

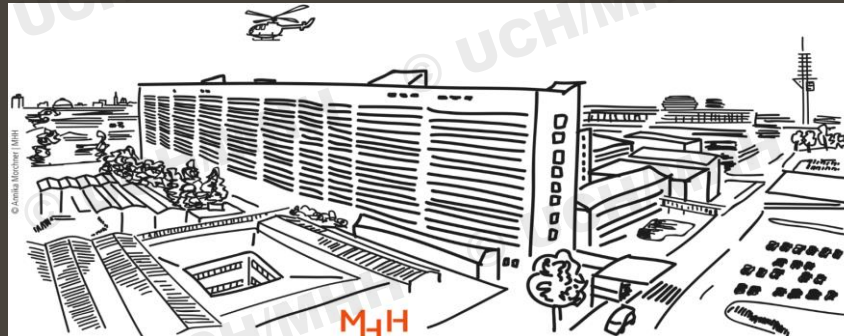


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CHIRURGISCHE  
PRAXISKLINIK  
BRAUNSCHWEIG

ORTHOPÄDISCH-  
CHIRURGISCHE  
PRAXIS  
HELMSTEDT

# Oberarmkopffregister - ein rationaler Ansatz zur Behandlung der proximalen Oberarmfraktur im Alter

70. Unfallseminar der Klinik für Unfallchirurgie der Medizinischen Hochschule Hannover

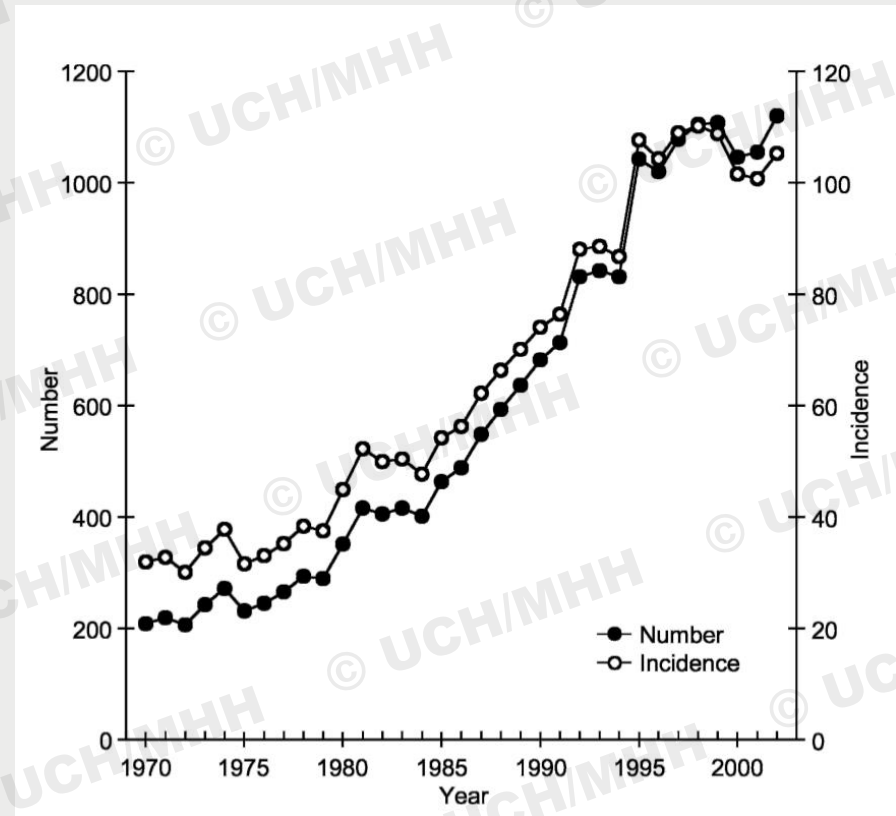


# Einleitung

## Update in the Epidemiology of Proximal Humeral Fractures

*Mika Palvanen, MD, PhD\*<sup>†</sup>; Pekka Kannus, MD, PhD\*<sup>†</sup>; Seppo Niemi\*<sup>‡</sup>; and Jari Parkkari, MD, PhD<sup>‡</sup>*

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH  
Number 442, pp. 87–92  
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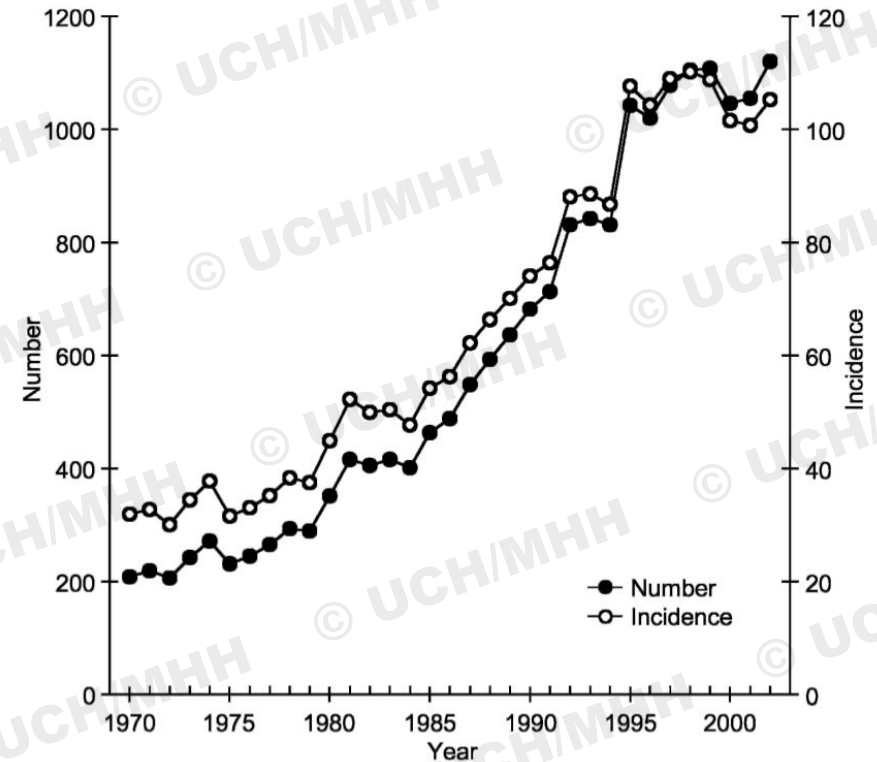


Anstieg der Inzidenz bei hospitalisierten Pat. von 32 auf 105 bei > 60a in Finnland

## Update in the Epidemiology of Proximal Humeral Fractures

*Mika Palvanen, MD, PhD\*;* *Pekka Kannus, MD, PhD\*†;* *Seppo Niemi\*;* and *Jari Parkkari, MD, PhD‡*

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Number 442, pp. 87–92  
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Im Regressionsmodell unter Berücksichtigung der demografischen Veränderungen  
**Verdreifachung der Inzidenz bis zum Jahr 2030**

# Einleitung

Hemmann et al. *Journal of Orthopaedic Surgery and Research* (2020) 15:65  
<https://doi.org/10.1186/s13018-020-1580-4>

