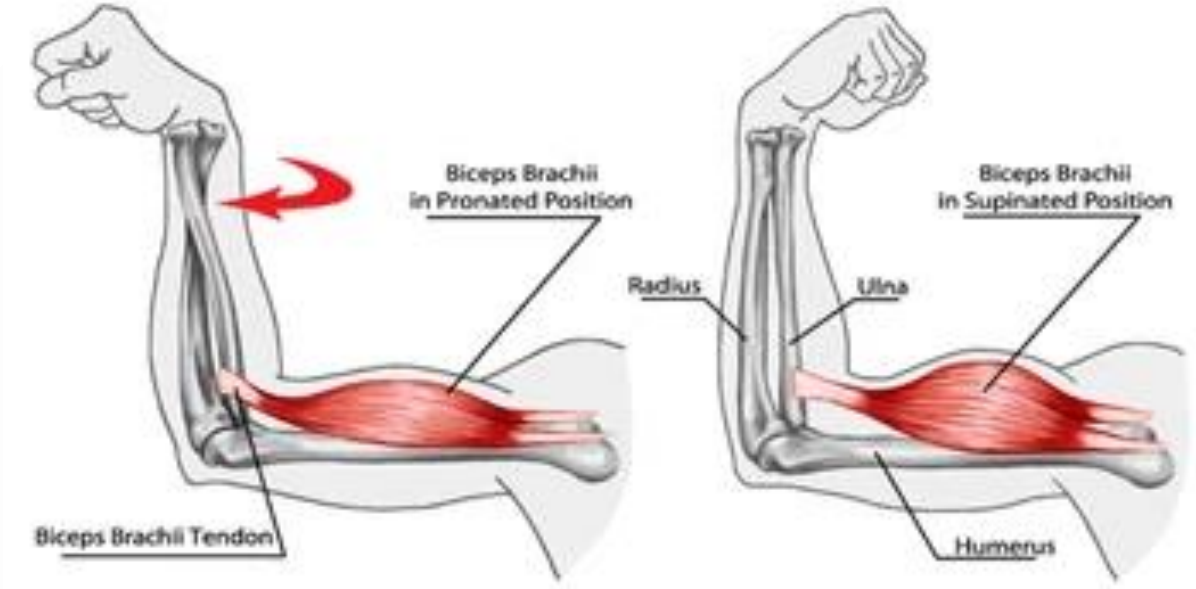
- **Hook test**
  - Elleboog 90° flexie, schouder abductie en actieve supinatie
  - Lateraal → mediaal
  - CAVE: intacte Lacertus fibrosus



Klinisch onderzoek

- **“Biceps squeeze test”**

- **“Passive rotation test”**
  - Cascade PRO-SUPINATIE
  - Onderbreking = totale bicepspees ruptuur



Klinisch onderzoek

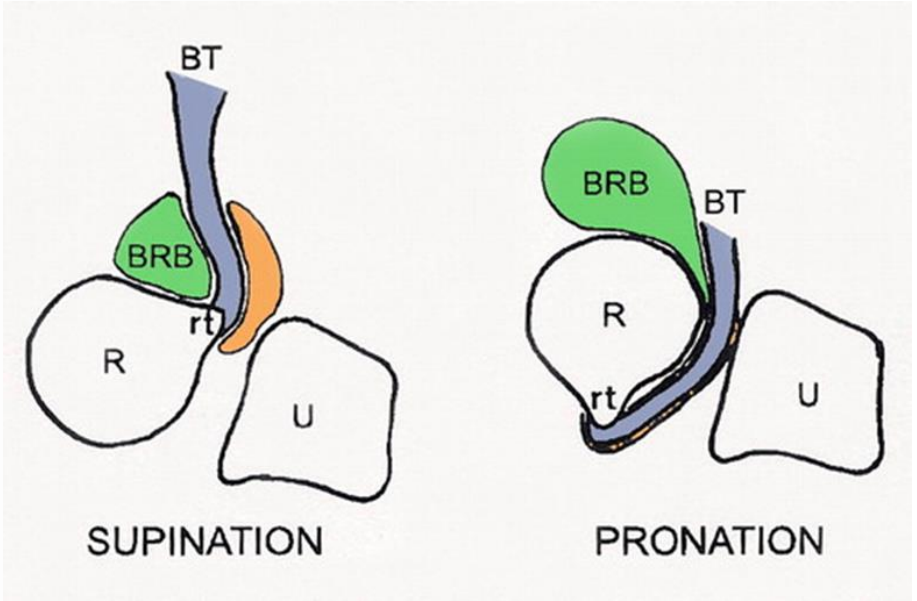
- “Antwerp biceps test” -

“**Biceps provocation test**”

- Elleboog in 70° flexie
- Flexie tegen weerstand
  - **Pronatie ++** (BPTp)
  - Supinatie (BPTs)

Klinisch onderzoek

- **Biceps Provocation test**
  - CAM effect in pronatie
  - Inklemming van de biceps en bursa
  - Partiele rupturen of distale biceps insertie-tendinopathie

