

# Inter-departmental variation in surgical treatment of proximal femoral fractures: A nationwide observational cohort study

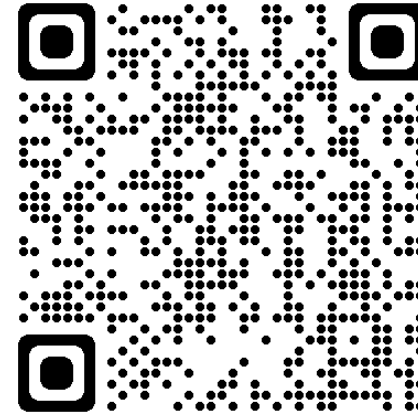
Björn Hernefalk, Emilia Möller Rydberg, Jan Ekelund, Cecilia Rogmark, Michael Möller, Nils Hailer, Sebastian Mukka och Olof Wolf

Uppsala, Göteborg, Malmö/Lund, Umeå

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Björn Hernefalk , Emilia Möller Rydberg, Jan Ekelund, Cecilia Rogmark, Michael Möller, Nils P. Hailer, Sebastian Mukka, Olof Wolf

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- 46,243 personer 65 år och äldre registerade i SFR 2016 till 2020
- 5% icke-opererade + 3% “andra metoder” exkluderades
- “The large interdepartmental variation in the surgical management of hip fractures in Sweden appears unwarranted based on the *current evidence*, indicating a need for *updated national guidelines*.”

Inledande bilder från Wolf & Hernefalk!

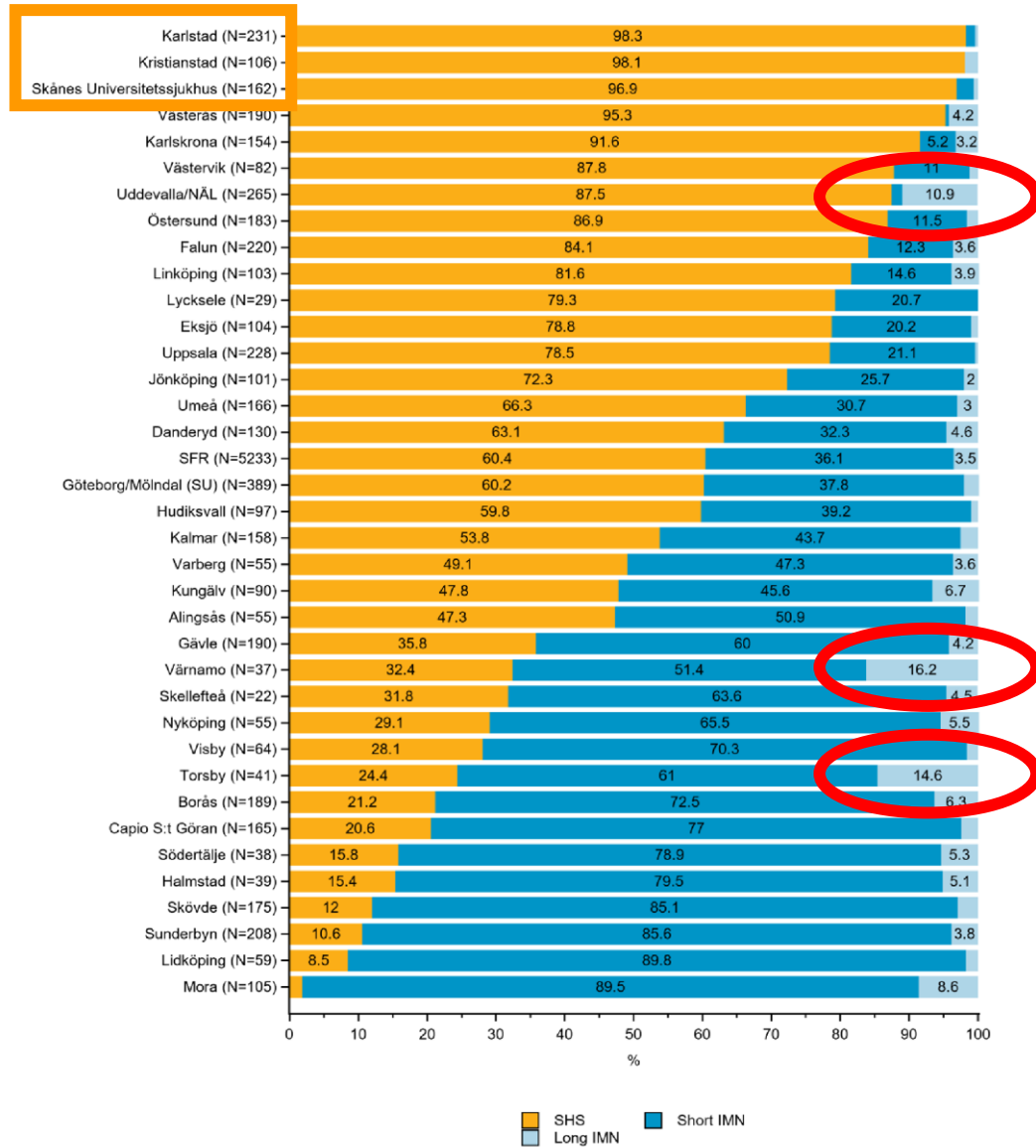


Figure 2.

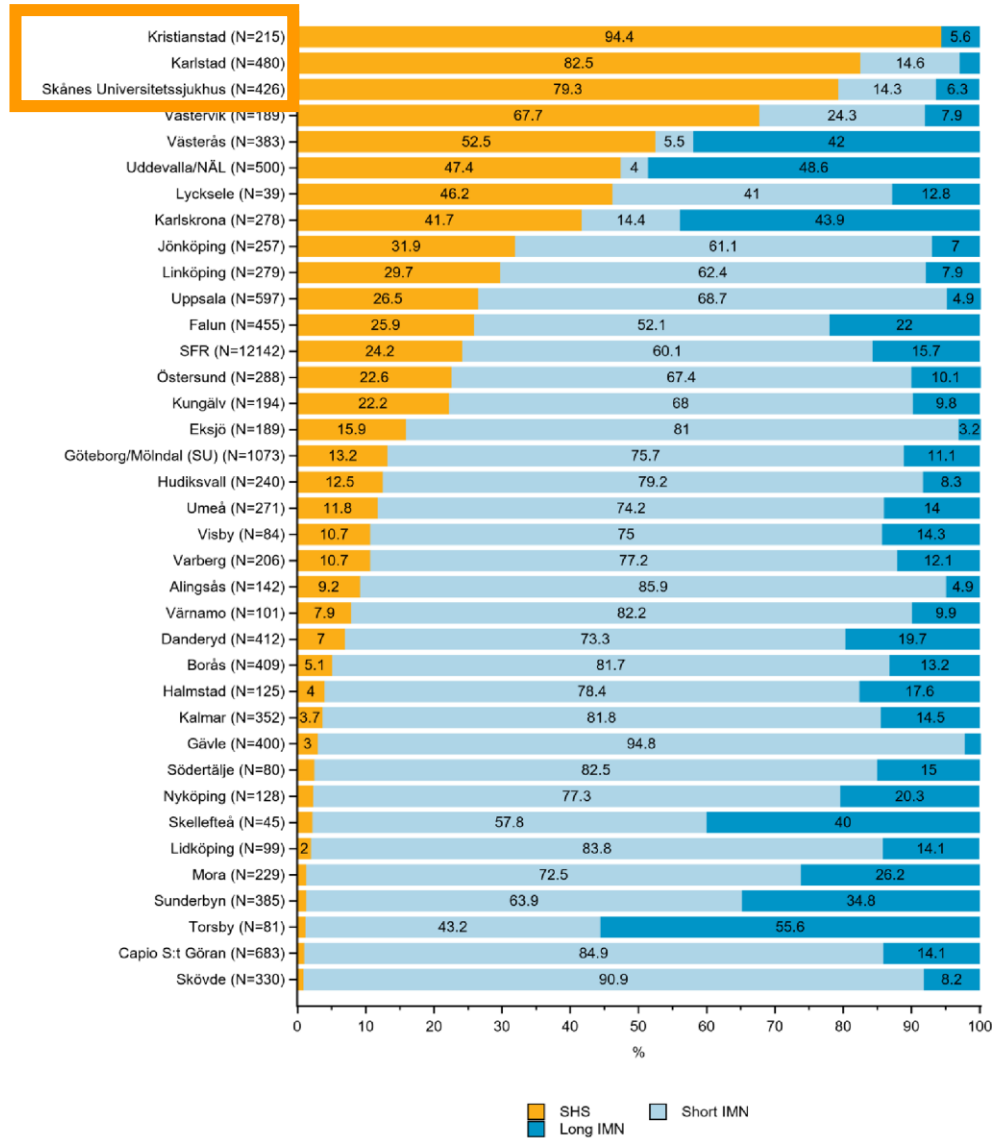
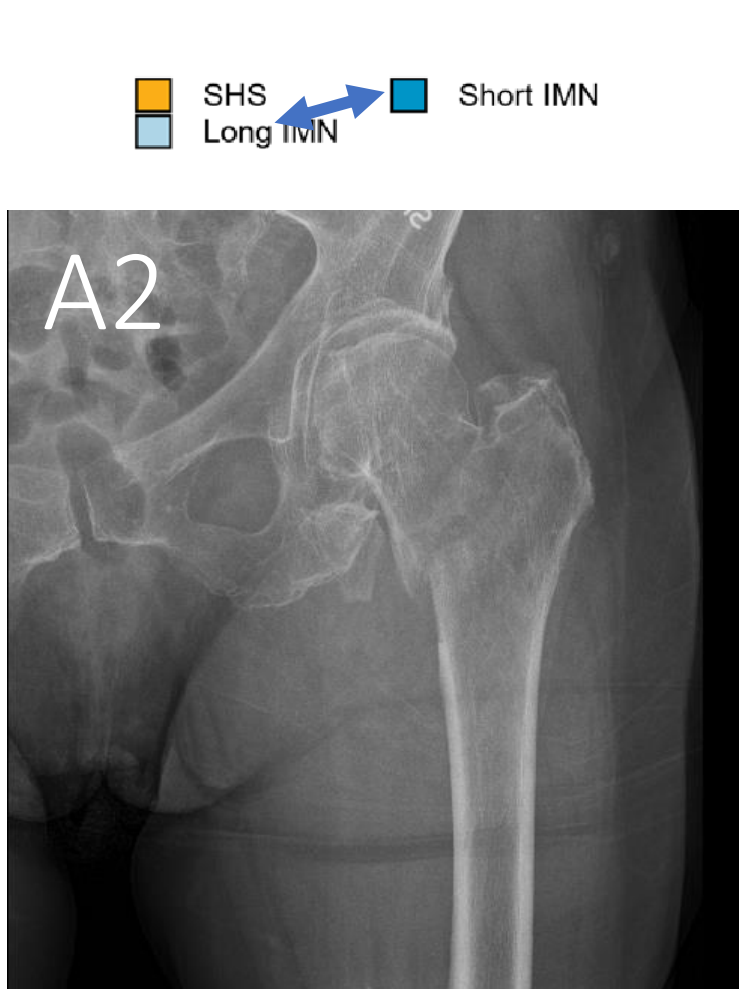
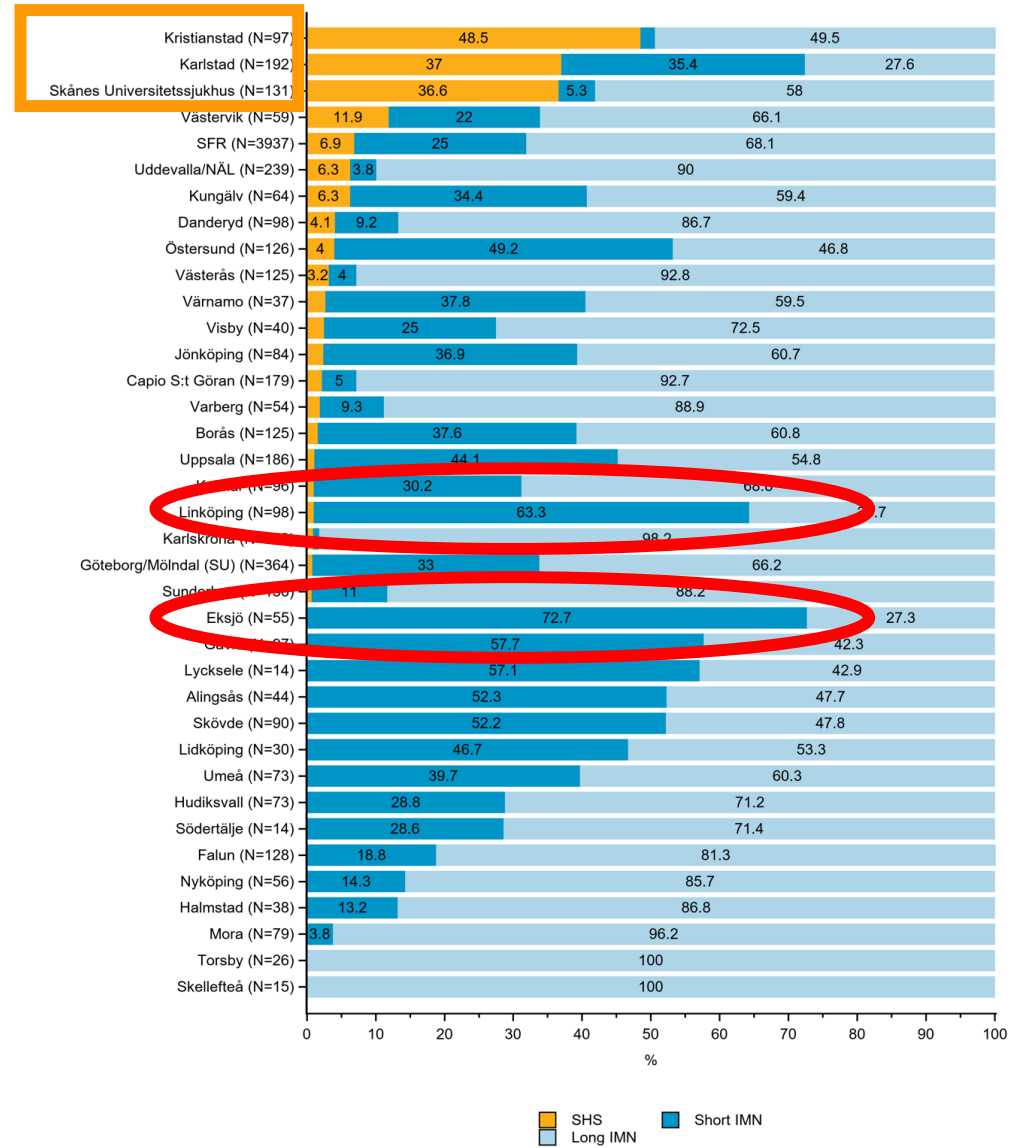