Journal of Orthopaedic  
Surgery and Research

RESEARCH ARTICLE

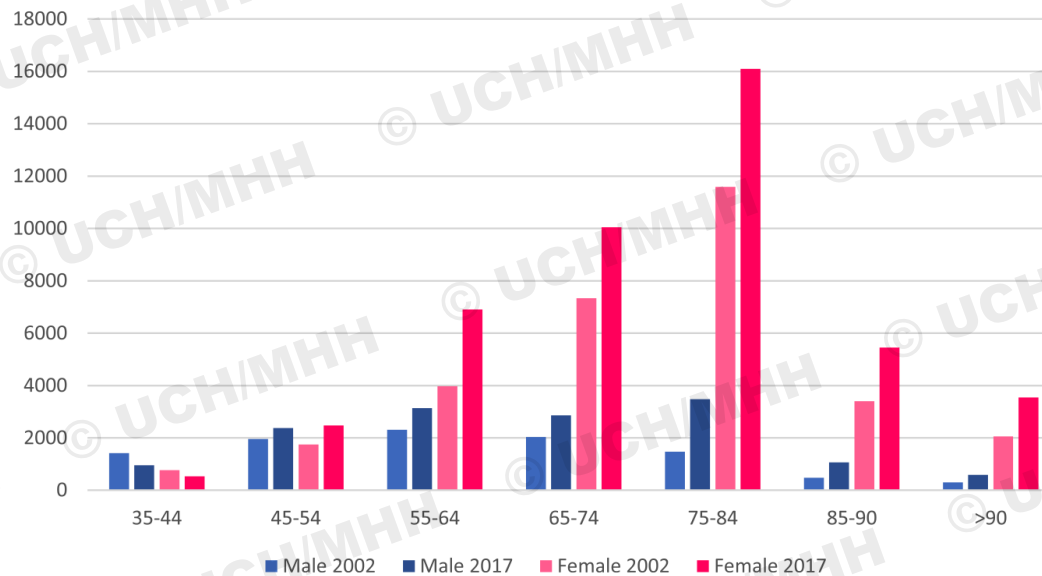
Open Access

## Trends in fracture development of the upper extremity in Germany—a population-based description of the past 15 years



P. Hemmann\*, P. Ziegler, C. Konrads, A. Ellmerer, T. Klopfer, A. J. Schreiner and C. Bahr

Total count of proximal humeral fractures in men and women for 2002 and 2017



**Fig. 1** Total count of proximal humeral fractures in men and women for 2002 and 2017

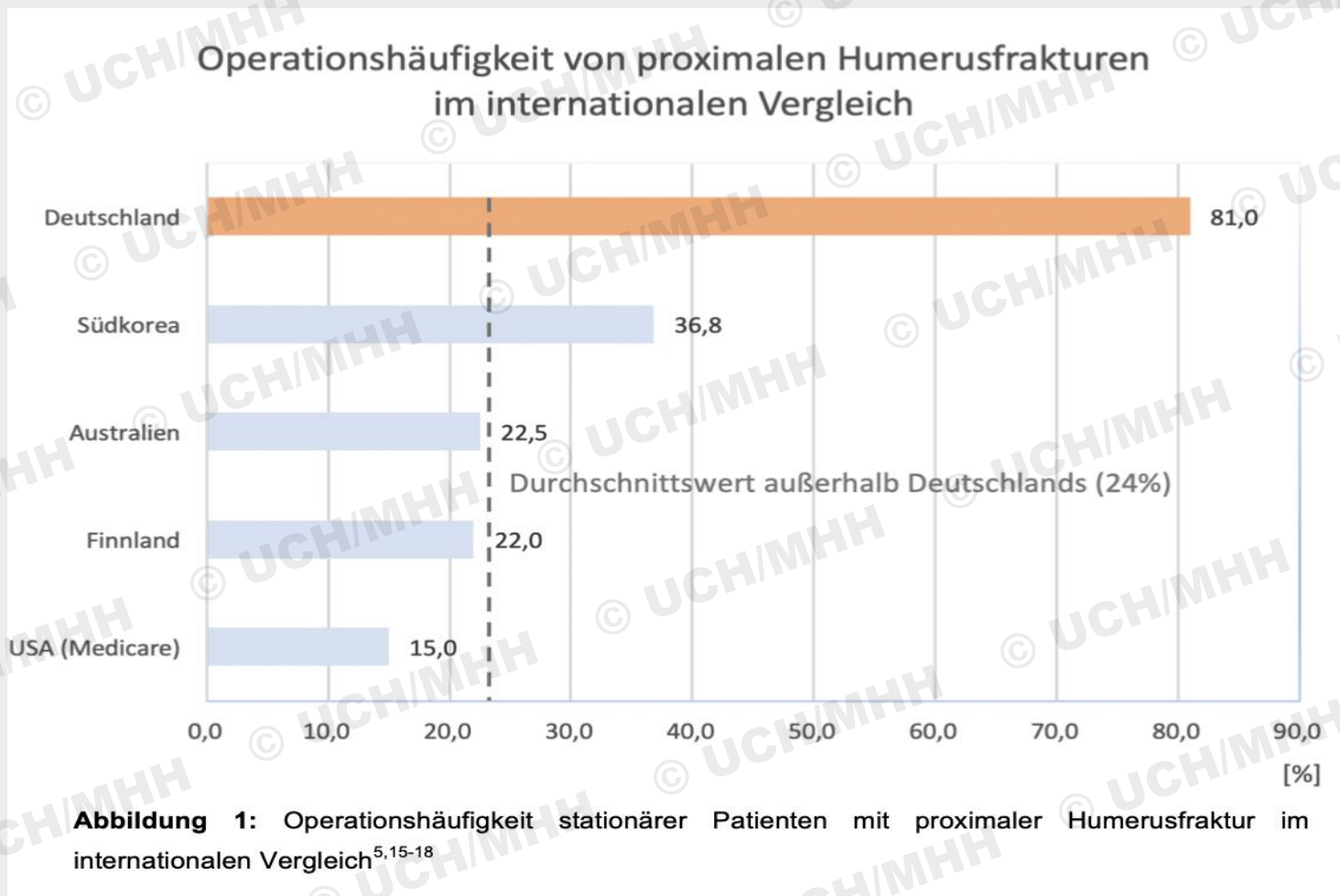
## Hip Fractures

Hip fractures (femoral neck and intertrochanteric) from simple falls, are among the most common injuries in the elderly. The incidence of hip fractures increases with age, and women, probably because of their smaller bone mass, are most at risk. Hip fractures are often treated with open or internal fixation. In a study of 1,000 Medicare patients treated surgically, mortality rates were very high, 30% at one year. Mortality rates were comparable for those treated non-operatively (17% at 30 days, 39% at one year).

**Konsens???**

## Treatment of Proximal Humerus Fractures

The large majority of patients with proximal humerus fractures are treated without surgery, generally with a sling that immobilizes the arm and shoulder. Although there is disagreement about indications for surgical repair, surgery is most often performed for patients with displaced (separated) fractures, in the hope that better anatomic alignment will improve long-term shoulder function. In 1996-97, the proportion of surgical repair of proximal humerus fracture varied by a factor of almost ten, from 6.4% of all proximal humerus fractures to 60.0%.