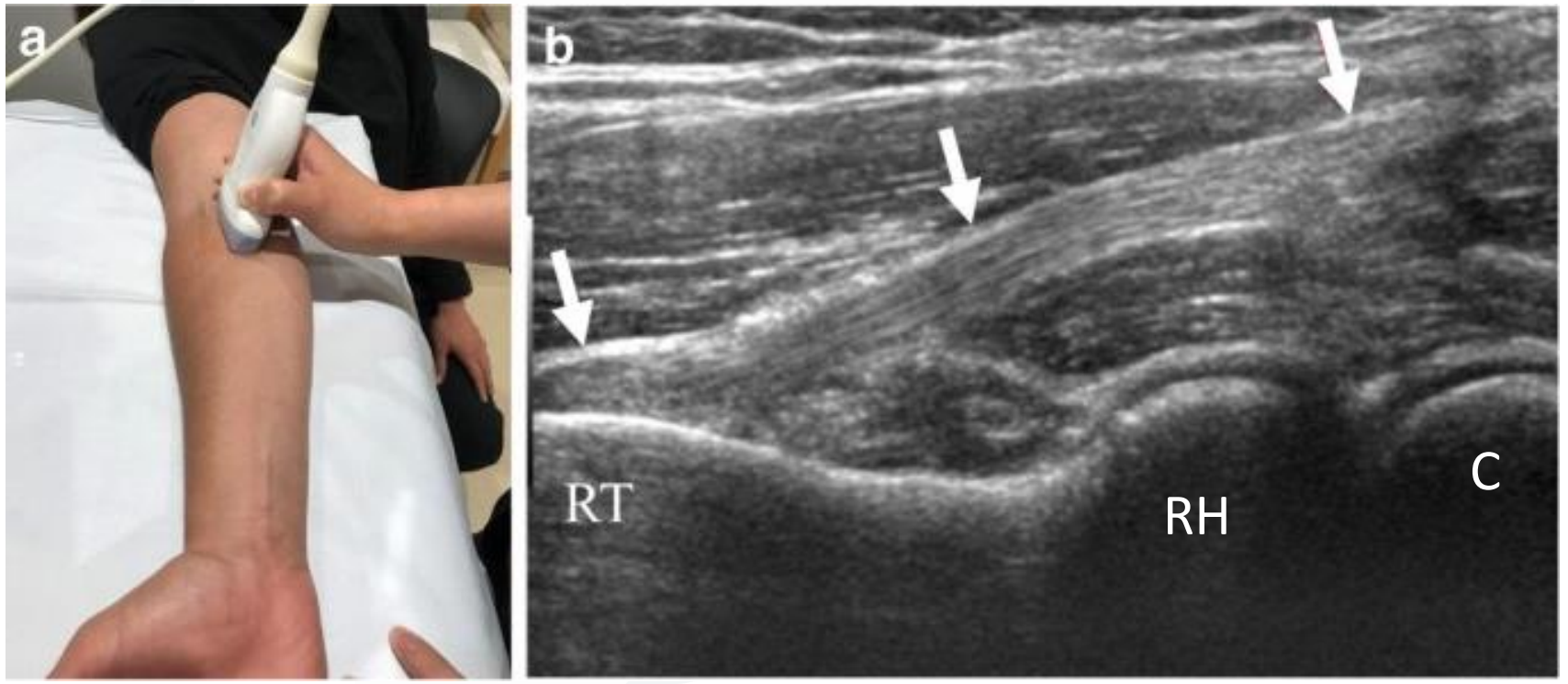


Beeldvorming

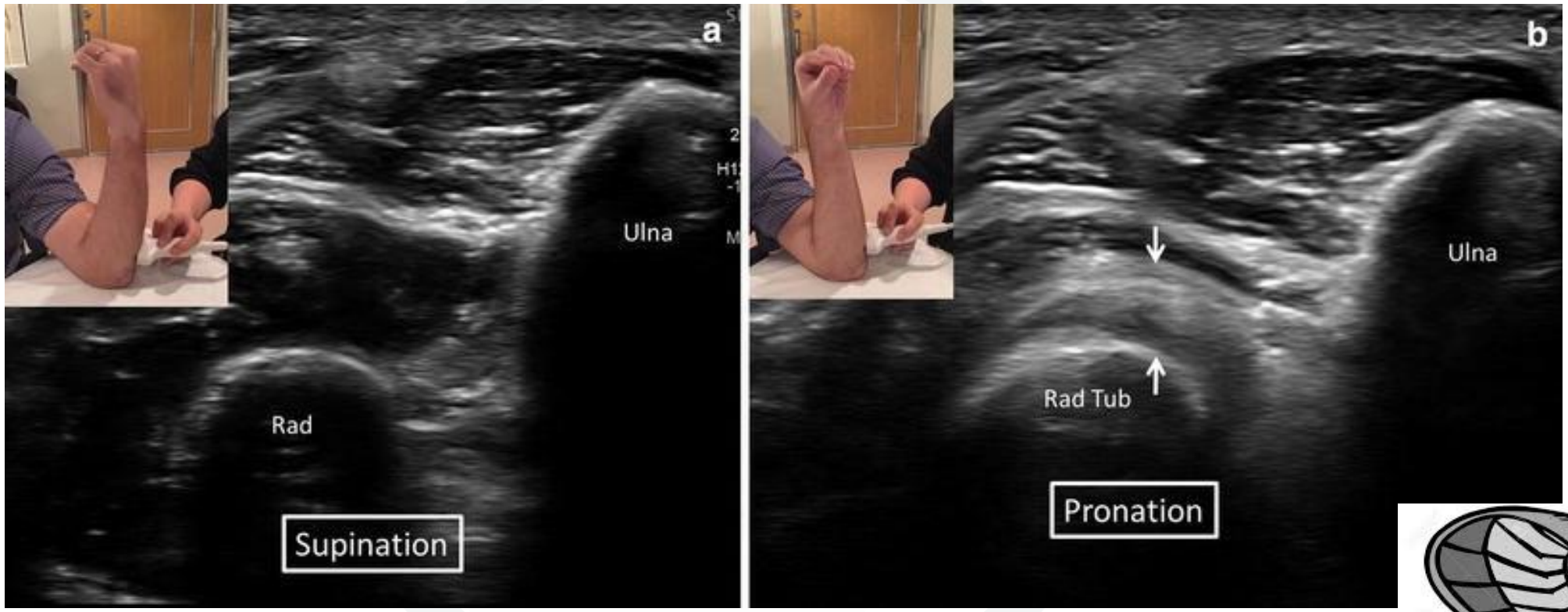
- RX
- Echografie
- MRI
  - Extensie
  - FABS view