Figure 3.





IF
  arthroplasty

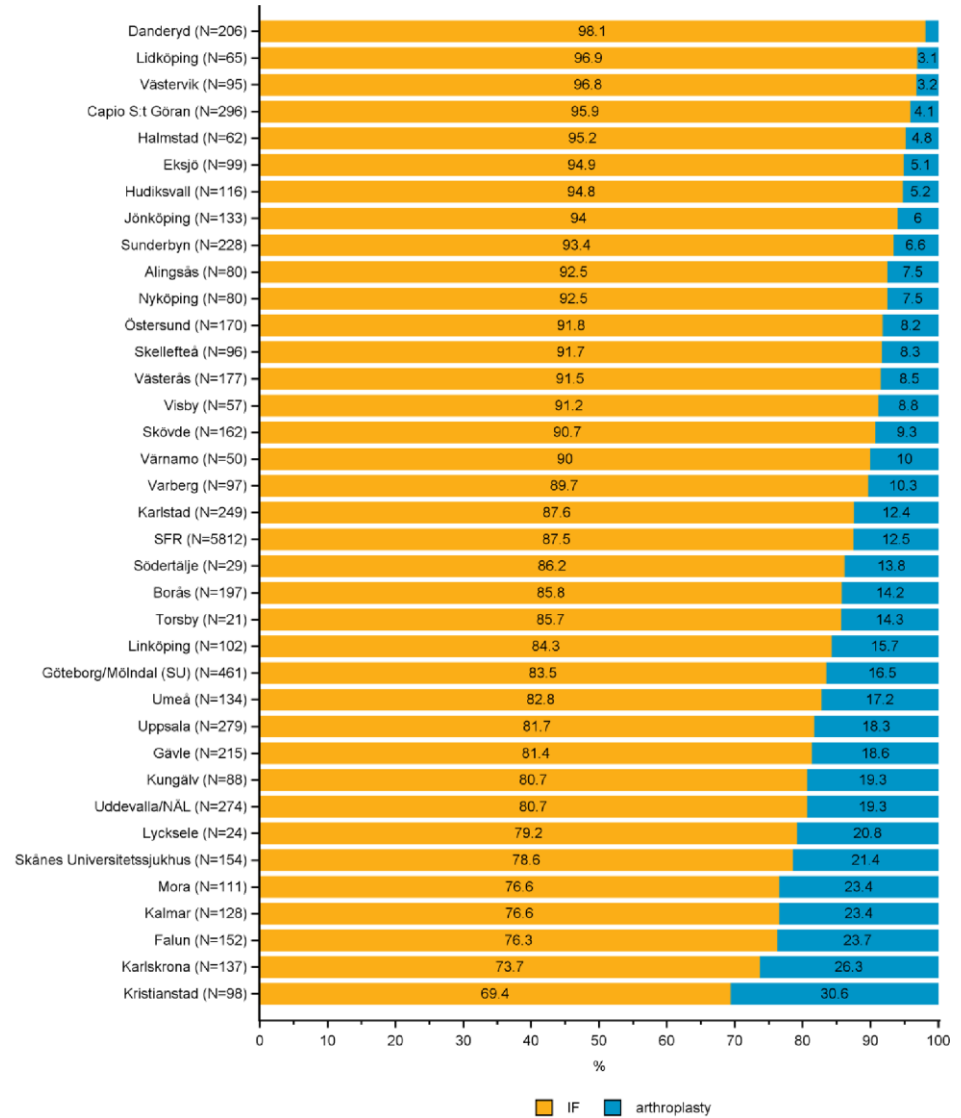
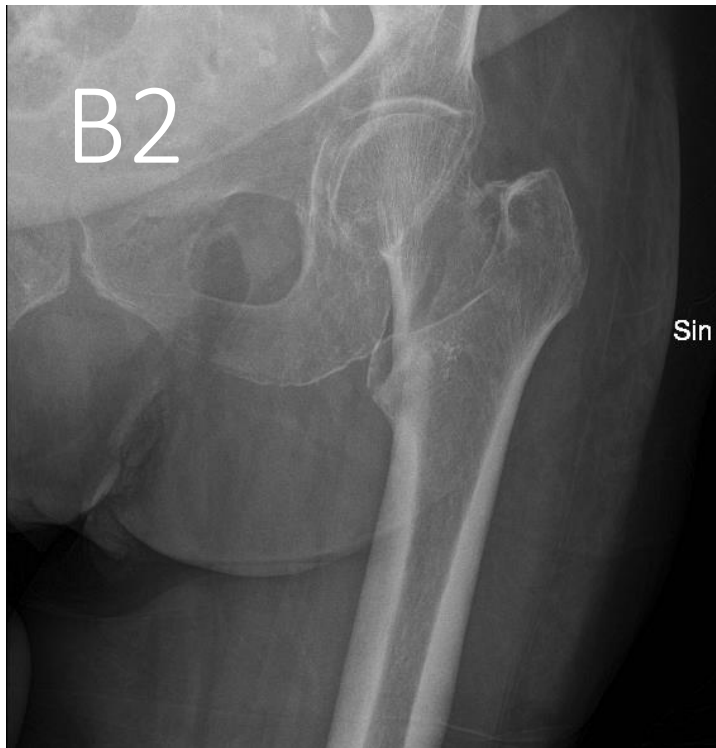


Figure 5.



IF    arthroplasty

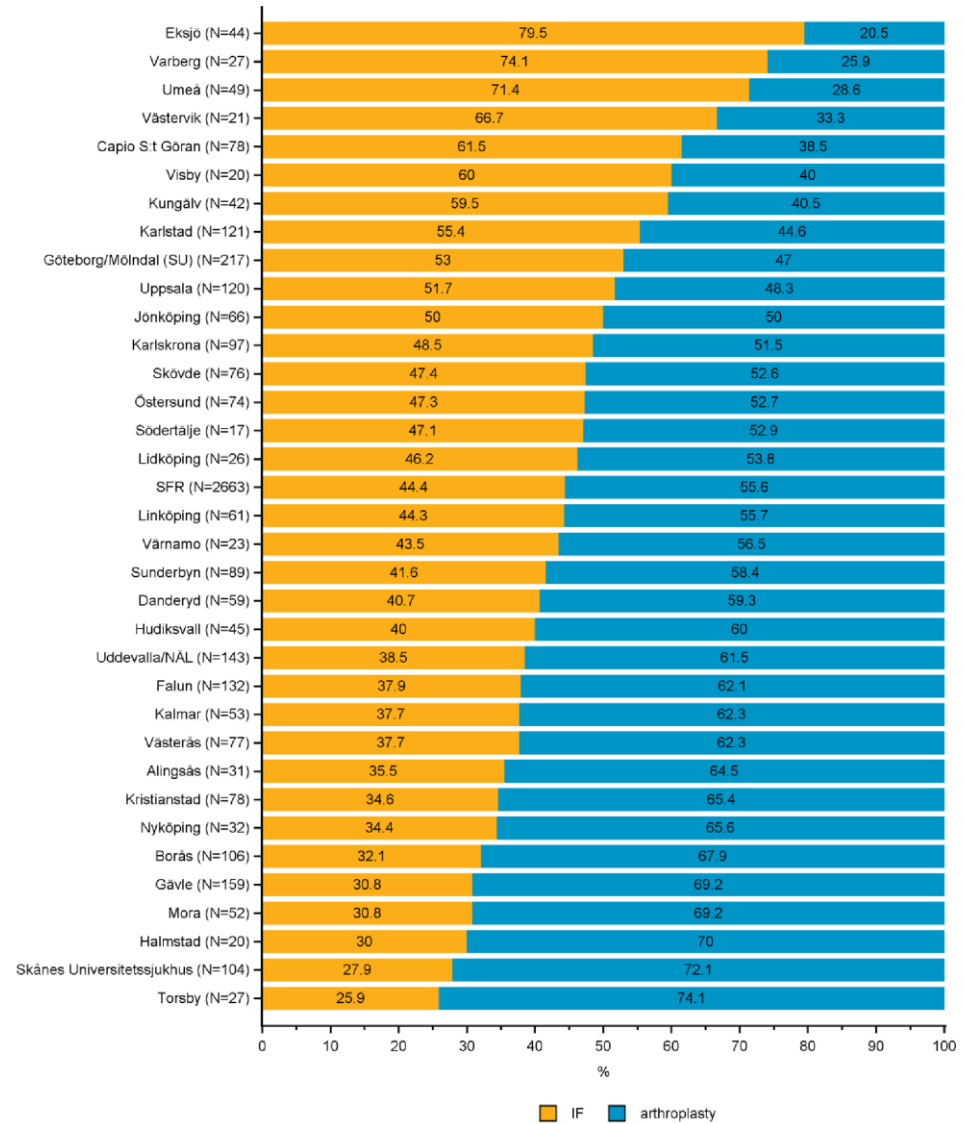
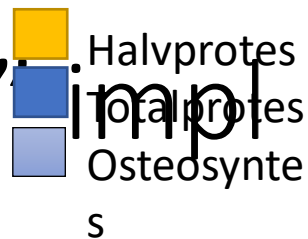