# Fälle – oder eher Grenzfälle?

Nonsensus in the treatment of proximal humerus fractures:  
uncontrolled, blinded, comparative behavioural analysis  
between Homo chirurgicus accidentus and Macaca sylvanus

Sam Razaean,<sup>1</sup> Birgitt Wiese,<sup>2</sup> Dafang Zhang,<sup>3</sup> Afif Harb,<sup>1</sup> Christian Krettek,<sup>1</sup> Nael Hawi<sup>1</sup>

doi: 10.1136/bmj.m4429 | *BMJ* 2020;371:m4429 | [thebmj](https://www.bmj.com)



Professional experience as senior physician	<5 years	≥5 years	>10 years	>15 years	>20 years
All experts	2	1	3	2	2
United States	2	0	1	1	1
Germany	0	1	2	1	1

	Recommended treatment		Preferred surgical procedure						
	Non-operative	Operative	Locking plate	Cement augmented locking plate	Intramedullary nail	Hemi-arthroplasty	Reverse shoulder arthroplasty	Allograft augmented locking plate	Something else
Case 1, aged 52 ♂	0	10	6	1	1	0	0	2	0
Case 2, aged 44 ♀	1	9	5	0	2	0	0	2	1
Case 3, aged 55 ♀	5	5	6	0	2	0	0	1	1
Case 4, aged 60 ♀	5	5	5	0	1	0	0	2	2
Case 5, aged 62 ♀	2	8	1	0	0	3	4	0	2
Case 6, aged 77 ♀	9	1	3	1	1	0	1	0	4
Case 7, aged 60 ♀	0	10	1	0	0	1	7	0	1
Case 8, aged 86 ♀	9	1	1	0	1	2	5	1	0
Case 9, aged 80 ♀	8	2	1	0	2	1	2	2	2



# Fall I, 62 Jahre, berufstätig



# Fall 1, 62 Jahre, berufstätig



	Recommended treatment		Preferred surgical procedure						
	Non-operative	Operative	Locking plate	Cement augmented locking plate	Intramedullary nail	Hemi-arthroplasty	Reverse shoulder arthroplasty	Allograft augmented locking plate	Something else
Case 5, aged 62 ♀	2	8	1	0	0	3	4	0	2

## Clinical Orthopaedics and Related Research<sup>®</sup>

A Publication of The Association of Bone and Joint Surgeons<sup>®</sup>

- n=69
- Minimum follow-up 2 years
- 48 ± 15 years
  
- **Results:**
  - Constant score 68 ± 12
  - 21 % had a Constant score < 55
  - 21 % experienced avascular necrosis
  - 15% with either nonunion or avascular necrosis underwent revision shoulder arthroplasty
  
- **Confounding variables:**
  - being a woman
  - four-part fracture dislocations
  - absence of a metaphyseal head extension
  - absence of active back-bleeding from the humeral head
  - height of the head segment
  - absence of capsular attachments to the head fragment

**What Factors Are Associated with Poor Shoulder Function and Serious Complications after Internal Fixation of Three-part and Four-part Proximal Humerus Fracture-dislocations?**

Date submitted: 11 October 2021. Date accepted: 7 March 2022.

# Prothese?



## **Clinical Outcomes of Reverse Total Shoulder Arthroplasty for Elective Indications versus Acute Three and Four-Part Proximal Humerus Fractures: A Systematic Review and Meta-Analysis**

- Systematic Review
- 11,651 elective versus 3,117 fracture cases
- RTSA-F ... significantly lower Constant scores
- RTSA-F ... significantly lower ROM
- RTSA-F ... significantly higher tuberosity complications

# Prothese?

## Research Article

### Shoulder Arthroplasty for a Fracture Is Not the Same as Shoulder Arthroplasty for Osteoarthritis: Implications for a Bundled Payment Model

*J Am Acad Orthop Surg* 2019;27:927-932

DOI: 10.5435/JAAOS-D-18-00268

Copyright 2019 by the American Academy of Orthopaedic Surgeons.

#### Multivariate Analysis Showing Postoperative Outcomes for Total Shoulder Arthroplasty Done for a Fracture Versus Degenerative Arthritis

Outcome	Odds Ratio [95% CI]	P Value
Length of stay of >2 d	2.39 [1.97-2.92]	<0.001
Surgical complications	2.44 [1.31-4.55]	0.005
Revision surgeries	2.41 [1.26-4.62]	0.008
Medical complications	3.58 [2.72-4.72]	<0.001
Pulmonary embolism	3.62 [1.31-10.02]	0.013
Bleeding transfusions	4.55 [3.29-6.27]	<0.001
Non-home discharge	3.01 [2.42-3.74]	<0.001
30-d readmissions	2.14 [1.41-3.26]	<0.001
30-d mortality	0.48 [0.05-4.58]	0.520



- 1) Initiale Sichtung der Patienten über die ZNA
- 2) Röntgen + CT
- 3) Entscheidung OP versus konservativ
- 4) Verlaufskontrollen
  - T0** Woche 1
  - T1** Woche 3
  - T2** Woche 6
  - T3** Woche 12
  - T4** 6 Monatskontrolle
  - T5** 12 Monatskontrolle
- 5) Standardisiertes Nachbehandlungsschema