Beeldvorming

- Echografie



Beeldvorming

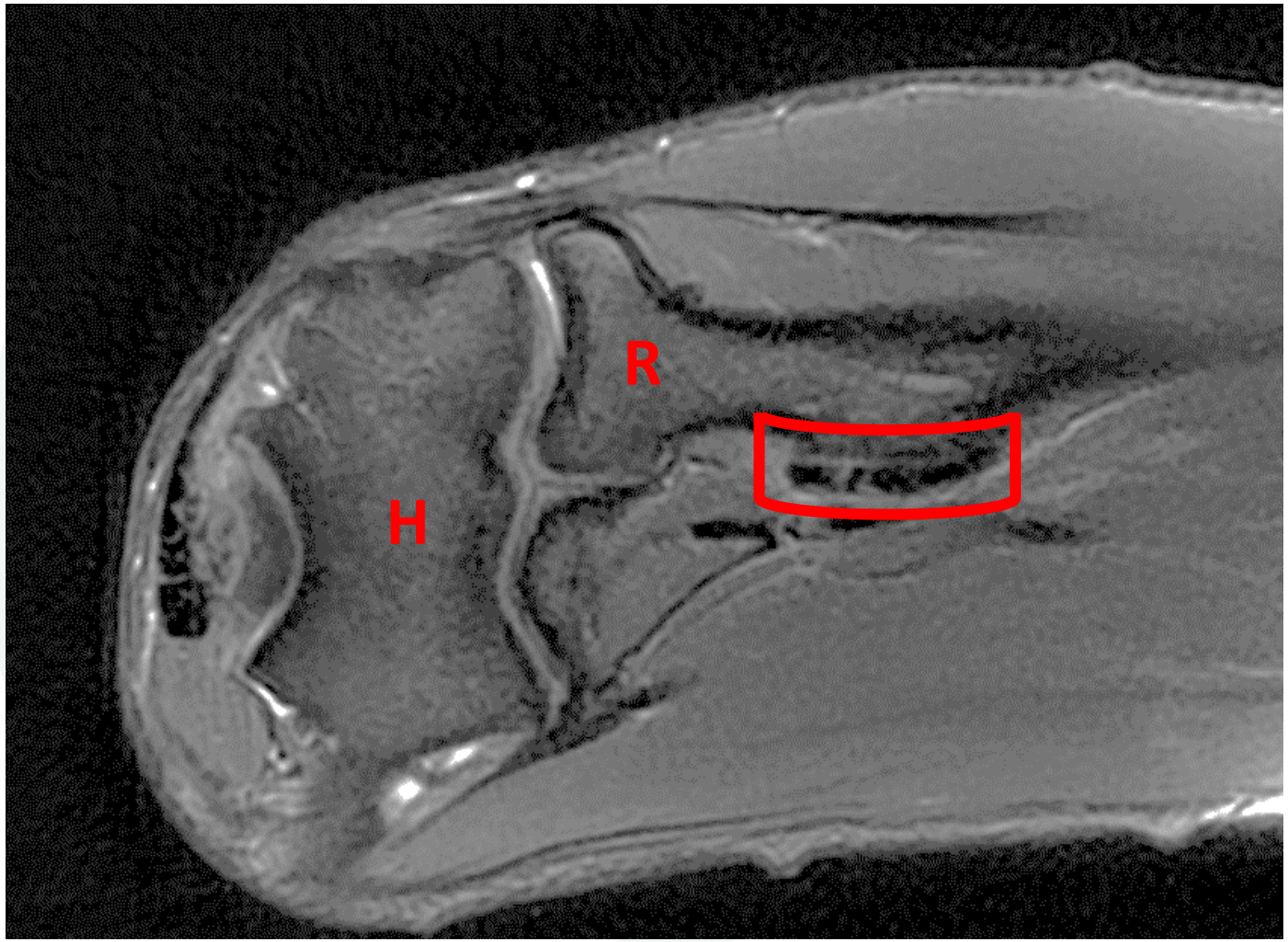


Beeldvorming

- MRI
  - Extensie
  - **FABS view !!**
    - **F**lexed elbow, **Ab**ducted shoulder, forearm **S**upinated

Beeldvorming

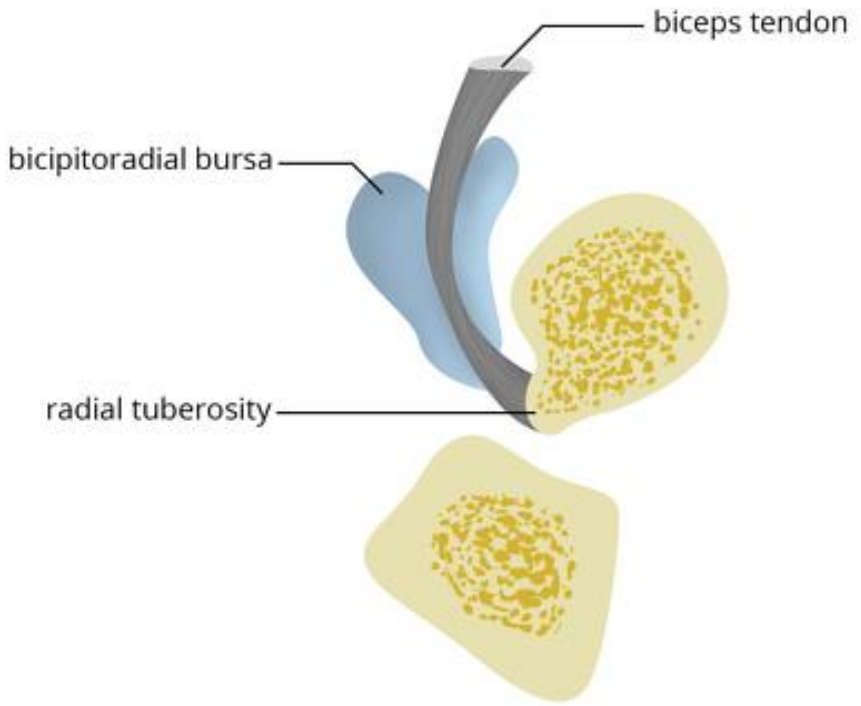
- MRI

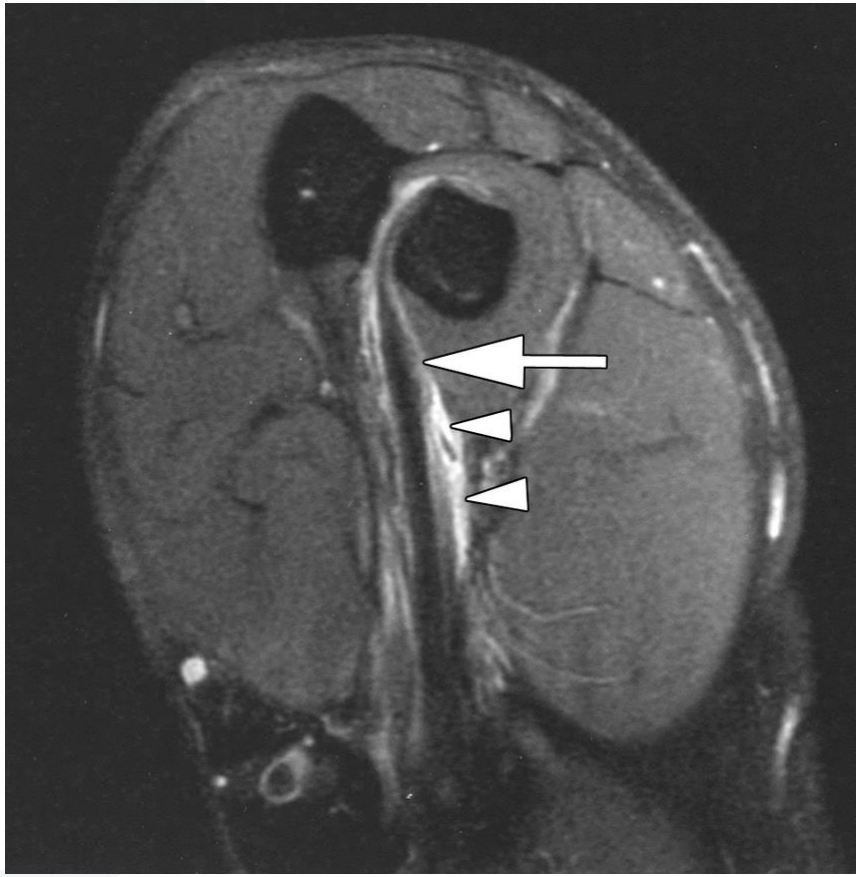


Spectrum

- Biceps tendinopathie
- Radio-bicipitale bursitis
- Distale bicepspees ruptuur
  - Partieel of compleet
  - Acuut (< 21d -4w) of chronisch (>21d – 4w)
  - Lacertus fibrosus?
  - Retractie?

Biceps tendinopathie +/- bursitis





Acute totale ruptuur

Acute distale biceps ruptuur

- 1.2 – 2.55 / 100.000 / jaar
- Mannen >>> vrouwen
- 40-60 jaar
- 52% dominante arm
- “Forced extension of an actively flexed and supinated elbow”