Figure 6.

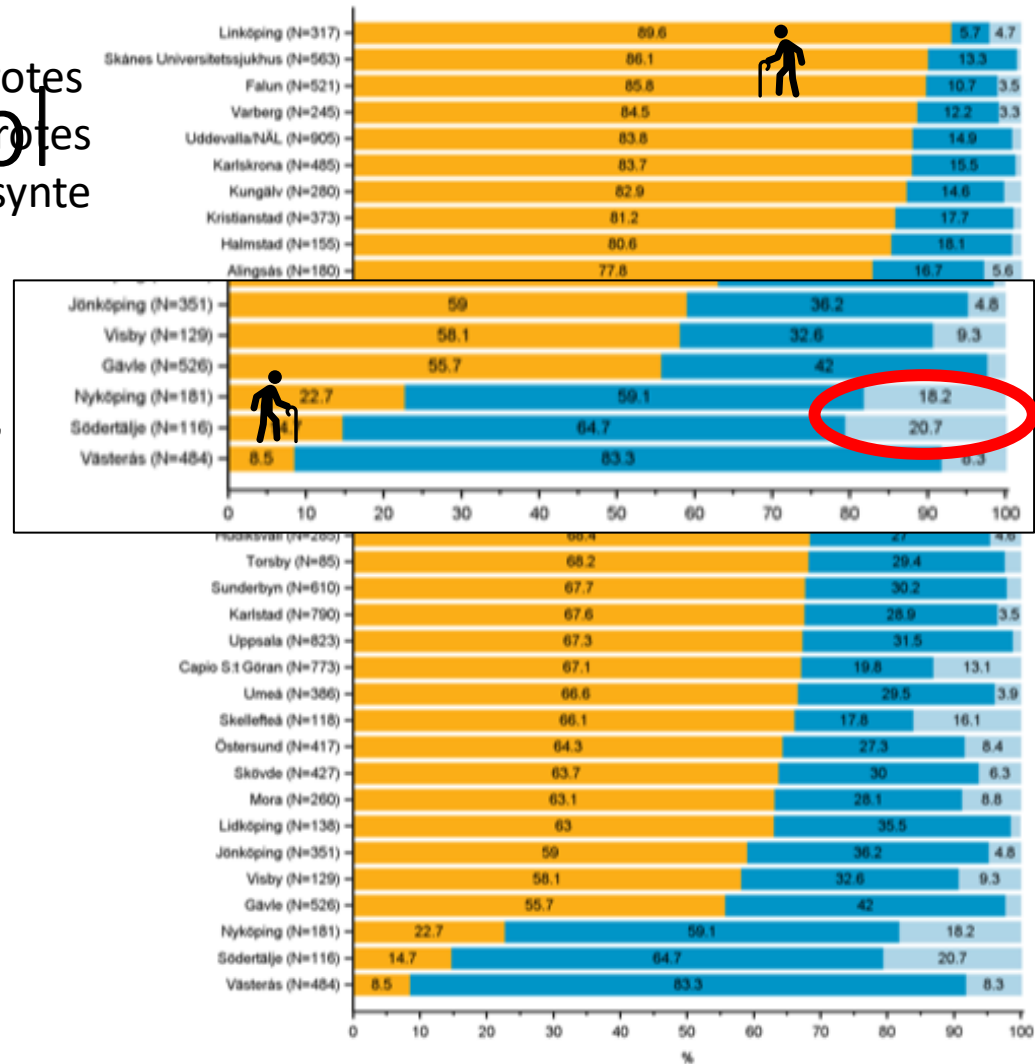




# Vad är "rätt" impl



Dislocerad cervikal fraktur, över 65 år



# The different strategies in treating displaced femoral neck fractures: mid-term surgical outcome in a register-based cohort of 1,283 patients aged 60–69 years

Johan LAGERGREN<sup>1</sup>, Sebastian STRØM RÖNNQUIST<sup>2</sup>, Olof WOLF<sup>3,4</sup>, Sebastian MUKKA<sup>5</sup>, Michael MÖLLER<sup>4,6,7</sup>, Jonatan NÅTMAN<sup>4,8</sup>, and Cecilia ROGMARK<sup>8,9</sup>

Alingsås, Köpenhamn, Uppsala, Umeå, Göteborg, Malmö/Lund



Acta Orthopaedica





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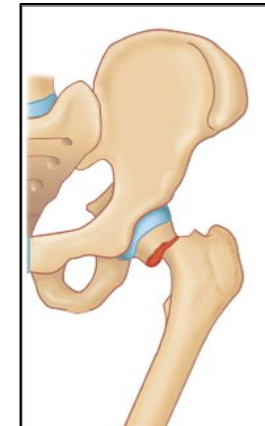
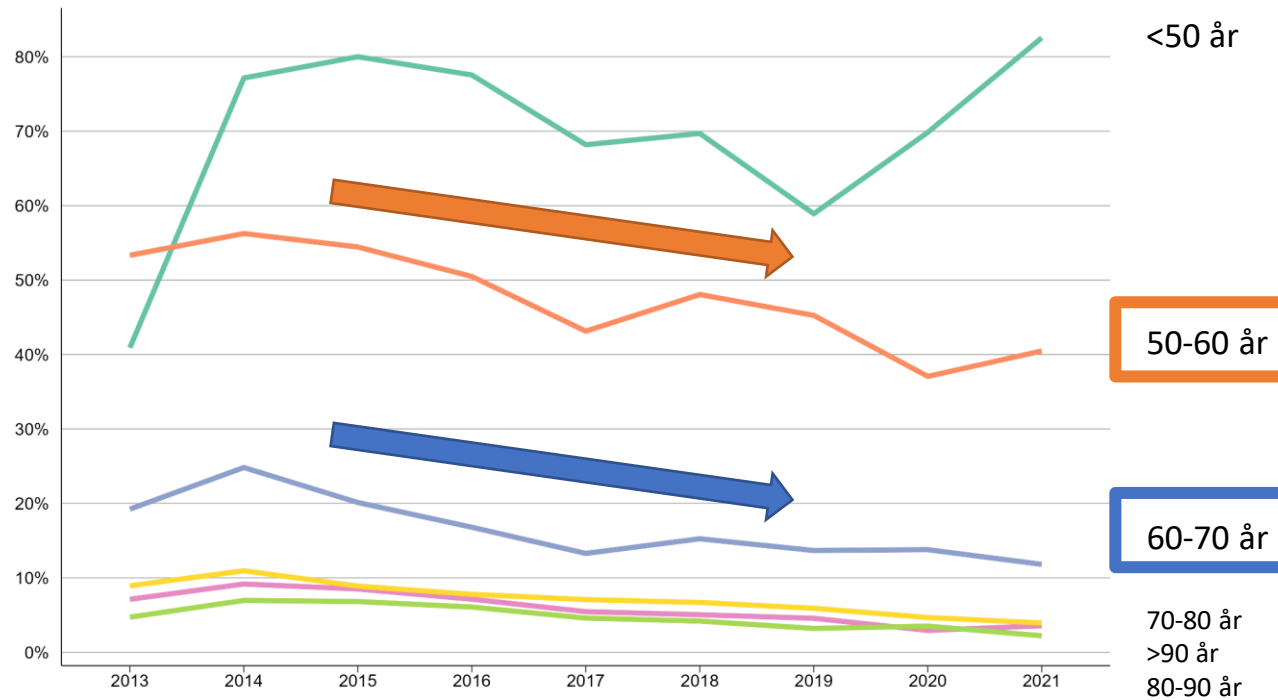
# Var dra gränsen mellan osteosyntes och höftprotes?

60 – 65 – 70 år? Biologisk ålder? Kan vi fortfarande spika/skruva?