# Hannover Humerus Register

## Nach/behandlung

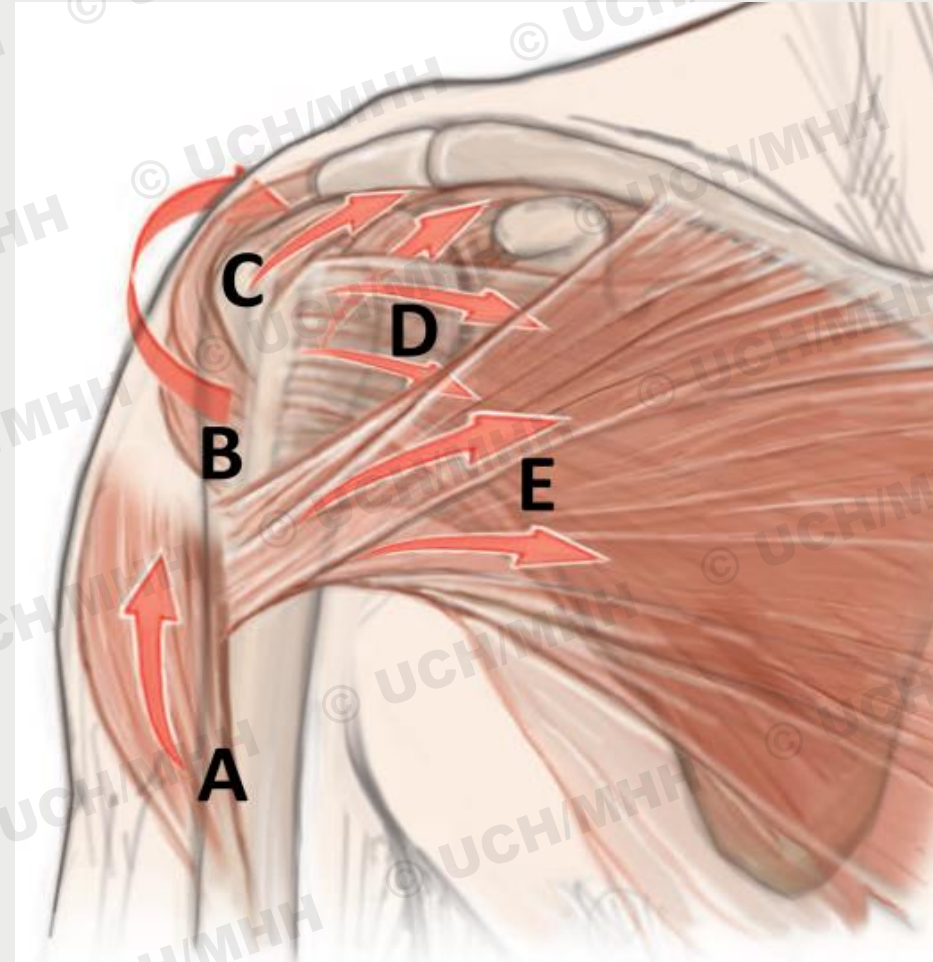


- Phase 1 (Woche 1)
  - Ruhigstellung, Analgesie und Abschwellung
- Phase 2 (Woche 2-3) Ziel: passive Beweglichkeit
  - Verband: Im Idealfall Umstieg auf Schultertasche
  - Übungen/Körperpflege: Beginn mit Pendelübungen aus der Schultertasche heraus und geführte passive Bewegungen mit Hilfe des kontralateralen Armes
- Phase 3 (Woche 4-6) Ziel: aktive Beweglichkeit
  - Verband: Jegliche Hilfsmittel/Orthesen werden teilweise oder ganz weggelassen werden
- Phase 4 (Woche 7-12) Ziel: Reintegration in den Alltag



# Hannover Humerus Register Reposition und Retention

1. Frakturmorphologie
2. auf die PHF wirkenden dislozierenden Muskel- kräfte („deforming forces“)
3. Einflussmöglichkeiten lediglich auf die körperstammfernen Anteile des Oberarmes
4. Anlage unter Bildwandler- Kontrolle in aufrecht sitzender, vorzugsweise stehender Position