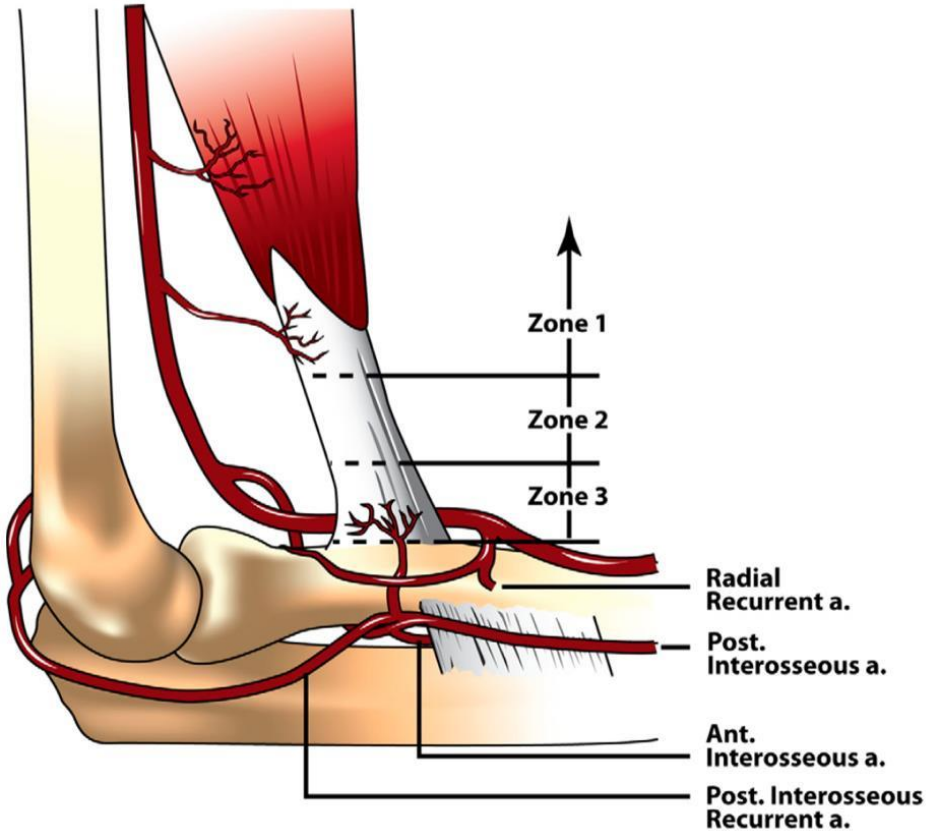
Acute distale biceps ruptuur

- Risk factors:
  - **Roken (tot 7 x)**
  - **Hoge BMI**
  - Zwaar fysiek werk
  - Anabole steroïde gebruikers

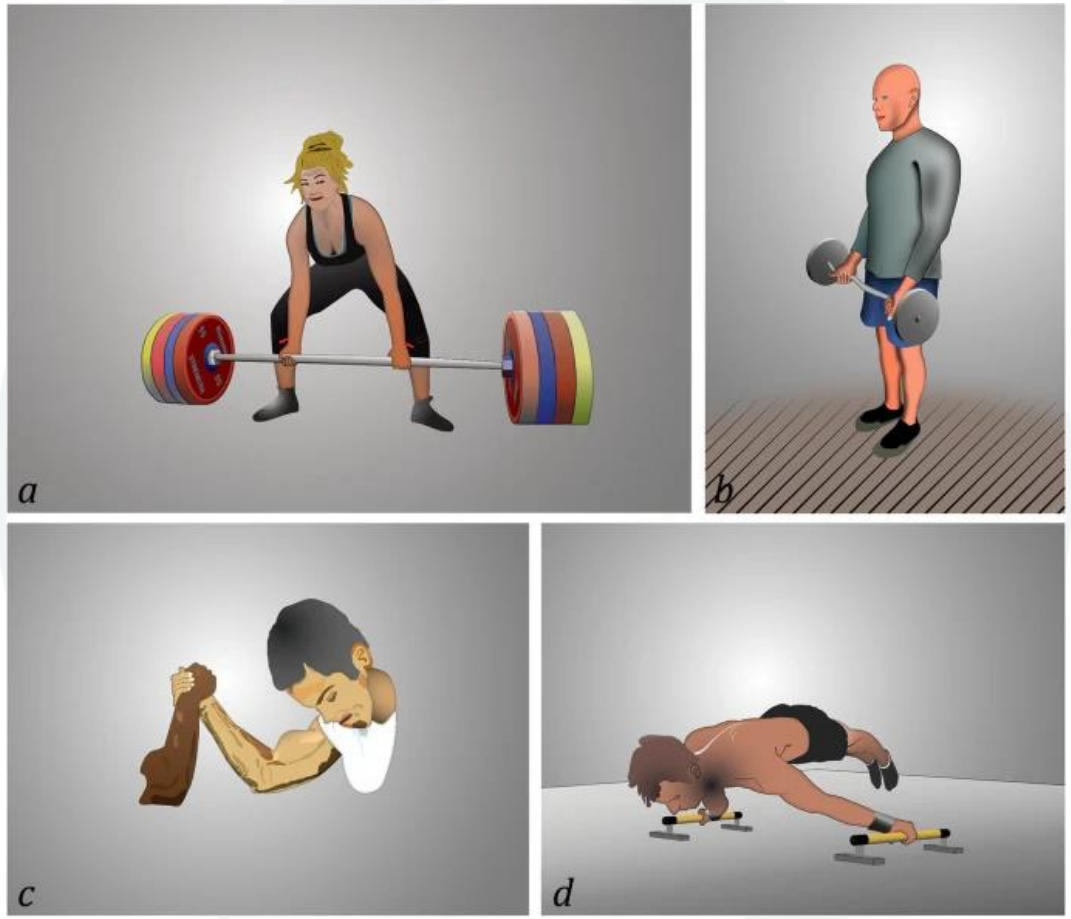
- Hypovascularisatie
- Intrinsieke degeneratie door mechanische impingement (CAM effect – tuberositas radii)