# Andel opererade med osteosyntes i Sverige

Dislocerad cervikal fraktur, åldersgrupper

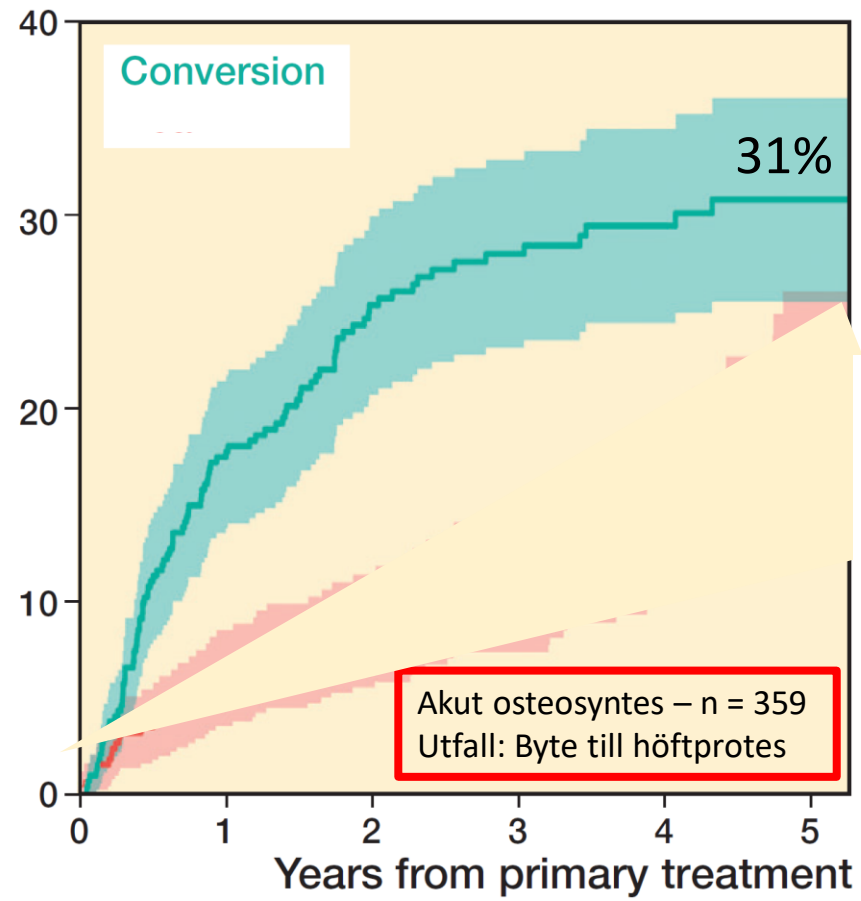
Bakgrund



- Syfte: Beskriva den kumulativa andelen av större reoperation och död vid 5 år efter osteosyntes respektive primär totalprotes

Design:

- Longitudinell kohortstudie baserad på prospektivt insamlad data
- Ålder 60 till 69 år
- Dislocerad cervikal fraktur (AO/OTA31-B3) registrerad i SFR 2012-2018
- Dessa individers data länkades till eventuella data i Svenska Ledprotesregistret fram till 2019-12-31
- Competing risk analysis



# Klinisk betydelse?



Diskussion

gränsningar:

Selektionsbias – "lämpliga" för osteosyntes

är för kort uppföljning för höftproteserna

proteser ett acceptabelt resultat?

- Kan/ska man mäta på
- Kan metoderna jämföras
- Är det värt mödan att 10 har sitt eget caput 10 år?

Lägg upp en behandlingsplan i samråd med patienten  
Behärska teknikerna  
Följ upp både osteosyntes- och protesopererade!

# Osteosyntes eller höftprotes, 60 – 70 år?

## PROM-data från SFR

Injury 51 (2020) 2652–2657



Lite överraskande så hade de med osteosyntes samma patientrapporterat utfall\* efter 1 år som de med totalprotes

\*) EQ5D + SMFA

Välinformerade patienter?  
Hunnit återhämta sig efter sekundär protes?






Annat än op-metod som avgör hur man mår efter 1 år?



EMPIRICAL STUDIES

 OPEN ACCESS  Check for updates

## Lingering challenges in everyday life for adults under age 60 with hip fractures – a qualitative study of the lived experience during the first three years

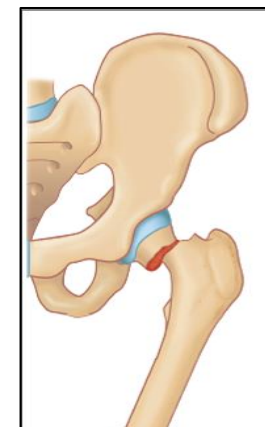
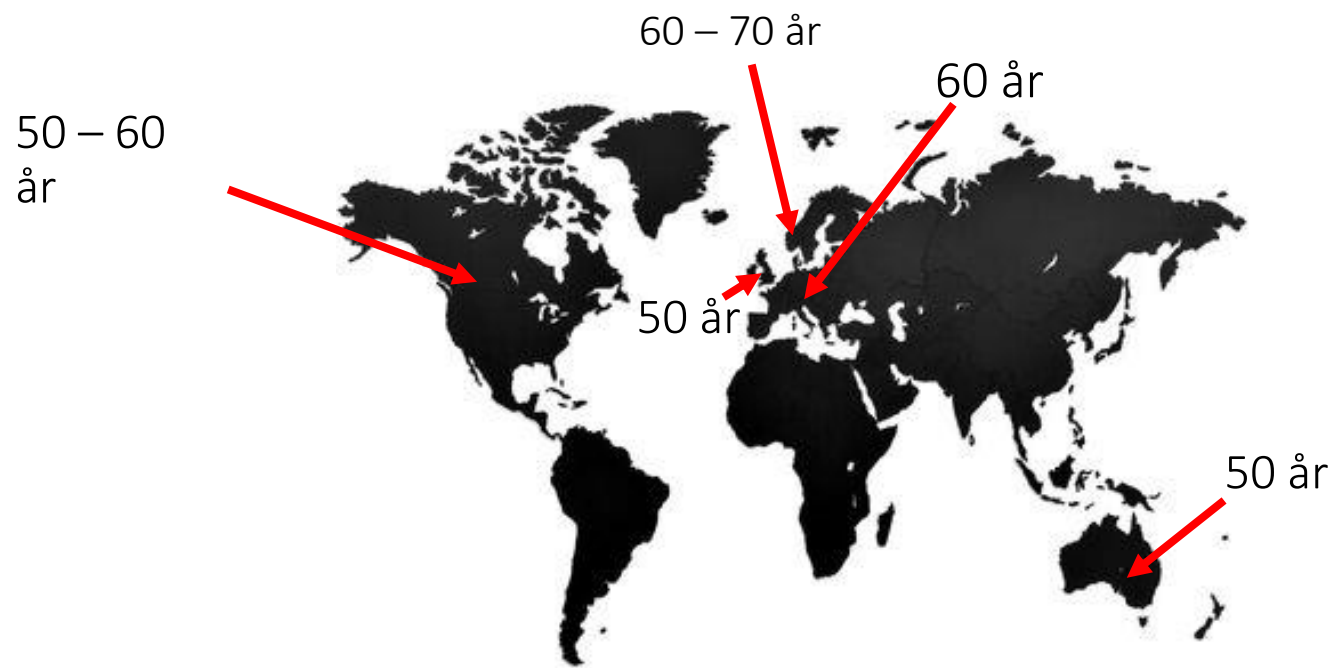
Sebastian Strøm Rönquist <sup>a,b,\*</sup> Hilda K Svensson <sup>c,\*</sup> Charlotte Myhre Jensen <sup>b,d</sup>, Søren Overgaard <sup>e,f</sup> and Cecilia Rogmark <sup>a</sup>

<sup>a</sup>Department of Orthopaedics, Lund University, Skåne University Hospital, Malmö, Sweden; <sup>b</sup>Department of Orthopaedic surgery and Traumatology, Odense University Hospital, Odense, Denmark; <sup>c</sup>Department of Orthopaedics and welfare and Centre of research on Welfare, Health and Society, Umeå, Sweden; <sup>d</sup>Department of Clinical Research, University of Southern Denmark, Odense, Denmark; <sup>e</sup>Department of Orthopaedic Surgery and Traumatology, Copenhagen University Hospital – Bispebjerg and Frederiksberg, Copenhagen, Denmark; <sup>f</sup>Department of Clinical Medicine, Faculty of Health and Medical Sciences, University of Copenhagen, Copenhagen, Denmark

**substantial challenges in everyday life, even up to 3.5 years after the injury.**

- Informera Din patient – igen och igen och igen....
  - Följ dem under första året!
- Behöver de andra insatser än de ortopediska?

## Bakgrund



Världen ser olika på var gränsen ska dras...