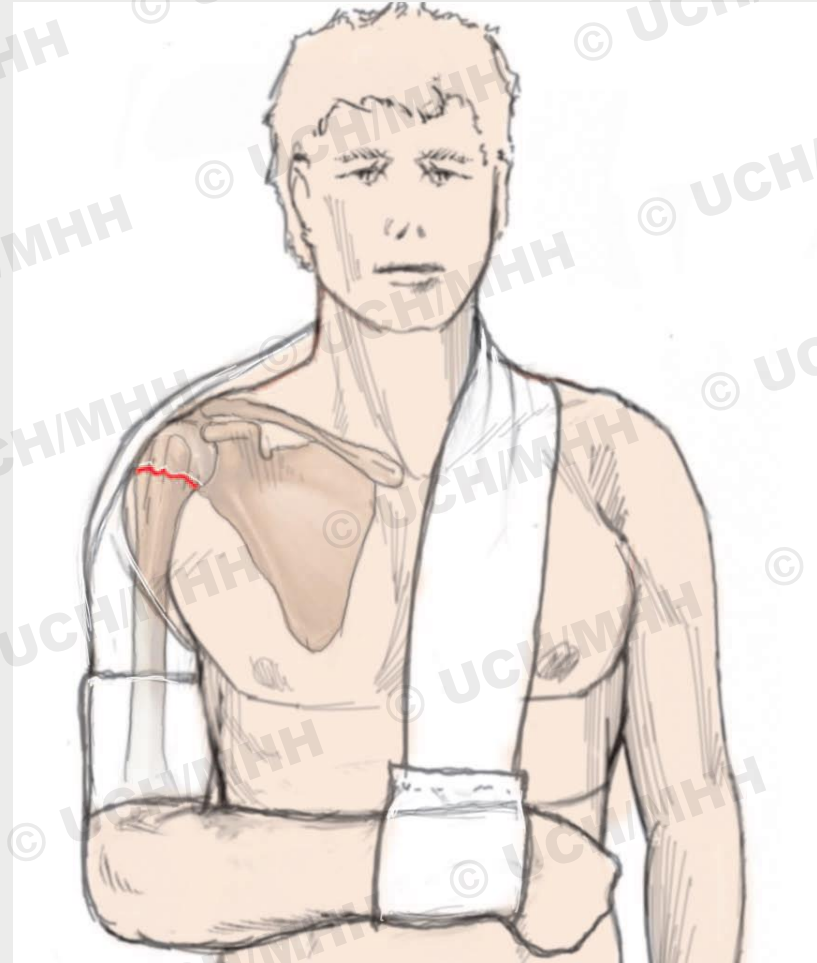
# Röntgenbilder im Stehen



# Hannover Humerus Register Gilchrist



- stabile Fraktur
- Grundlage für vielfältige Modifikationen dienen

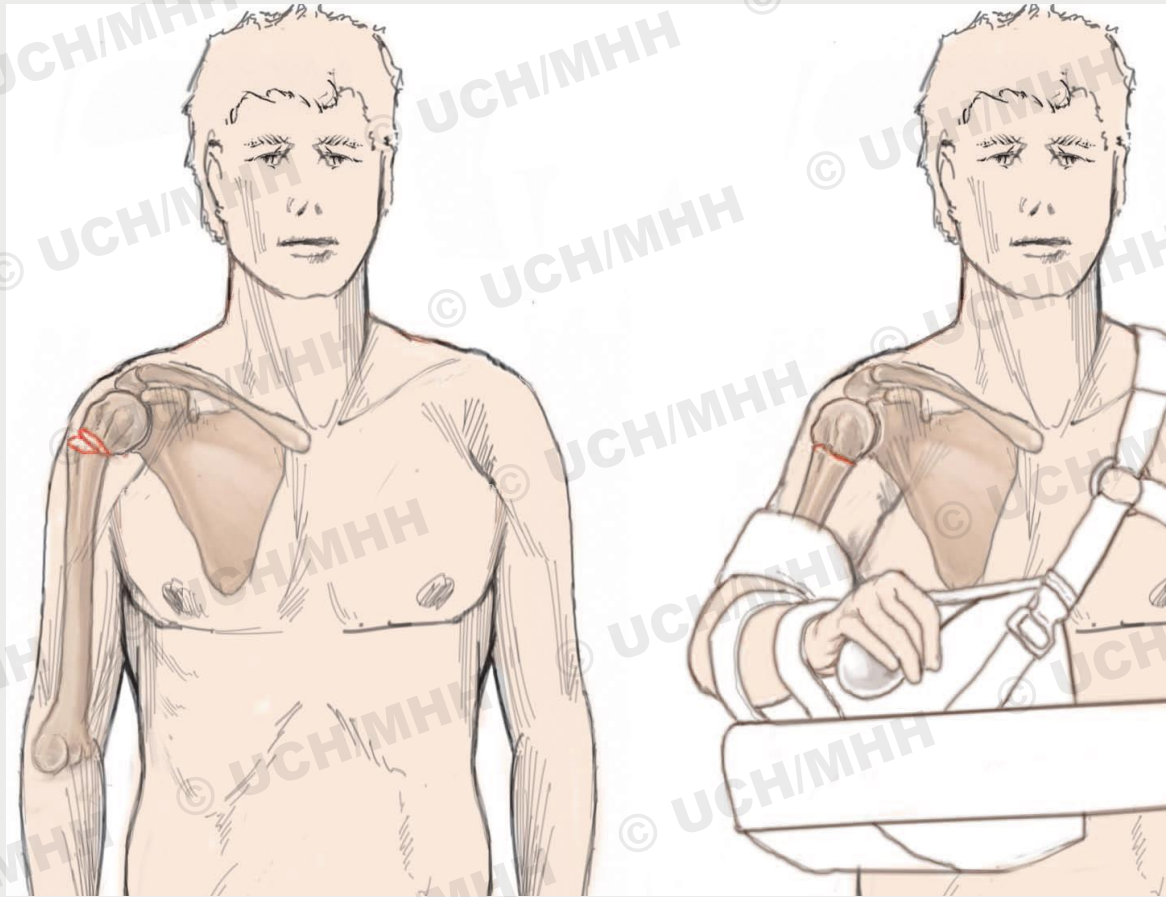


# Hannover Humerus Register

## Abduktionskissen



- Bei varisch dislozierten Frakturen und/oder Tuberculum majus
- Prinzip: lediglich die Position des Schaftes lässt sich beeinflussen und dem dislozierten Kalotten- und/oder TM-Fragment nachgeführt wird