Acute distale biceps ruptuur

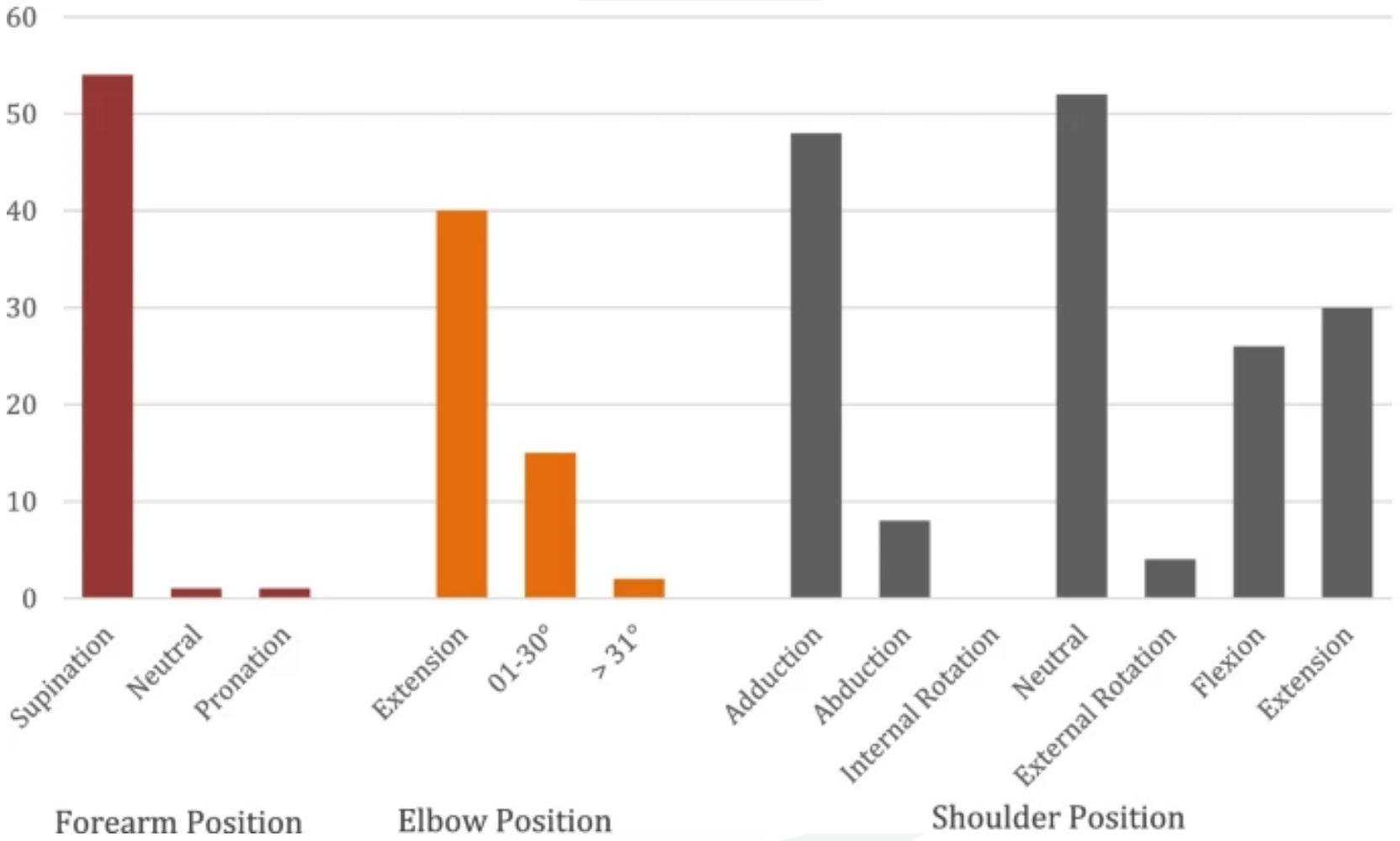
- Hypovascularisatie – ZONE 2



Acute distale biceps ruptuur bij sporters



Lappen, BMC Musculoskeletal Disorders 2022



Lappen, BMC Musculoskeletal Disorders 2022

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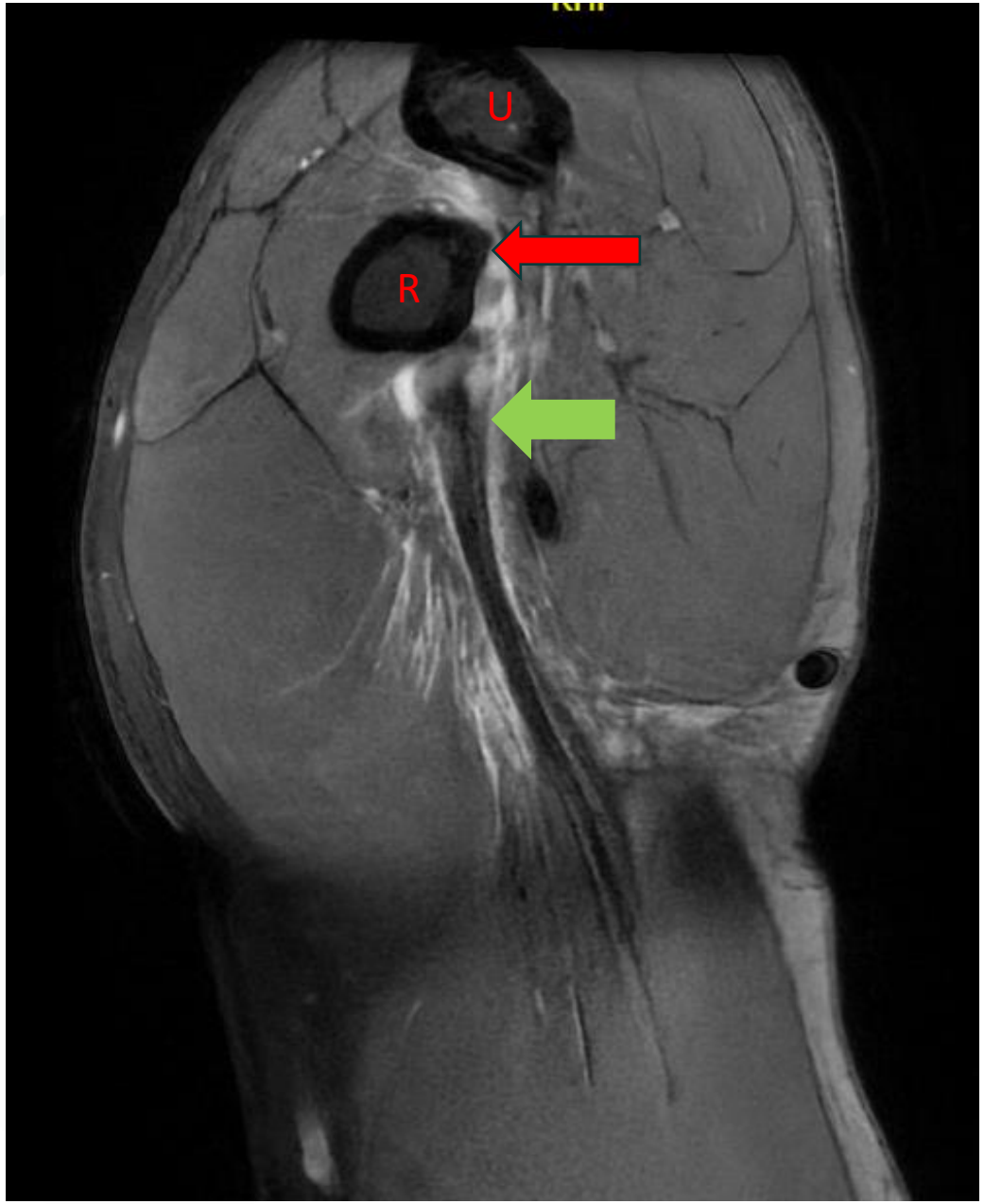
Kliniek acute distale biceps ruptuur

- In combinatie met een zwaar gewicht: Krak / pop / pijnscheut
- Haematoom en zwelling
- Hook test positief
- Fors verminderde supinatiekracht
- Cascade pro-supinatie onderbroken
- Biceps provocation test +