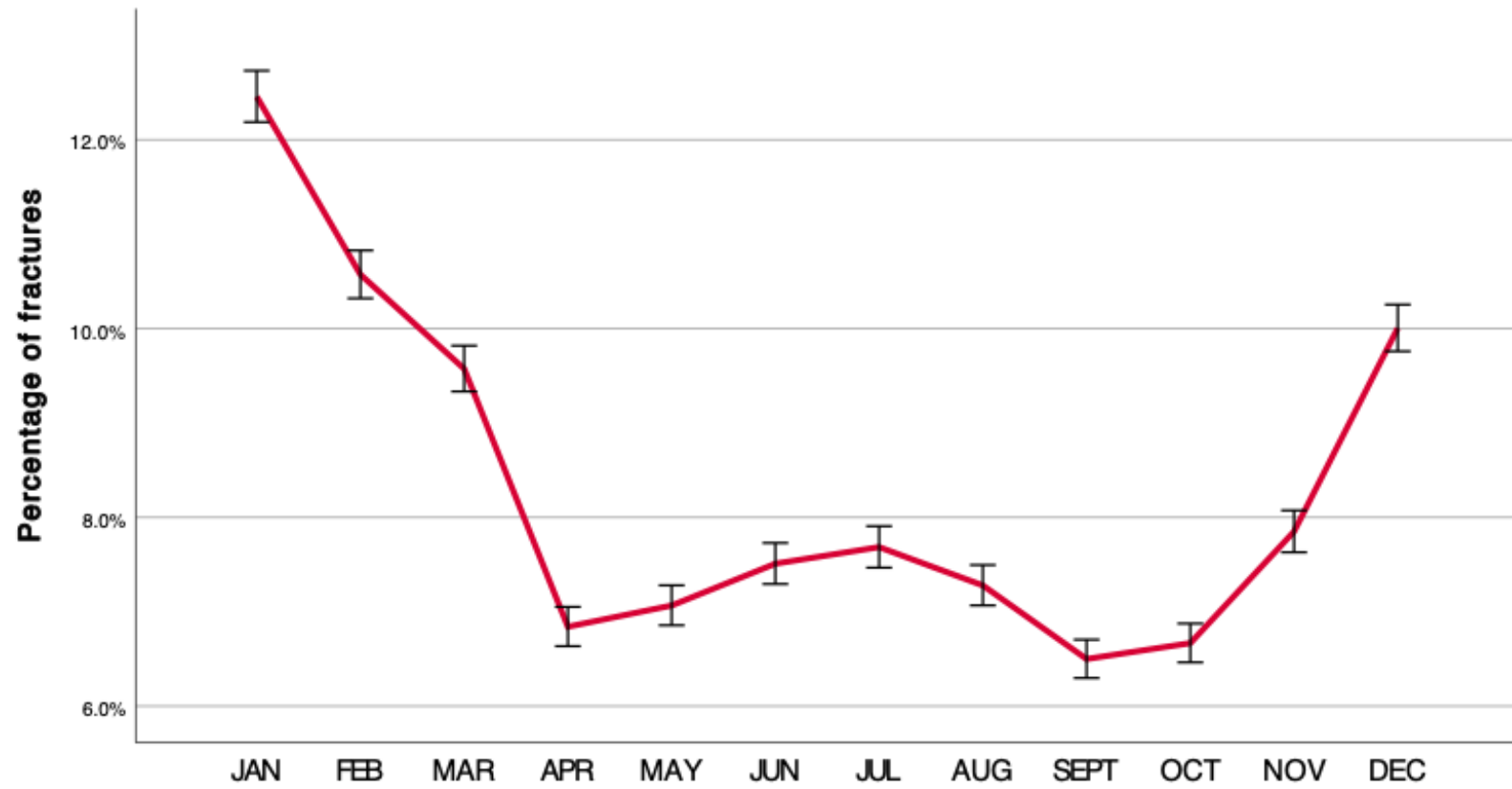
**RESEARCH ARTICLE**

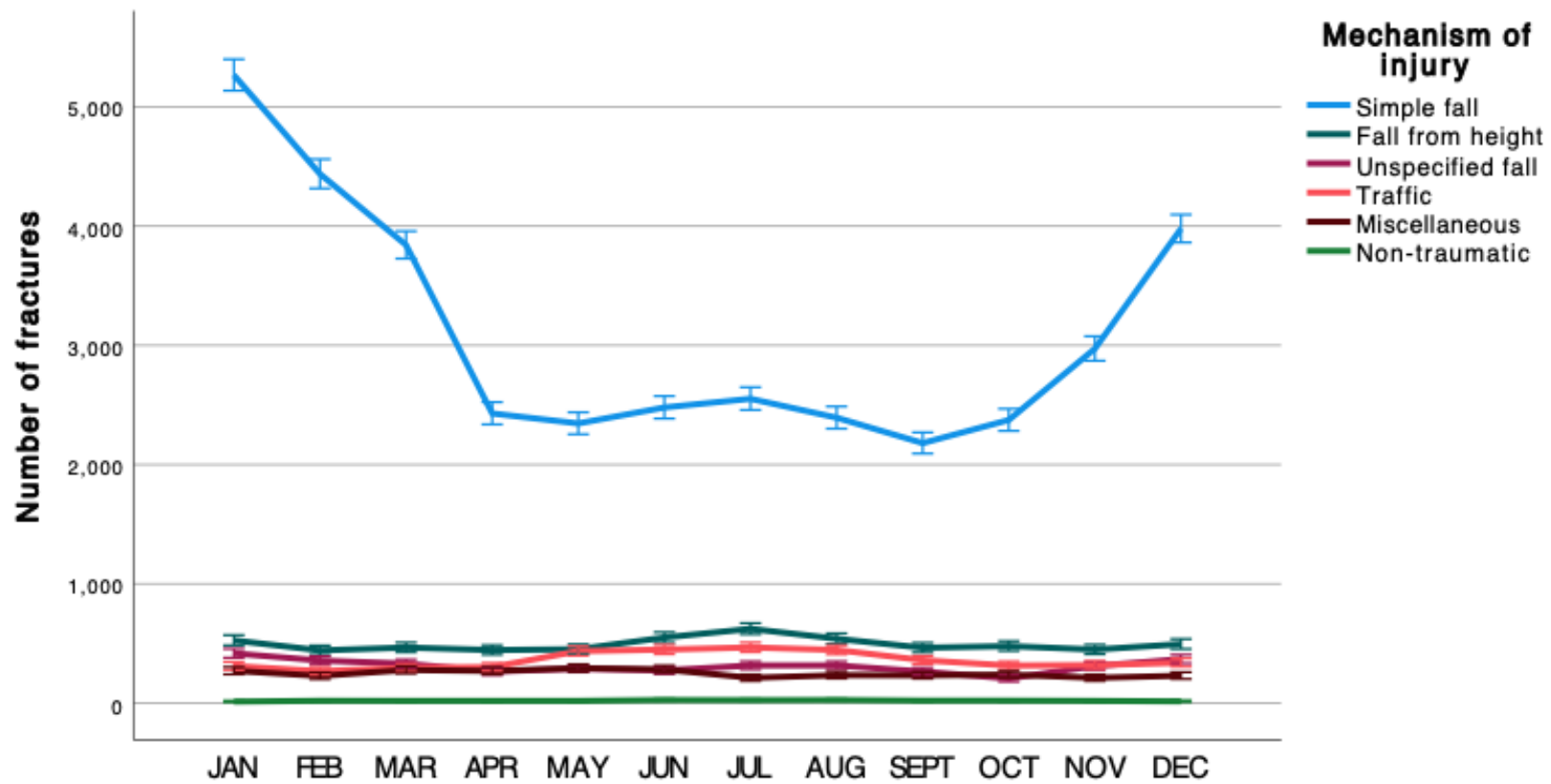
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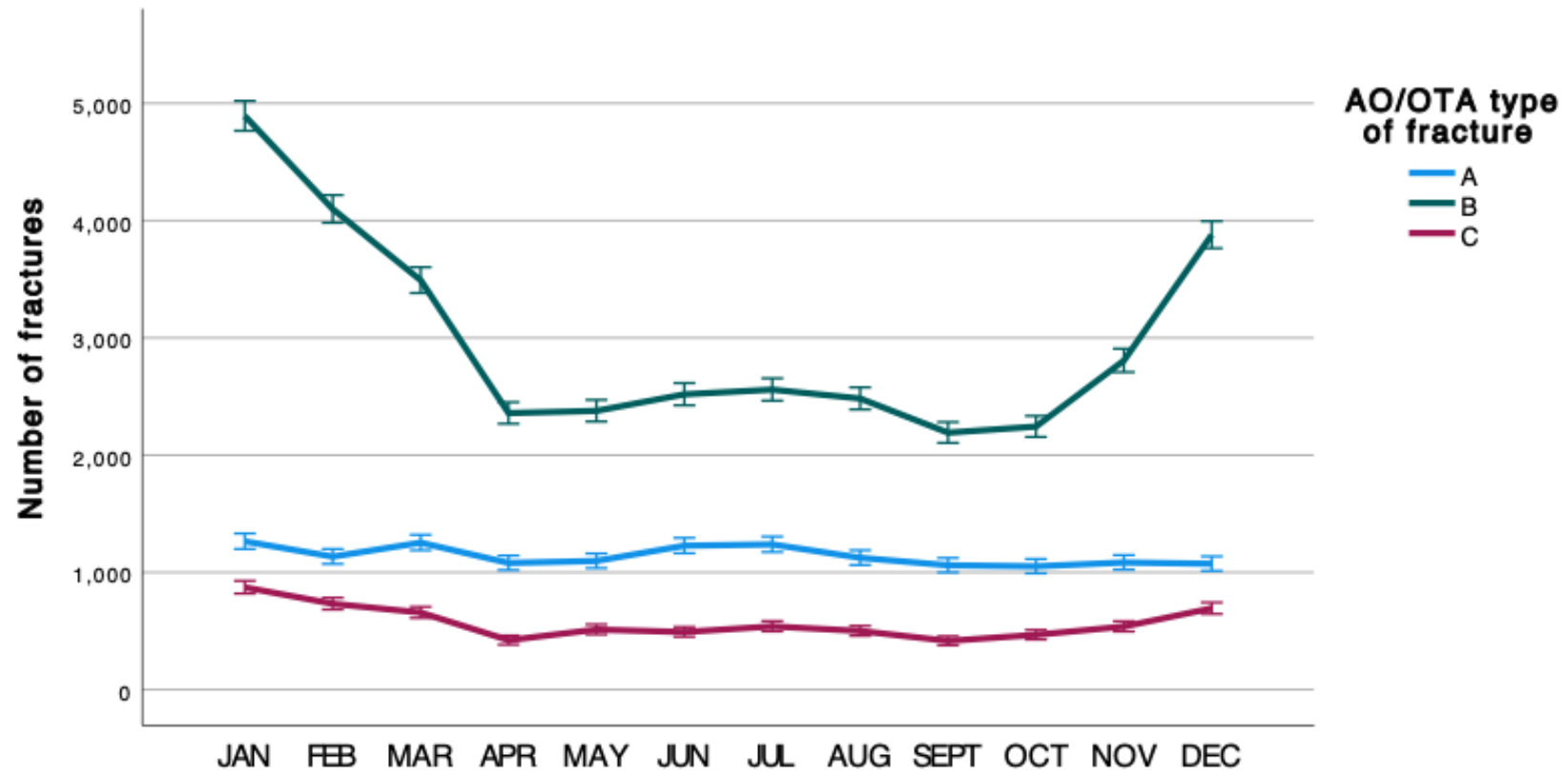
# Epidemiology of more than 50,000 ankle fractures in the Swedish Fracture Register during a period of 10 years