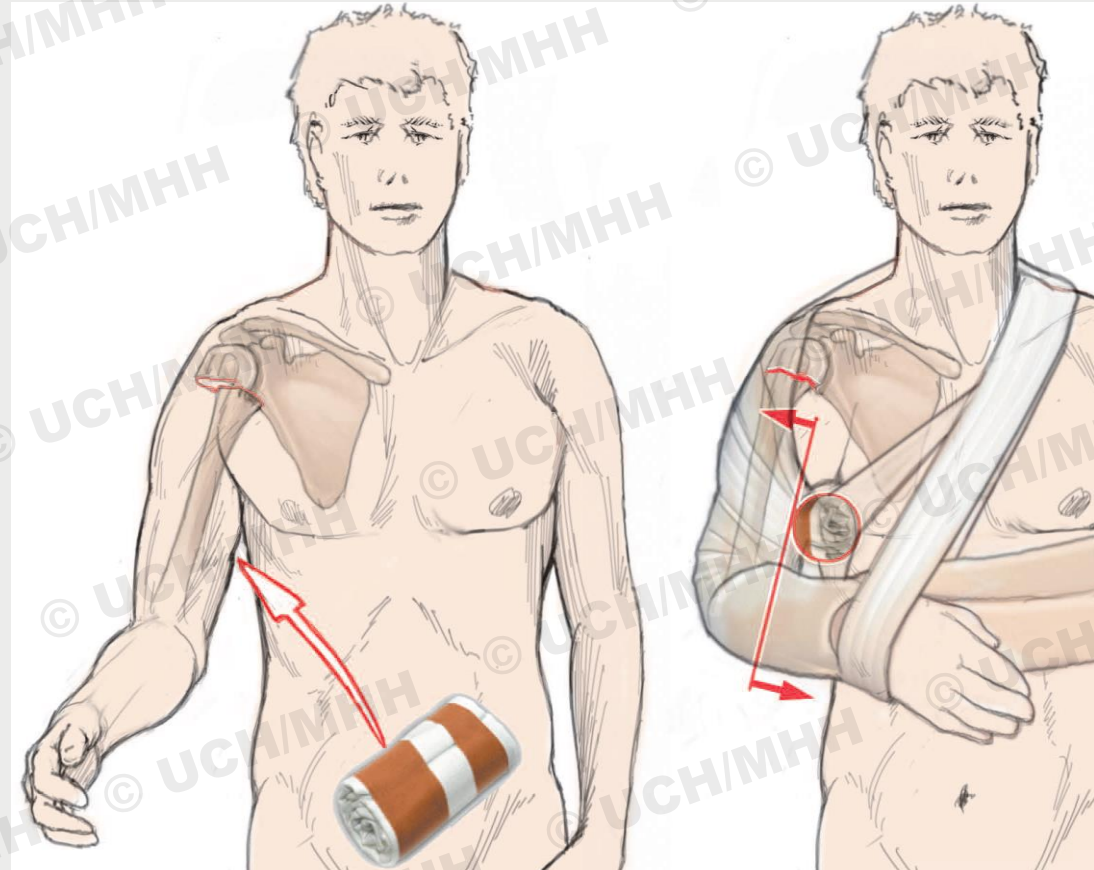




# Hannover Humerus Register

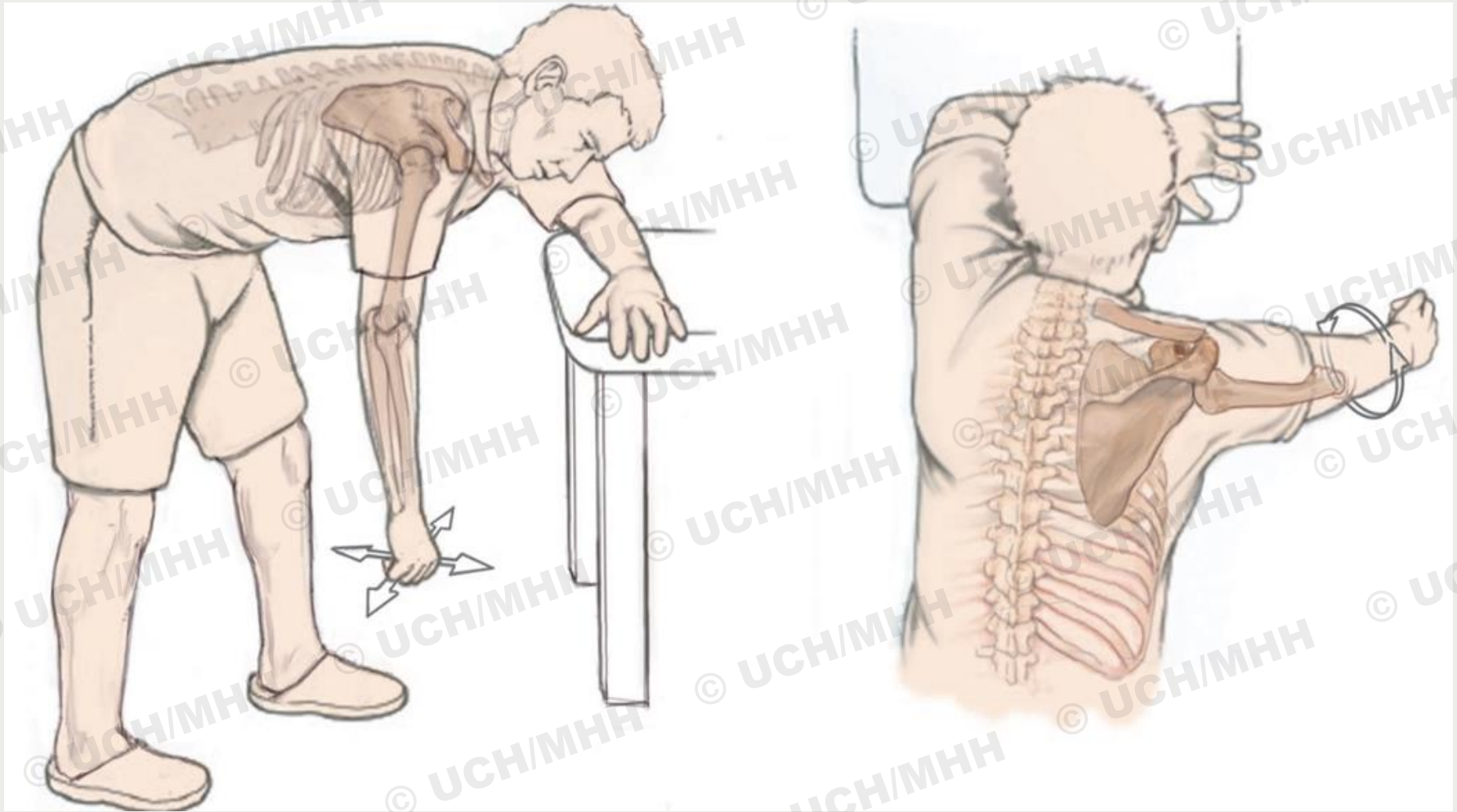
## Achselrolle

- Achselrolle als Hypomochlion um einer Schafftranslation nach medial durch den Zug des M. pectoralis major entgegenzuwirken





# Pendelübungen





# Fall I, 62 Jahre, berufstätig



UT

Woche 1

Woche 3

# Fall I, 62 Jahre, berufstätig



Jahr 1

Jahr 2

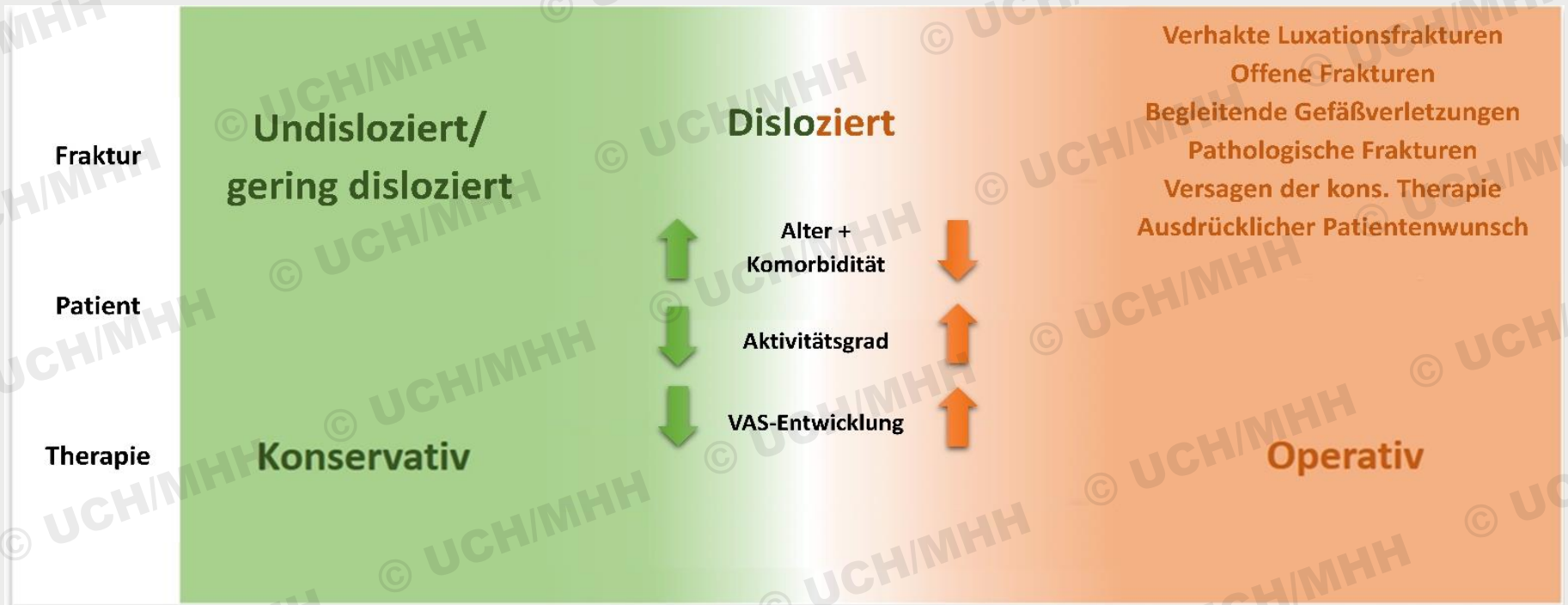
# Fall I, 62 Jahre, berufstätig



Jahr 2, SSV 70, CS 58, Adj. CS 83

	Actual outcome in points*	Predicted outcome in points				
		<59	60-69	70-79	80-89	90-100
Case 5, aged 62 ♀	83	5	4	1		

# Welche Therapie?



# Selbstkorrekturpotential?



Article

Journal of  
Orthopaedic  
Surgery

## Self-reducing proximal humerus fractures

*Journal of Orthopaedic Surgery*  
25(2) 1-4  
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[sagepub.co.uk/journalsPermissions.nav](http://sagepub.co.uk/journalsPermissions.nav)  
DOI: 10.1177/2309499017717180  
[journals.sagepub.com/home/osj](http://journals.sagepub.com/home/osj)  
SAGE