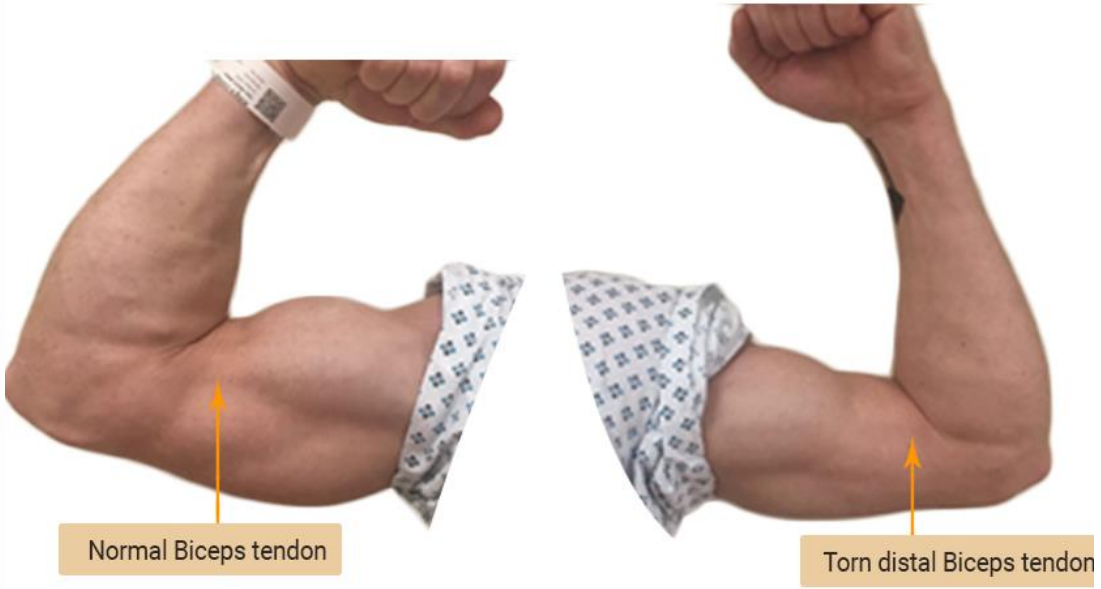
- Echografie
- MRI

- MRI FABS view



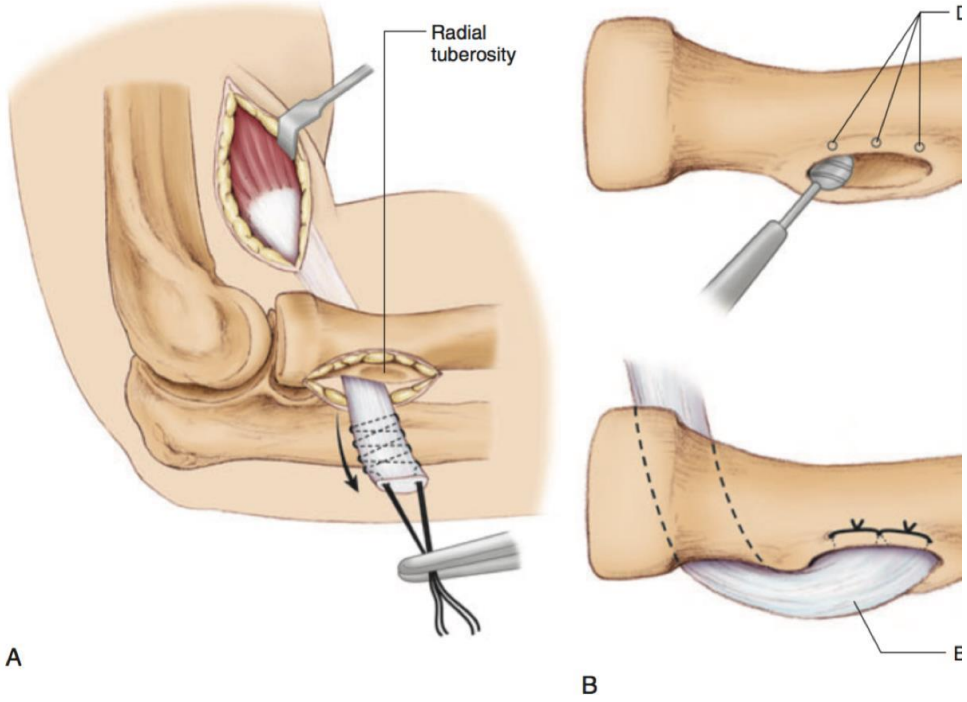
Conservatief beleid

- 60% verlies aan supinatiekracht
- 40% verlies aan flexiekracht
- Verlies aan uithoudingsvermogen
- Retractie: “reverse popeye ” +/- spierkrampen



Operatief beleid - controversie

- Single vs double incision
- Endobutton, ankers, interferentieschroef
- Revalidatie schema



Single vs double incision

- **Single incision**
  - Henry approach (anterieure toegang)
  - (+) Minimaal invasief
  - (+) Partiele letsels
  - (+) Uitbreiden voor chronische letsels / reconstructies
  - (-) Niet-anatomisch herstel (CAVE: Nervus radialis)

- **Double incision**
  - (+) Anatomische herstel → CAM effect: meer supinatiekracht en uithouding
  - Bone tunnel
  - (-) Laterale incisie → split van extensor loge → Heterotope ossificaties

Complicaties

- Tot **25 %**
- Majeure vs mineure

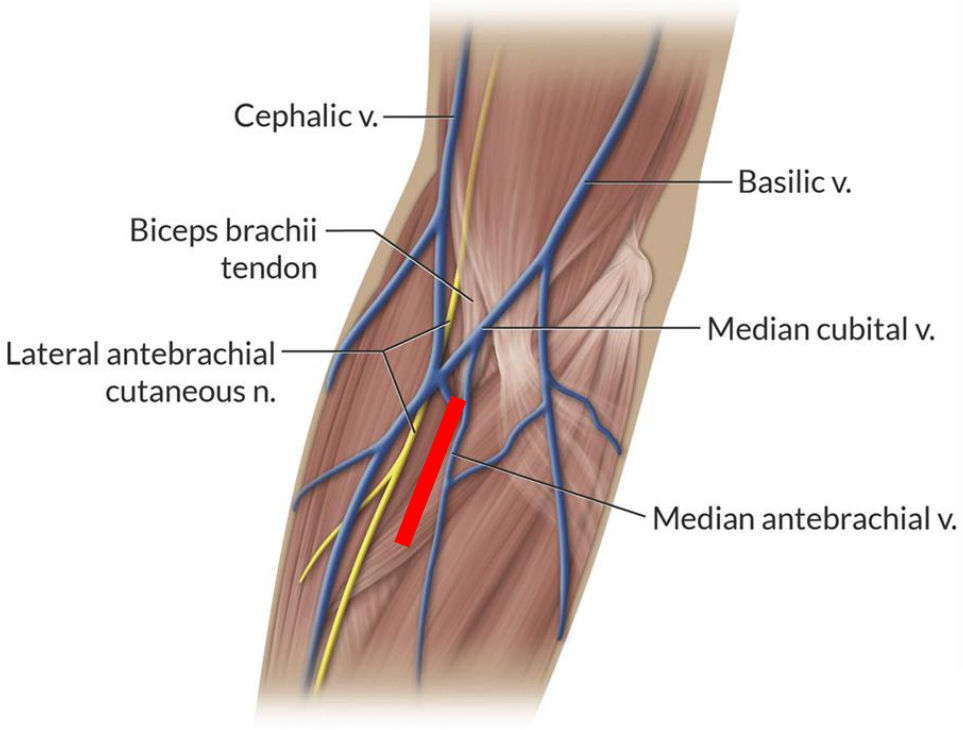
Table 2. Complications after biceps tendon repair separated by fixation method and approach[37,46]