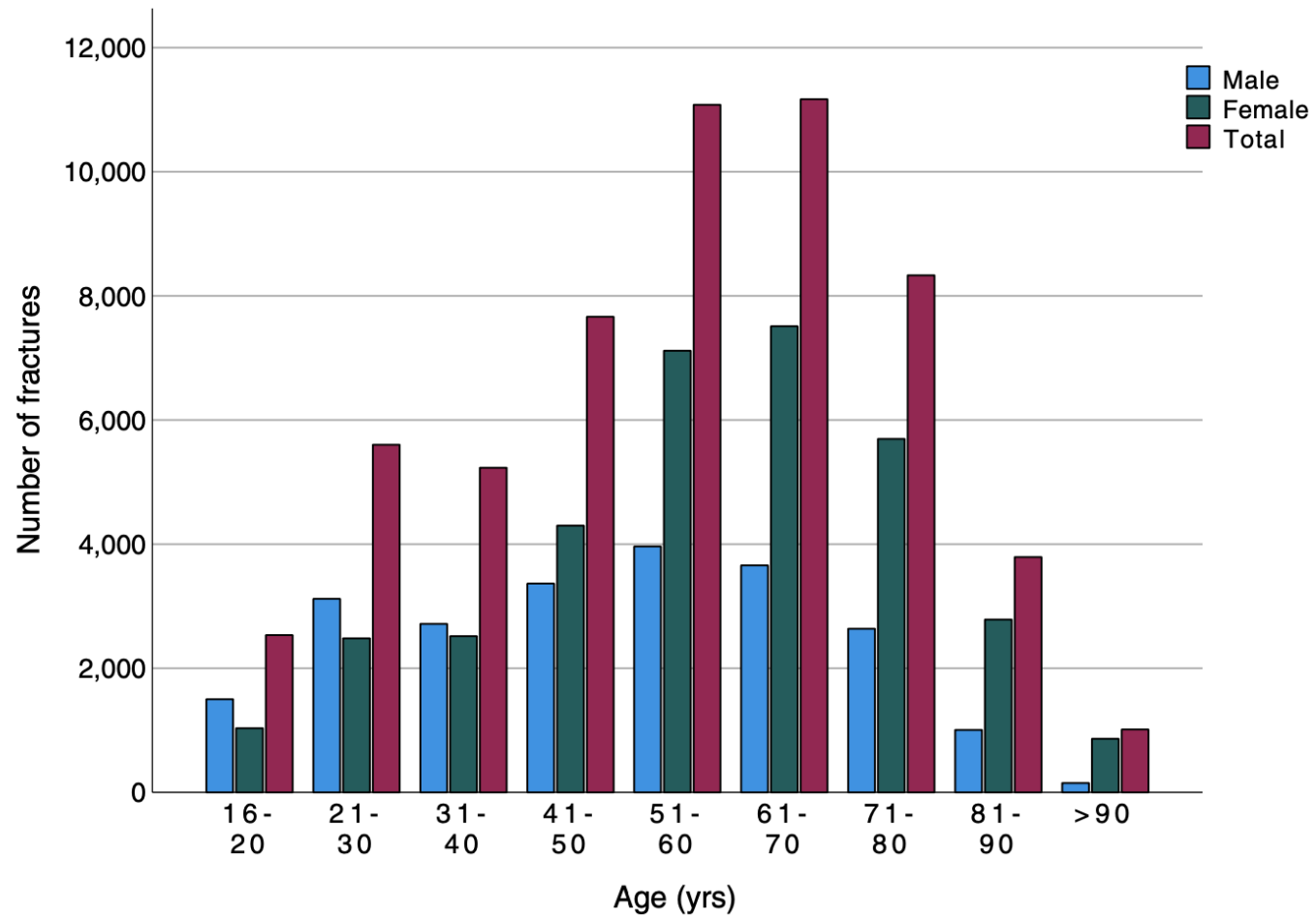


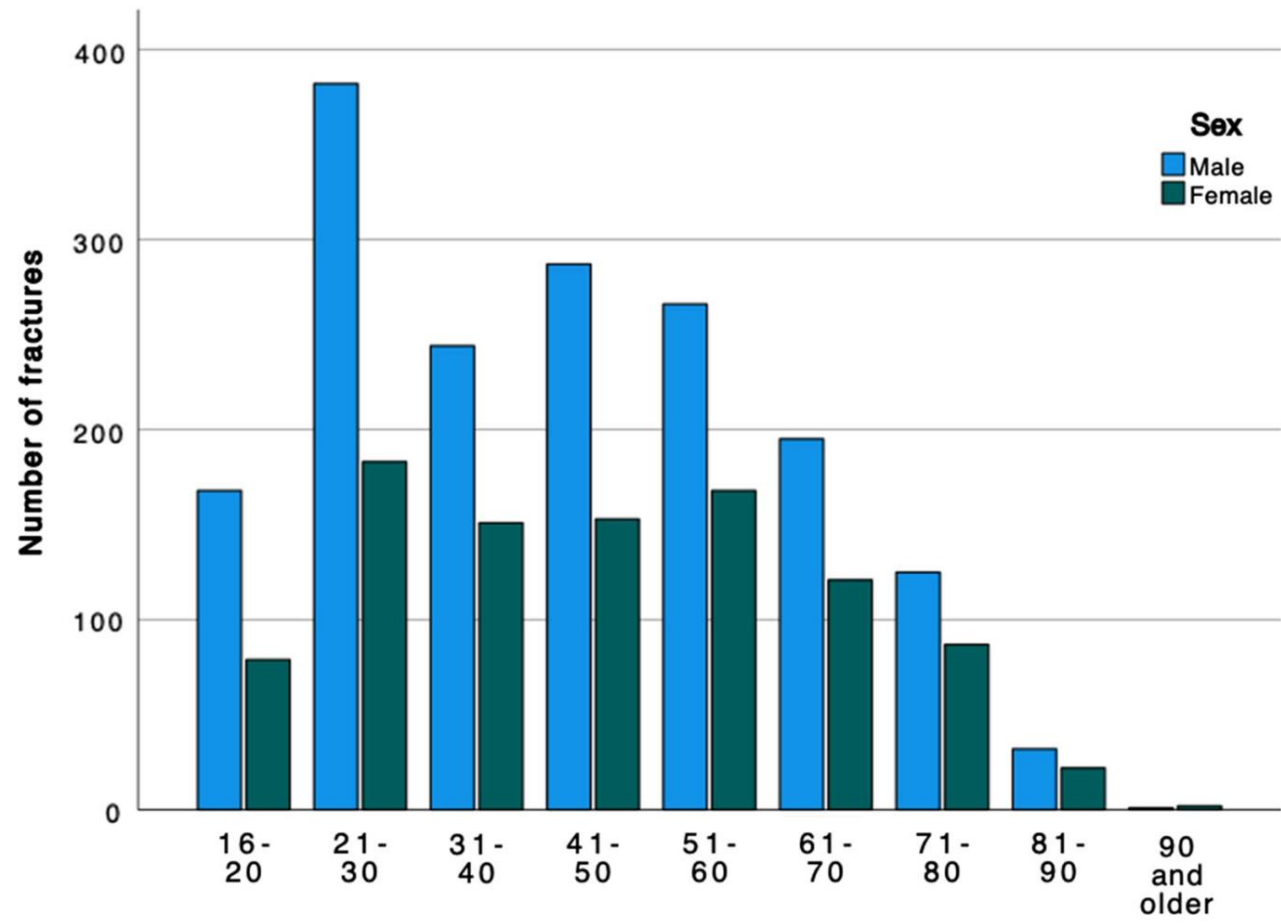
Emilia Möller Rydberg<sup>1,2\*</sup>, David Wennergren<sup>1,2</sup>, Caroline Stigevall<sup>1,2</sup>, Jan Ekelund<sup>3</sup> and Michael Möller<sup>1,2</sup>











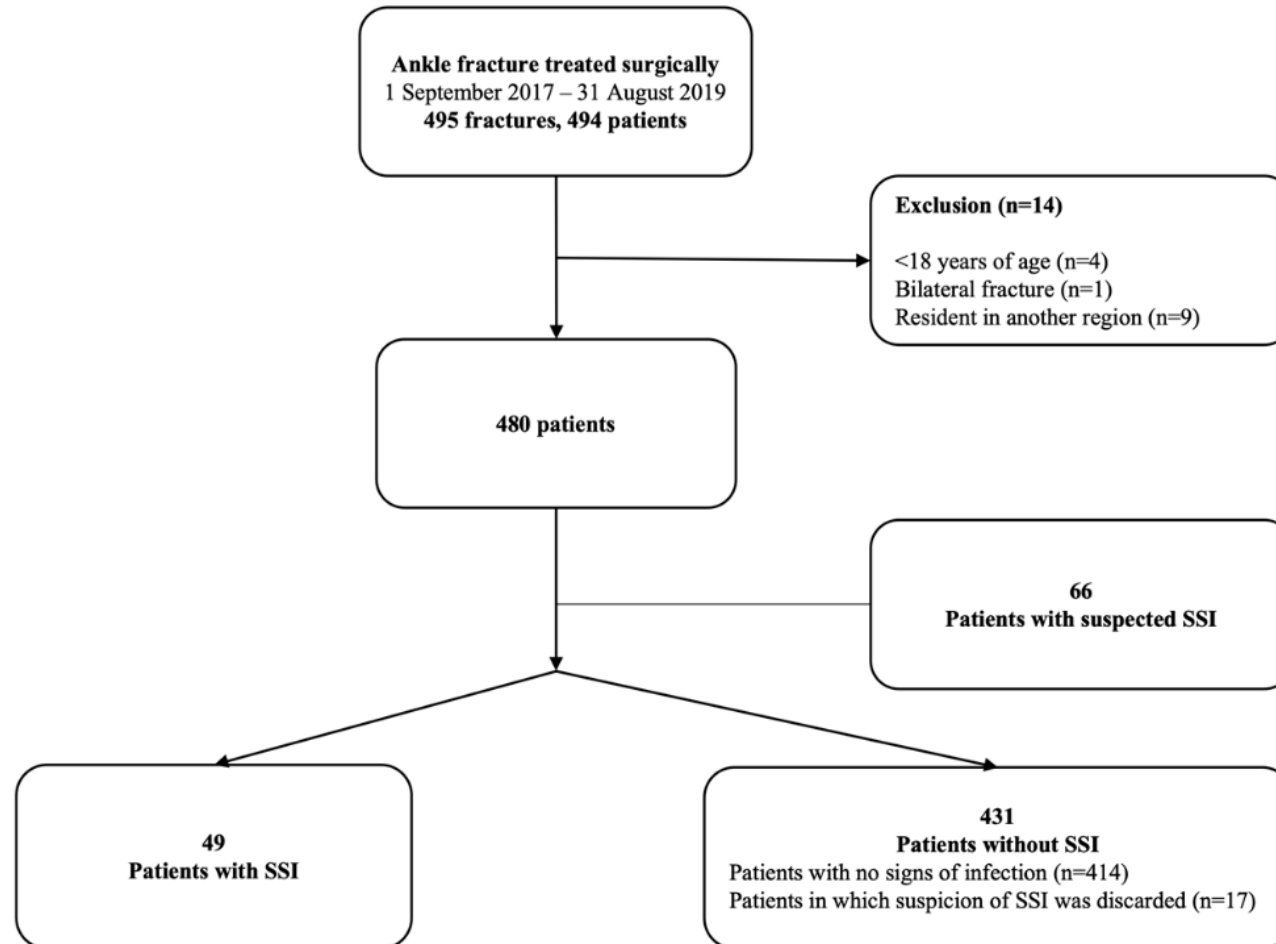




*Article*

# Incidence and Risk Factors for Surgical Site Infection in Ankle Fractures: An Observational Study of 480 Patients in Sweden

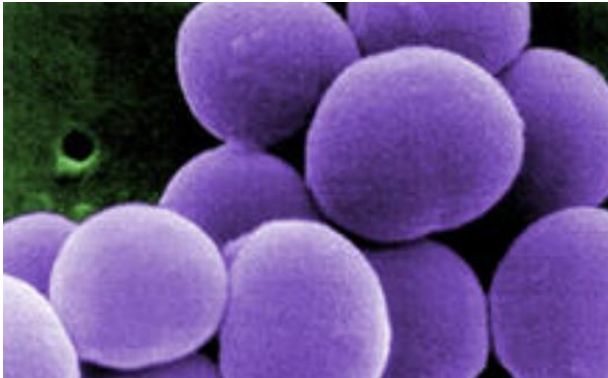
Johanna Bergström <sup>1,\*</sup> , Emilia Möller Rydberg <sup>1,2</sup> , David Wennergren <sup>1,2</sup>  and Karin Svensson Malchau <sup>1,2</sup> 



**10.2%** risk för infektion efter kirurgiskt åtgärdad fotledsfraktur

Störst risk efter en **öppen fraktur** (32.3% risk)

Oftast **S.aureus** (24% av fallen)



**Table 4.** Characteristics of the infected and non-infected patients with univariate analyses.

Characteristics	Infected— <i>n</i> (%) 49 (100)	Non-Infected— <i>n</i> (%) 431 (100)	<i>p</i> -Value
Age <sup>+</sup> , median (IQR, range)	61 (25, 21–93)	55 (29, 18–91)	0.016
Female sex	30 (61)	256 (59)	0.805
Diabetes *	6 (12)	36 (8)	0.419
Smoking	12 (24)	68 (16)	0.154
ASA 1–2	41 (84)	386 (90)	0.213
ASA 3–4	8 (16)	45 (10)	0.374
BMI *:			
<18.5	1 (2)	1 (0)	
18.5–24.9	15 (31)	127 (29)	
25–30	18 (38)	162 (38)	
>30	14 (29)	123 (29)	
Open fracture *	10 (20)	21 (5)	<0.001
Time until surgery <24 h	8 (16)	79 (18)	0.652
24–72 h	12 (24)	131 (30)	
>72 h	27 (55)	212 (49)	
Duration of surgery >90 min	25 (51)	193 (45)	0.601
LAF	24 (49)	247 (57)	0.228
Temporary external fixation *	7 (14)	35 (8)	0.176
Head surgeon:			0.249
Resident	15 (31)	165 (38)	
Specialist	12 (25)	124 (29)	
Consultant	22 (45)	141 (33)	
Length of stay (days) <sup>+</sup> , median (IQR, range)	4 (8, 0–20)	3 (5, 0–33)	0.037
No. of follow-ups <sup>+</sup> , median (IQR, range)	5 (7, 1–26)	3 (2, 0–24)	<0.001

No. of follow-ups: number of outpatient visits to a doctor after index surgery, either in the emergency room or orthopaedic department. Statistical analysis: Pearson's chi-square, Fisher's exact test \*, Mann-Whitney U<sup>+</sup>. Abbreviations: ASA, American Society of Anaesthesiologists; BMI, body mass index; h, hours; LAF, laminar air flow; LOS, length of stay; min, minutes; n, number; No, number.