Christopher Fang<sup>1</sup> and Ernest Beng Kee Kwak<sup>1</sup>





Fall II, 79 Jahre, SSF 80, VAS 0, CS 75

L

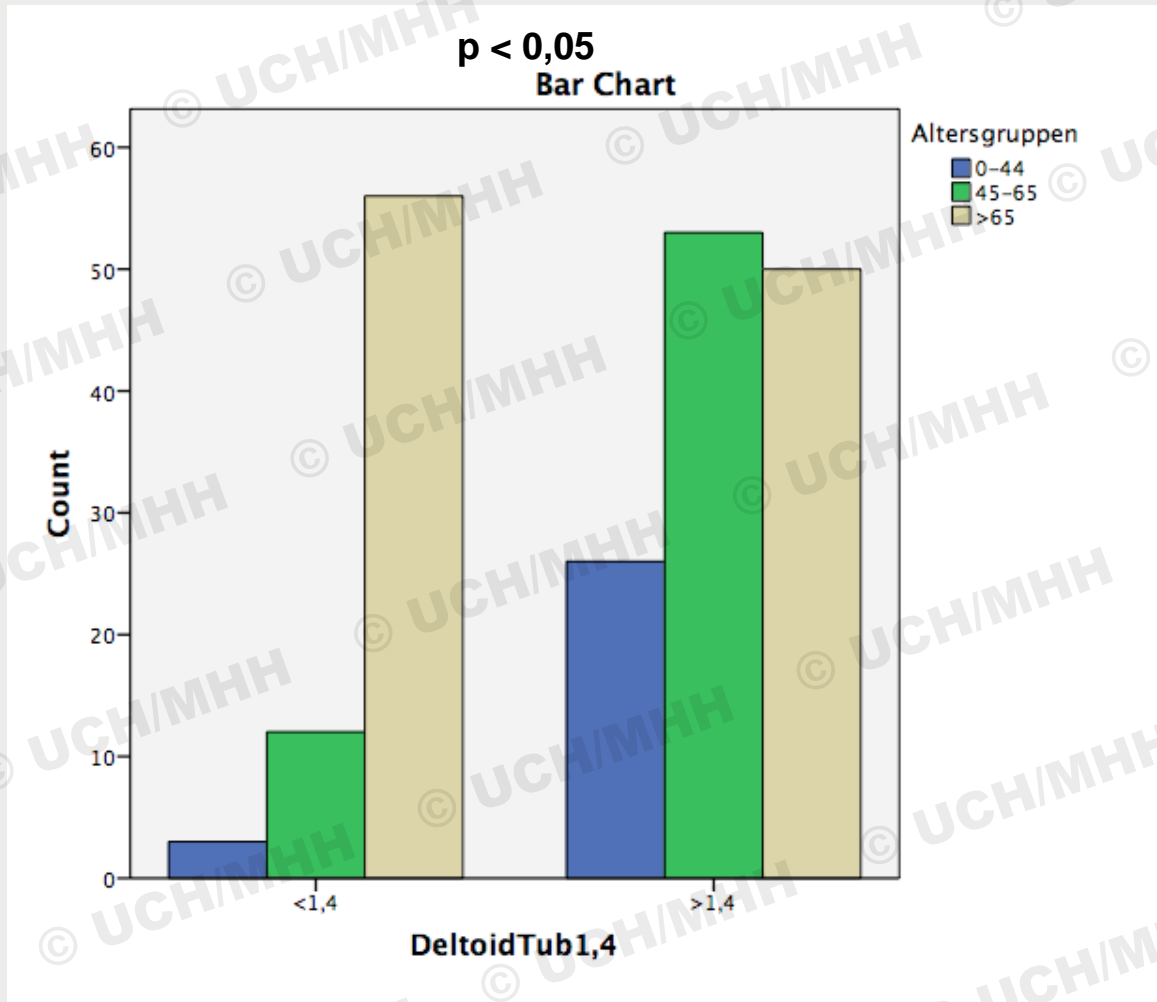


Fall III, 84 Jahre, SSF 95, VAS 0, CS 90

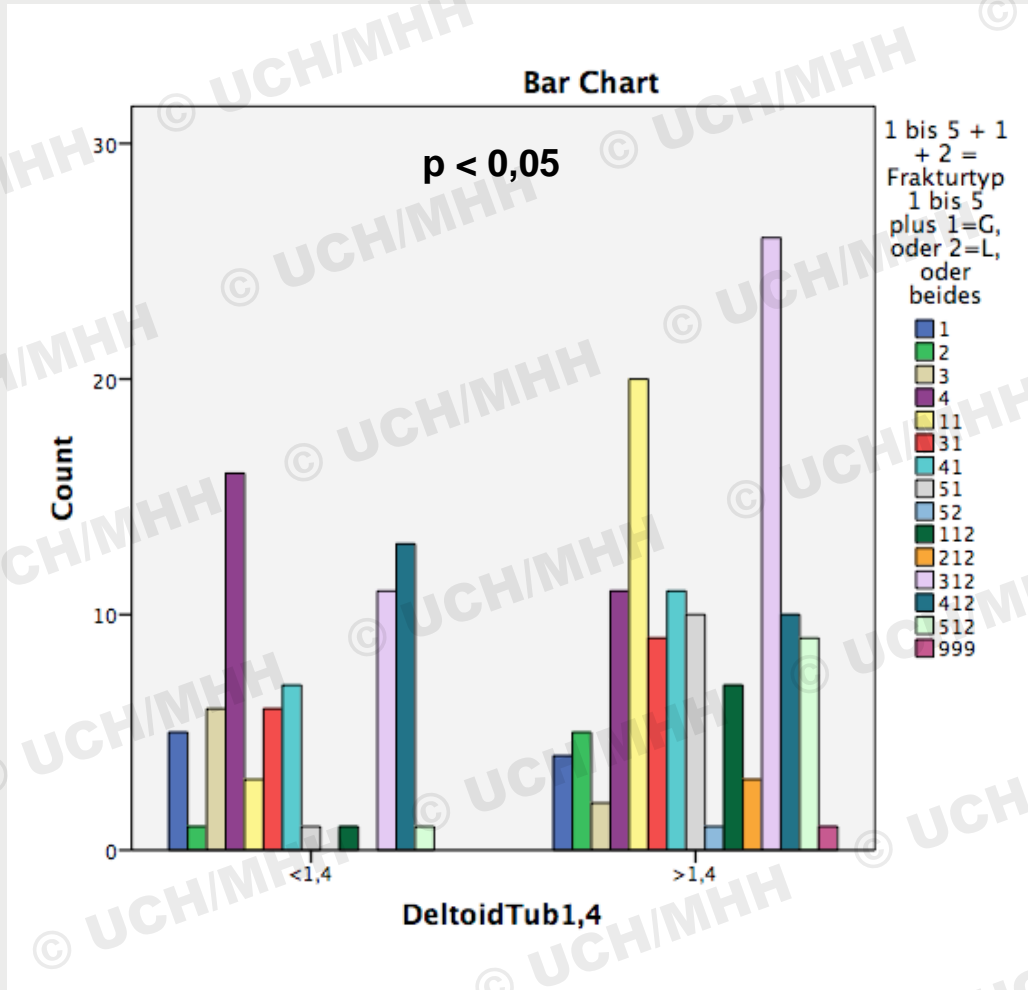




# Hannover Humerus Register (MHH) Knochenqualität / Deltoid Tuberosity Index



# Hannover Humerus Register (MHH) Resch Klassifikation



Clin Orthop Relat Res (2015) 473:3038–3045  
DOI 10.1007/s11999-015-4322-x

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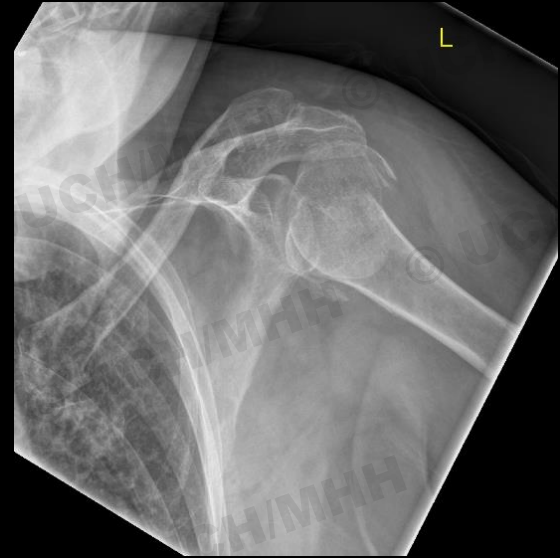
CLINICAL RESEARCH

**Deltoid Tuberosity Index: A Simple Radiographic Tool to Assess Local Bone Quality in Proximal Humerus Fractures**

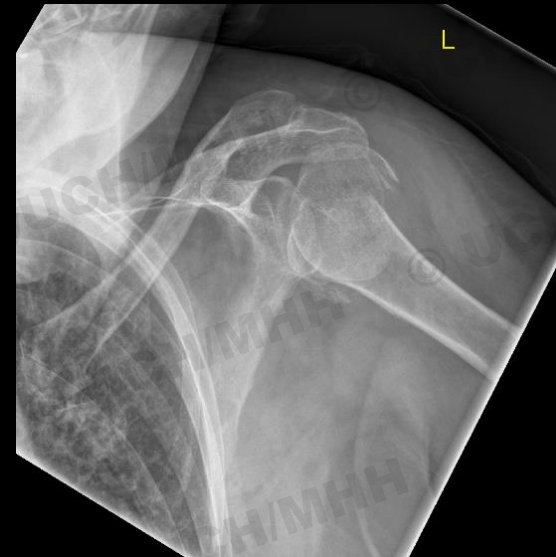
Christian Spross MD, Nicola Kaestle MD, Emanuel Benninger MD, Jürgen Fornaro MD, Johannes Erhardt MD, Vilijam Zdravkovic MD, Bernhard Jost Prof, MD