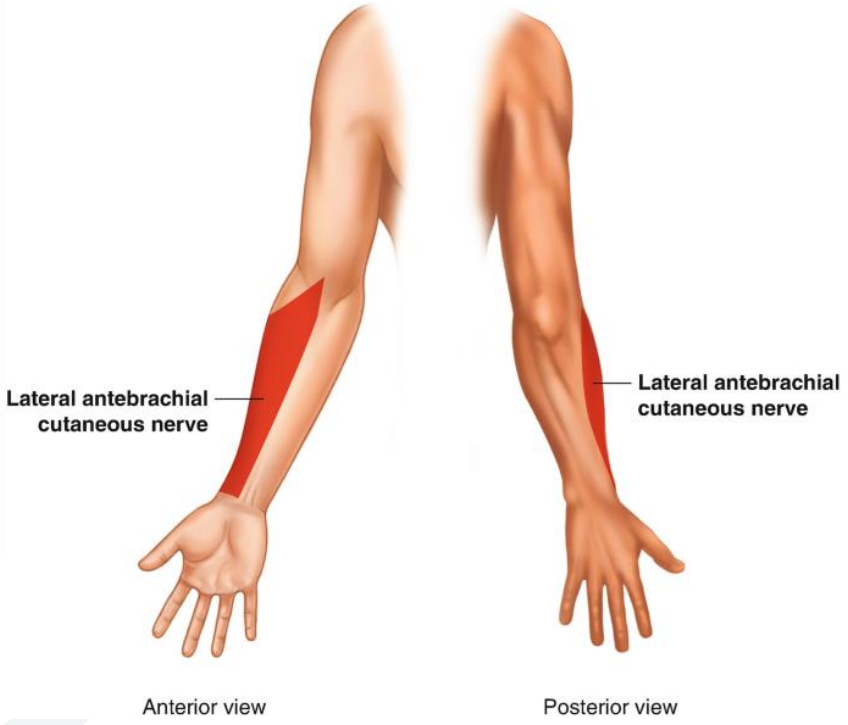
	Suture anchors	Cortical button	Interference screw	Button and screw	Bone tunnels	Single-incision	Double-incision
Major							
PIN palsy	1.7%	3.3%	2.9%	0.9%	1.7%	4.6%	1.6%
R-U synostosis	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%	2.3%
Rerupture	1.7%	0.8%	1.5%	0.9%	1.2%	1.8%	1.2%
Minor							
LABCN paresthesia	7.7%	18.6%	13.0%	8.0%	5.9%	11.6%	5.8%
SRN paresthesia	4.2%	3.3%	1.5%	4.9%	0.5%	0.6%	0.0%
HO	5.4%	6.1%	5.8%	1.5%	4.9%	3.1%	7.0%
Stiffness	1.7%	0.6%	0.0%	0%	0.9%	1.8%	5.7%
Total	22.4%	32.8%	24.6%	16.4%	16%	23.9%	25.7%

Note. HO, heterotopic ossification; LABCN, lateral antebrachial cutaneous nerve; PIN, posterior interosseous nerve; R-U, radioulnar; SRN, superficial radial nerve.

Caekebeke, EFORT , 2021

Neuropraxie LACN





TRANSIENT !!

Heterotope ossificatie

■ SYSTEMATIC REVIEW

Single- versus double-incision technique for the treatment of distal biceps tendon rupture

A SYSTEMATIC REVIEW AND META-ANALYSIS OF COMPARATIVE STUDIES

D. Castioni,
M. Mercurio,
D. Fanelli,
O. Cosentino,
G. Gasparini,
O. Galasso

Aims

The aim of this systematic review and meta-analysis is to evaluate differences in functional outcomes and complications between single- (SI) and double-incision (DI) techniques for the treatment of distal biceps tendon rupture.

- 606 → 13 vergelijkende studies
- 2622 distale biceps herstel
  - 1825 Single incision vs. 797 Double incision
- Range of motion
- Functional outcomes
- Complicaties

Single vs double incision

- **Single** incision
  - GROTERE 'Range of motion' (flexie en pronatie)
  - LAGERE incidentie van HO -> minder revisie chirurgie
- **Double** incision
  - LAGER risico op neuropraxie van LACN
- Geen verschil in **re-ruptuur** of letsel van nervus **radialis** (nervus interosseus posterior)
- DASH / ASES / PREE / kracht (**functional** outcomes) zijn gelijk

Table 1. Clinical and functional outcomes[43-45]

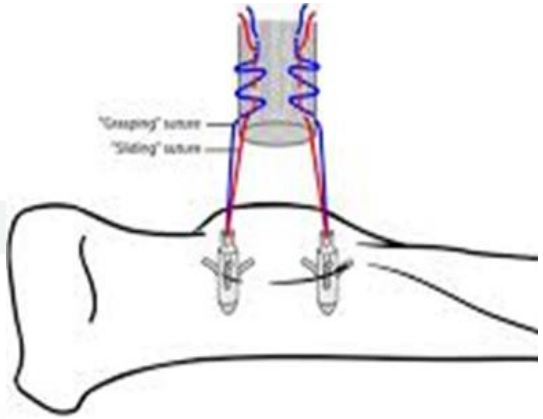
	Single-incision	Double-incision
Flexion	134.5 ± 6.9	131.8 ± 9.1
Extension	3.0 ± 4.3	1.9 ± 4.6
Pronation	76.7 ± 8.2	72.4 ± 12.6
Supination	63.9 ± 12.5	59.5 ± 11.5
ASES pain score	4.6 ± 8.0	4.4 ± 8.5
ASES function score	32.6 ± 5.2	34.6 ± 3.7
DASH score	7.8 ±12.9	5.5 ± 11.8
PREE score	6.1 ± 14.6	4.9 ± 13.0
Supination strength	**Non-anatomical reinsertion**	**Anatomical reinsertion**
Strength: 60 pronation	101.2% ± 19.5%	94.0% ± 12.0%
Strength: 0 neutral	89.6% ± 21.9%	92.2% ± 6.9%
Strength: 60 supination	66.9% ± 18.3%	81.3% ± 16.4%

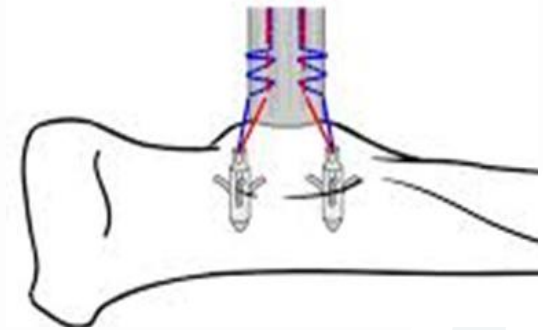
Note. ASES, American Shoulder and Elbow Surgeons score; DASH, Disabilities of the Arm, Shoulder and Hand score; PREE, patient-rated elbow evaluation score.