**Table 6.** Cox regression analysis of risk factors for SSI.

<b>Variables</b>	<b>Hazard Ratio</b>	<b>95% C.I.</b>	<b><i>p</i>-Value</b>
Age *	1.016	1.00–1.36	0.122
Male sex	1.072	0.56–2.05	0.834
Diabetes	1.407	0.53–3.71	0.490
Smoking	1.232	0.58–2.64	0.591
ASA 3–4	0.866	0.33–2.56	0.768
BMI *	0.991	0.93–1.06	0.789
Open	2.960	1.26–6.96	0.013
Time from ER to surgery *	1.001	1.00–1.00	0.227
Duration of surgery *	1.000	1.00–1.00	0.990
OR without LAF	1.221	0.65–2.28	0.532
External fixation	1.045	0.39–2.80	0.930
Head surgeon: Resident	0.993	0.45–2.18	0.986
Specialist	Ref.		0.797
Consultant	1.245	0.58–2.69	0.576

String variables \*. Abbreviations: ER, emergency room; ASA, American Society of Anaesthesiologists; BMI, body mass index; LAF, laminar air flow; OR, operating room; Ref., reference.



■ **CHILDREN'S ORTHOPAEDICS**

**How common are refractures in childhood?**

A STUDY BASED ON 40,000 PAEDIATRIC FRACTURES FROM THE SWEDISH FRACTURE REGISTER

Sofia Amilon, Carl Bergdahl, Ebba Fridh, Torsten Backteman, Jan Ekelund och David Wennergren

The Bone & Joint Journal 1 aug 2023

Alla under 16 år med öppna fyser som registrerats i SFR

Fraktur mellan 1e maj 2015 och 31 december 2020

Ny fraktur i samma segment inom ett år räknades som

refraktur

40 090 frakturer

348 refrakturer = 0.88%

Mediantiden var 147 dagar mellan fraktur och refraktur

Vanligast var refraktur i diafysära underarmen 3.4%

67% av refrakturerna drabbade pojkar



Risken för refraktur minskar efter olika lång tid beroende på segment:

- 90 dagar i handleden (3 månader)
- 135 dagar i diafysära tibia (4,5 månad)
- 180 dagar i diafysära underarmen (6 månader)

RESEARCH ARTICLE

Open Access

# Incidence of bony Bankart lesions in Sweden: a study of 790 cases from the Swedish fracture register



Vladislavs Gordins<sup>1,2\*</sup>, Mikael Sansone<sup>1,2</sup>, Baldur Thorolfsson<sup>1,2</sup>, Michael Möller<sup>1,2</sup>, Malin Carling<sup>1,2</sup> and Nicklas Olsson<sup>1,2</sup>

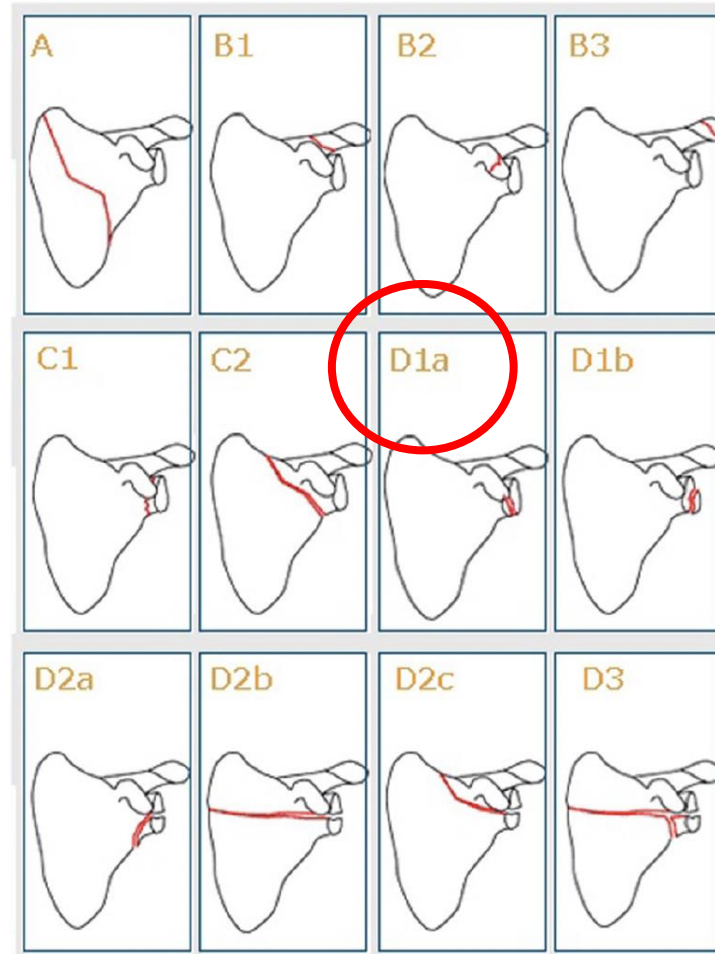
Möller

Exempel på studie där registerdata använts  
som en kohort för epidemiologisk kartläggning

Studien gjord av icke-frakturortopeder

Risk för övertolkning av data, t ex incidens

# D1a-frakturer 2012-2019



**Fig. 1** Modified Euler and Rüedi classification of scapular fractures

The present study shows that bony Bankart lesions are more frequent in the population over 50 years of age. This is contrary to primary anterior shoulder dislocation which usually occurs in the young population with the median age of 35 years [29]. One reason why a bony

The prevalence of male gender in all types of primary anterior shoulder dislocation is around 70% [29, 32]. The present study shows minor predominance for bony Bankart lesions in males, 58.7%.

**Conclusion** This national register-based study provides detailed information on the epidemiology, choice of treatment and patient-reported outcomes in a large cohort of bony Bankart lesions. Most bony Bankart lesions affected males between 40 and 75 years after low-energy falls and non-surgical treatment dominated.



acta orthopaedica belgica, 2023, 89, 241-247

ORIGINAL STUDY

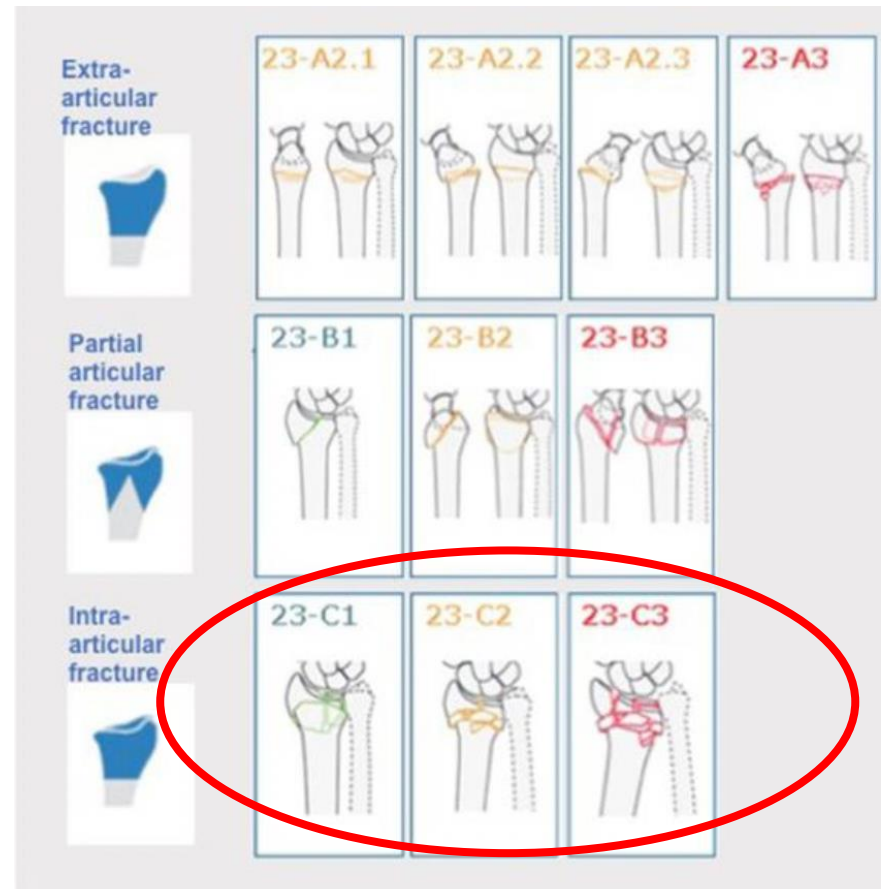
[doi.org/10.52628/89.2.11473](https://doi.org/10.52628/89.2.11473)

## **Treatment and outcome of AO/OTA type C distal radius fractures: 12 199 fractures from the Swedish Fracture Register**

Marcus SAGERFORS<sup>1</sup>, Hugo JAKOBSSON<sup>1</sup>, Per WRETENBERG<sup>1</sup>, Ole BRUS<sup>2</sup>, Michael MÖLLER<sup>3</sup>

Möller

# 12 199 frakturer 2012-2018



**Table I.** — Baseline data per subtype AO/OTA type C1, C2 and C3.

	<b>C1</b>	<b>C2</b>	<b>C3</b>
Number of cases	5400	4304	2495
Mean age (years)	62.0 (SD 17.0)	62.8 (SD 16.0)	60.8 (16.6)
Sex female/male (%)	74.9/25.1	77.2/22.8	67.1/32.9
Low-energy trauma/high-energy trauma/not known (%)	87.4/5.5/3.3	84.8/8.2/2.9	75.9/16.2/4.0
Simple fall	3550	2871	1380
Fall from a height	525	435	430
Unspecified fall	582	399	229
Traffic accident	371	330	288
Other causes	277	199	128
Cause unknown	95	70	40



**Table III.** — Type of treatment; number (%).

<b>Treatment method</b>	<b>Patients</b>
Cast	6042 (49.5%)
Volar locking plate	4325 (35.5%)
K-wire	208 (1.7%)
Double plates	157 (1.3%)
External fixation	78 (0.6%)
Bridge plate	12 (0.1%)
Other treatments	348 (2.9%)
Treatment information missing	1029 (8.4%)
Other treatments include combinations of treatments such as bridge plate, K-wires + external fixator, volar plate + K-wires, external fixator + volar plate.	