# Fall IV, 60 Jahre, Hausfrau



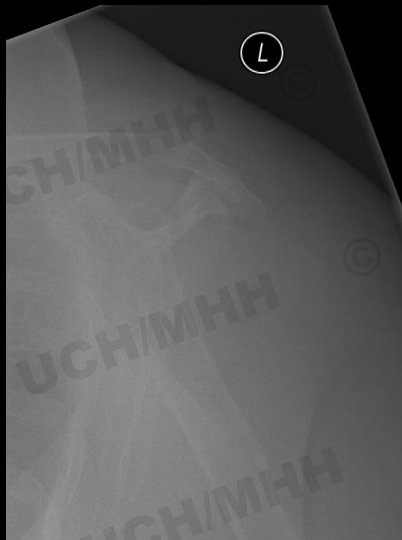
# Fall IV, 60 Jahre, Hausfrau



	Recommended treatment		Preferred surgical procedure						
	Non-operative	Operative	Locking plate	Cement augmented locking plate	Intramedullary nail	Hemi-arthroplasty	Reverse shoulder arthroplasty	Allograft augmented locking plate	Something else
Case 7, aged 60 ♀	0	10	1	0	0	1	7	0	1



# Fall IV, 60 Jahre, Hausfrau



Woche 3

Woche 6

Monat 3

# Fall IV, 60 Jahre, Hausfrau



# Fall IV, 60 Jahre, Hausfrau



Jahr 2, SSV 75 CS 62, Adj. CS 85

	Actual outcome in points*	Predicted outcome in points				
		<59	60-69	70-79	80-89	90-100
Case 7, aged 60 ♀	85	9	1			



# Komplikationsrate bei Wechsel erhöht

## Research Article

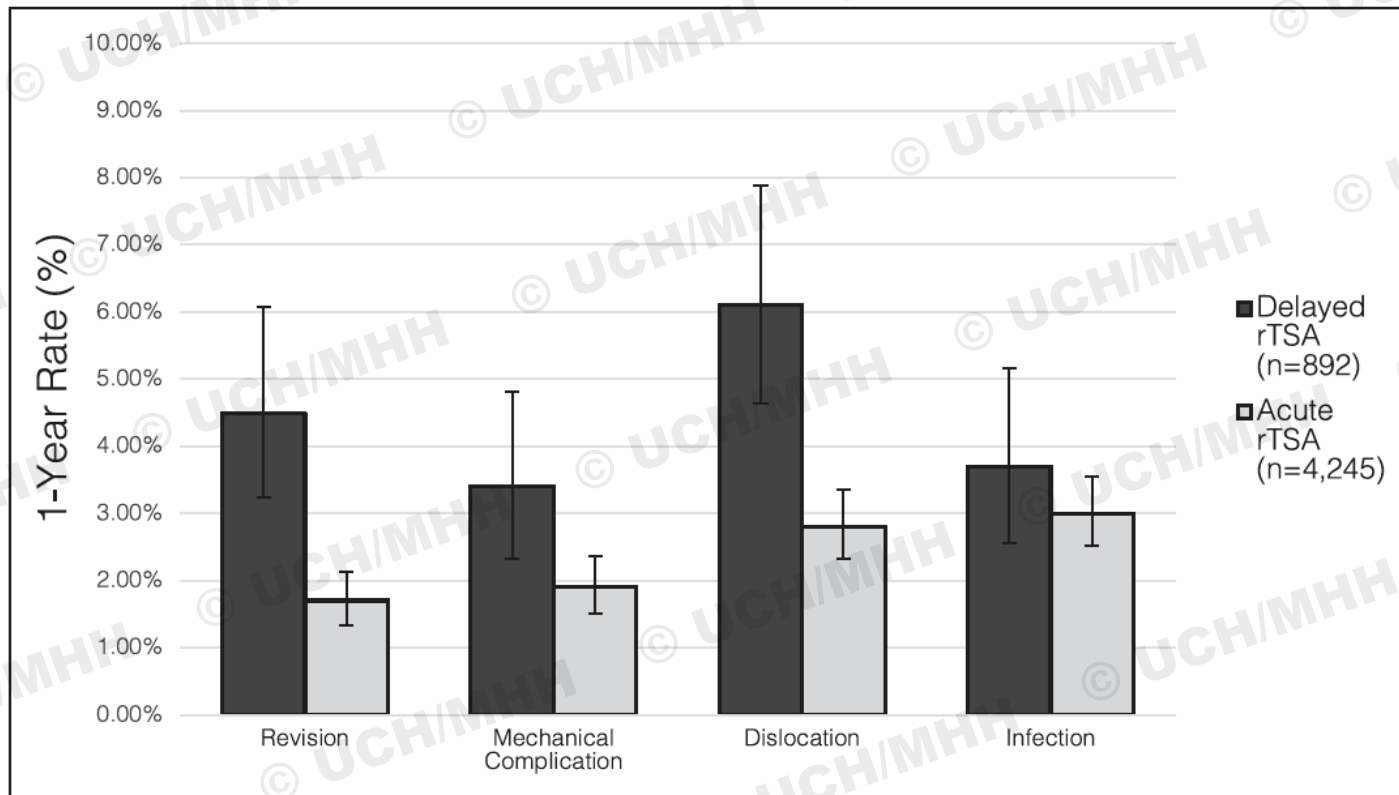
### Acute Versus Delayed Reverse Shoulder Arthroplasty for the Primary Treatment of Proximal Humeral Fractures

Henry D. Seidel, BS  
Sarah Bhattacharjee, BS  
Jason L. Koh, MD  
Jason A. Strelzow, MD  
Lewis L. Shi, MD

*J Am Acad Orthop Surg* 2021;00:1-8

DOI: 10.5435/JAAOS-D-20-01375

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# Unbeantwortete Fragen



- Bisher keine Klassifikation direkten Einfluss auf Therapieregime
- Durch Osteosynthese Verbesserung der Durchblutung?
- Stellenwert der Rotatorenmanschette
- Wieviel toleriert der proximale Humerus an Fehlstellung?
- Minimalinvasive Techniken / Fixateur Externe?

- Stellenwert der konservativen Therapie vor allem im fortgeschrittenen Alter
- Konservative Therapie Outcome unterschätzt
- Konservative Therapie aufwendig, benötigt Equipment und ist nicht entsprechend vergütet
- Patient in die Therapie einbeziehen
- VAS im Verlauf starker Hinweis auf Therapieerfolg
- Röntgenbilder im Stehen
- 2 – 4 Wochen Verlaufsbeobachtung und dann ggf. Wechsel auf inverse Prothese



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