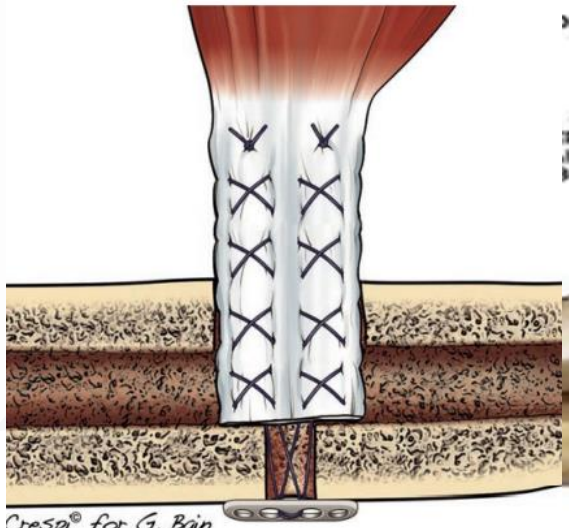
Caekebeke, EFORT , 2021

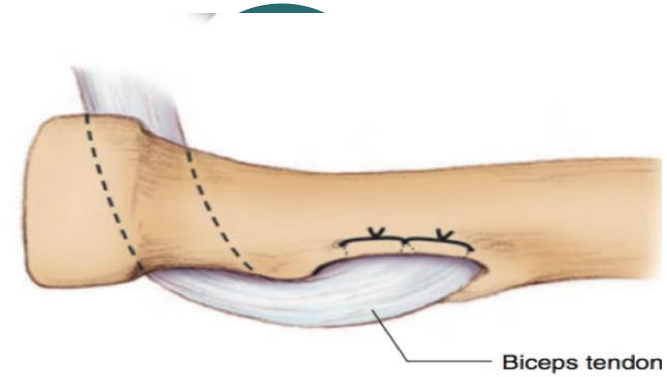
Fixatie techniek

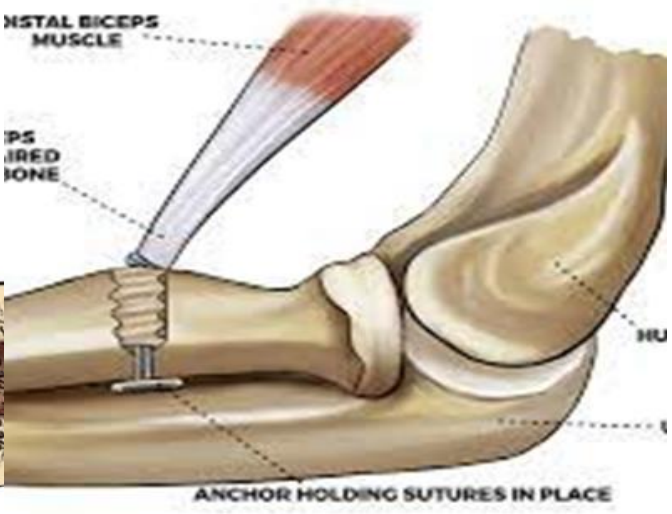
- Ankers
- Bone tunnel
- Corticale button
  - Intra-medullair
  - Extra-medullair
- Interferentie schroef











EFORT open reviews

Acute complete and partial distal biceps tendon ruptures: what have we learned? A review

Pieter Caekebeke[1]
Joris Duerinckx[1]
Roger van Riet[2,3]

Table 4. Biomechanical evaluation of fixation methods for distal biceps tendon repair

		Intact tendon	Suture anchors	Transosseous bone tunnels	Interference screw	Bicortical button	Double intramedullary button	Single custom intramedullary button
Mazzocca et al[47]	Load to failure (N)	/	381	310	232	440	/	/
	Stiffness (N/mm)	/	/	/	/	/	/	/
Idler et al[48]	Load to failure (N)	204.3 ± 76.9	/	124.9 ± 22.8	178.0 ± 54.5	/	/	/
	Stiffness (N/mm)	30.1 ± 12.4	/	15.9 ± 5.6	30.4 ± 9.5	/	/	/
Siebenlist et al[51]	Load to failure (N)	/	200 ± 120	/	/	/	312 ± 76	/
	Stiffness (N/mm)	/	55.9 ± 21.3	/	/	/	67.1 ± 11.7	/
Caekebeke et al[54]	Load to failure (N)	/	/	/	/	296 ± 97	/	356 ± 37
	Stiffness (N/mm)	/	/	/	/	58.2 ± 9.2	/	61.1 ± 9.7

EFORT open reviews

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	Stiffness (N/mm)	/	/	/	/	58.2 ± 9.2	/	61.1 ± 9.7

Load **biceps** 90° flexie - tegen **zwaartekracht = 50 N**

Timing van herstel

- **ACUUT** < 21 dagen – 4 weken < **LAATTIJDIG**

- Kracht =
- Range of motion =
- Functional outcomes =
- Retractie van de pees → High flexion fixation
- Complicaties ↑
  - Dissectie moeilijker ~ LACN

- **High flexion fixation**

- Spier relaxatie → volledig herstel op 2 - 6 weken

Revalidatie

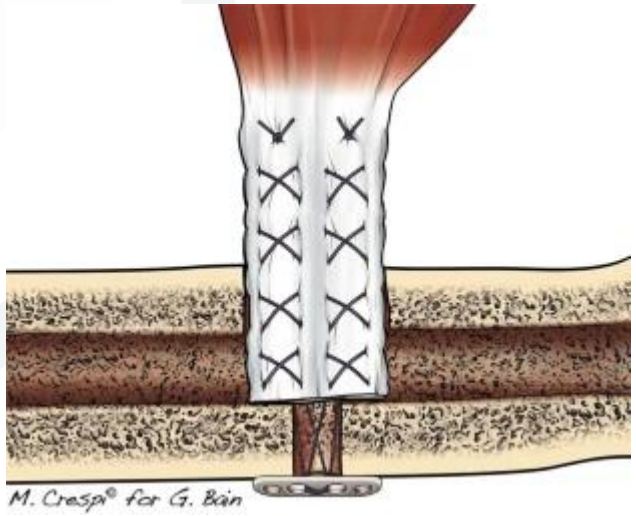
- **Pees ingroei**
  - Tot 12 weken
- **Load to failure**
  - Endobutton > ankers
- **Gap formation**
- **Bone socket (inlay)**
  - Maximaal contact oppervlakte
  - Voorkomt gapping
  - Vroegtijdige mobilisatie toegestaan

Table I Summary of results

	Endobutton	Suture anchor	*P* value
Displacement (mm)			
After 1000 Cycles	2.58 (1.72)	2.06 (0.71)	*P* = .20
At UTL	13.85 (4.44)	7.46 (5.58)	*P* = .01*
Stiffness (N/mm²)			
At 5th cycle	90.07 (24.05)	70.73 (70.73)	*P* = .01*
At 905th cycle	93.91 (29.48)	76.51 (19.70)	*P* = .07
Failure testing	80.07 (29.58)	72.12 (24.75)	*P* = .26
Loading to failure			
Ultimate tensile load (N)	274.77 (98.55)	230.06 (86.48)	*P* = .12
Clinical failure (N)	249.95 (86.40)	209.56 (65.91)	*P* = .13
Energy absorbed at UTL (mJ)	2919 (1401)	1399 (1467)	*P* = .02*

Data are presented as mean (SD).

*Statistically significant.



Herstel

- **Orthoclinic** - Brugge
  - Single incision: endobutton
  - Double incision: bone tunnel/endobutton
- POSTOP:
  - 2 weken: drukverband + afneembare elleboogspalk
  - Automobilisatie
  - NSAIDs: preventie van heterotope ossificatie.
  - Kinésitherapie +/-
  - Krachtsvebod 3 maanden.

TAKE HOME MESSAGE – ACUTE DBR

- **Eccentrische** contractie biceps , in **supinatie**
- MRI met **FABS** view
- Conservatief : verlies aan kracht en uithouding
- **Operatief**: Single = Double incision
- **Endobutton**: grootste ‘Load to failure’
- **Bone socket** / inlay repair: voorkomt gapping
- Snellere mobilisatie en revalidatie
- **NSAIDs** ter preventie van HO

THANK YOU

Merci

Vragen

pieter.pierreux@hotmail.com

MERCI