**Table IV.** — Distribution of problems with respect to EQ-5D 3L dimensions before

	Pre-fracture EQ-5D 3L		
<b>Factor</b>	<b>No problems</b>	<b>Moderate problems</b>	<b>Severe problems</b>
<b>Mobility</b>	5552 (87.4)	793 (12.5)	11 (0.2)
<b>Self-care</b>	5799 (91.0)	481 (7.5)	96 (1.5)
<b>Usual activity</b>	5434 (85.5)	608 (9.6)	315 (5.0)
<b>Pain/discomfort</b>	4133 (65.0)	2023 (31.8)	205 (3.2)
<b>Anxiety/depression</b>	5179 (81.3)	1080 (17.0)	112 (1.8)

ore the fracture and one year after; number (%).

<b>EQ-5D 3L one year after the fracture</b>		
<b>No problems</b>	<b>Moderate problems</b>	<b>Severe problems</b>
3318 (84.0)	613 (15.5)	17 (0.4)
3727 (93.0)	233 (5.8)	48 (1.2)
3213 (80.0)	689 (17.2)	112 (2.8)
1618 (40.4)	2252 (56.2)	134 (3.3)
3192 (79.6)	752 (18.8)	64 (1.6)

RESEARCH ARTICLE

# Finger fractures: Epidemiology and treatment based on 21341 fractures from the Swedish Fracture register

Henrik Alfort<sup>1,2\*</sup>, Johanna Von Kieseritzky<sup>1,2</sup>, Maria Wilcke<sup>1,2</sup>

**1** Department of Clinical Science and Education, Karolinska Institutet, Södersjukhuset, Stockholm, Sweden,  
**2** Department of Hand Surgery, Södersjukhuset, Stockholm, Sweden

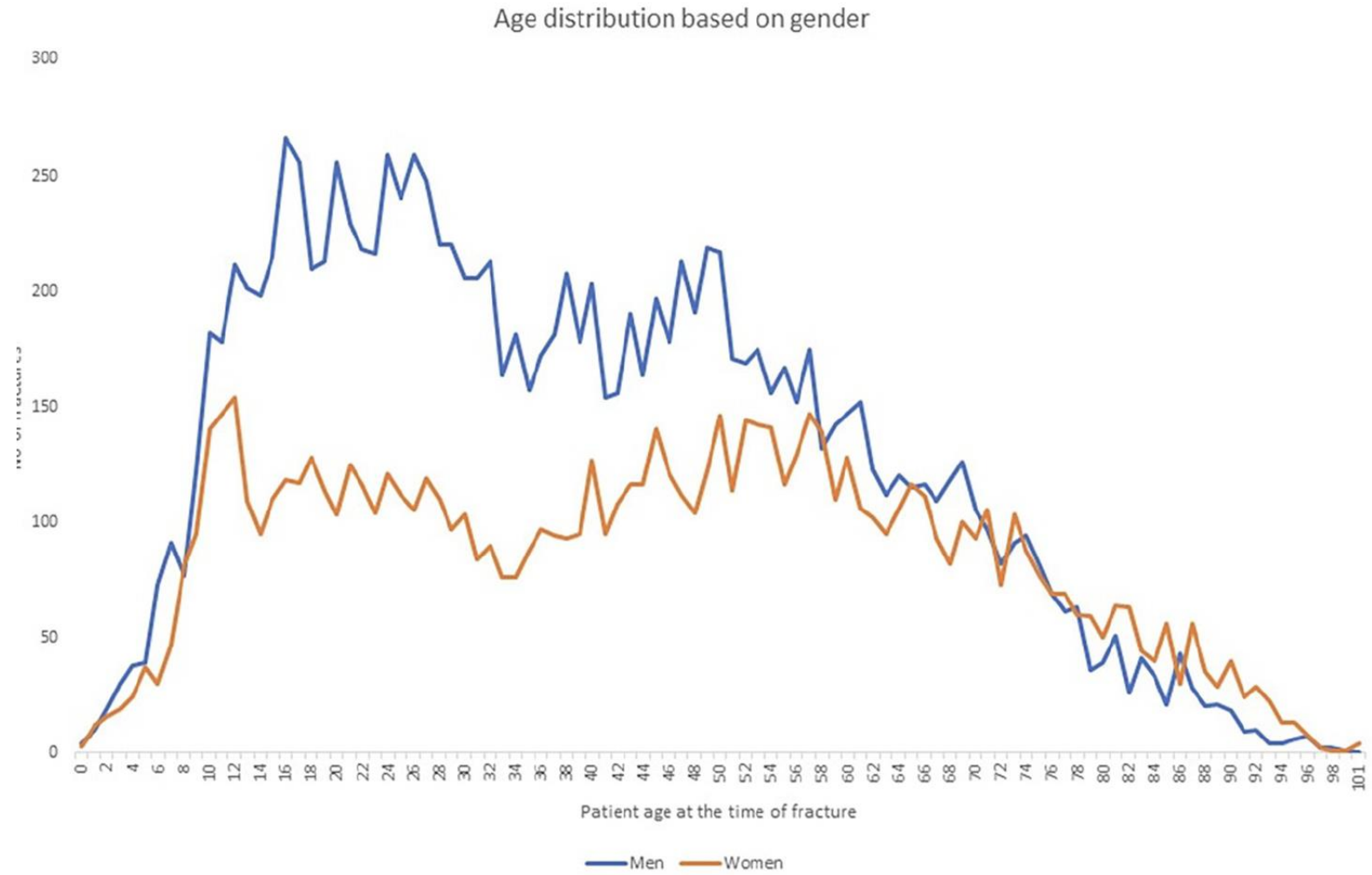
\* [henrik.alfort@ki.se](mailto:henrik.alfort@ki.se)

Möller

Exempel på studie där registerdata använts  
som en kohort för epidemiologisk kartläggning

Studien gjord av icke-frakturortopeder

Risk för feltolkning av data pga skevhet/bias



**Fig 2. Age distribution for all finger fractures 2015–2019. Blue-men, red-women.**

## Results

The most common finger fracture was of the base of the 5<sup>th</sup> finger, followed by the distal phalanx in the 4<sup>th</sup> finger. Open fractures were most common in the distal phalanges, especially in the 3<sup>rd</sup> finger. Intraarticular fractures were most frequent in the middle phalanges. Fall accidents was the most common cause of a fracture. The mean age at injury was 40 years (38 for men, 43 for women). 86% of finger fractures in adults were treated non-operatively. Men were more frequently operated than women. Finger fractures did not affect hand function or quality of life and there were no relevant differences in PROMs between fracture type, treatment, or sex.

# Ökade verkligen incidensen?

## Har de handkirurgiska klinikerna någon betydelse?

Table 3. Incidence of finger fractures in Region Västra Götaland 2015–2019.

Year	No of registred fractures	Population	Incidence (10 <sup>4</sup> PYR)
2015	1096	1648682	6.6
2016	1267	1671783	7.6
2017	1280	1690782	7.6
2018	1274	1709814	7.5
2019	1611	1725881	9.3



# Wolf

BJO



## ■ HIP

# Acetabular fractures: Epidemiology and mortality based on 2,132 fractures from the Swedish Fracture Register

**M. Albrektsson,  
M. Möller,  
O. Wolf,  
D. Wennergren,  
M. Sundfeldt**

*From Sahlgrenska  
University Hospital,  
Gothenburg, Sweden*

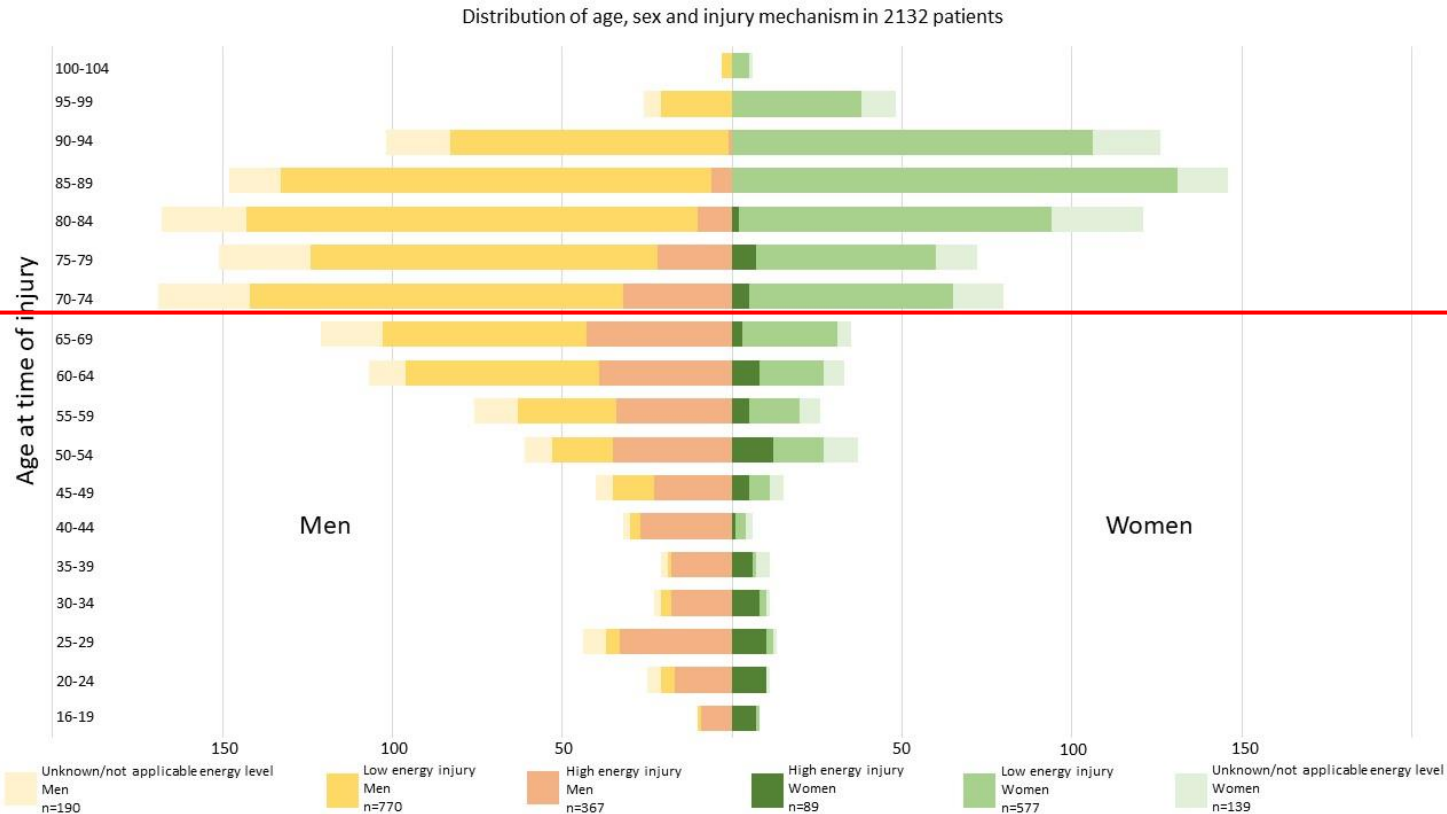
### **Aims**

To describe the epidemiology of acetabular fractures including patient characteristics, injury mechanisms, fracture patterns, treatment, and mortality.

### **Methods**

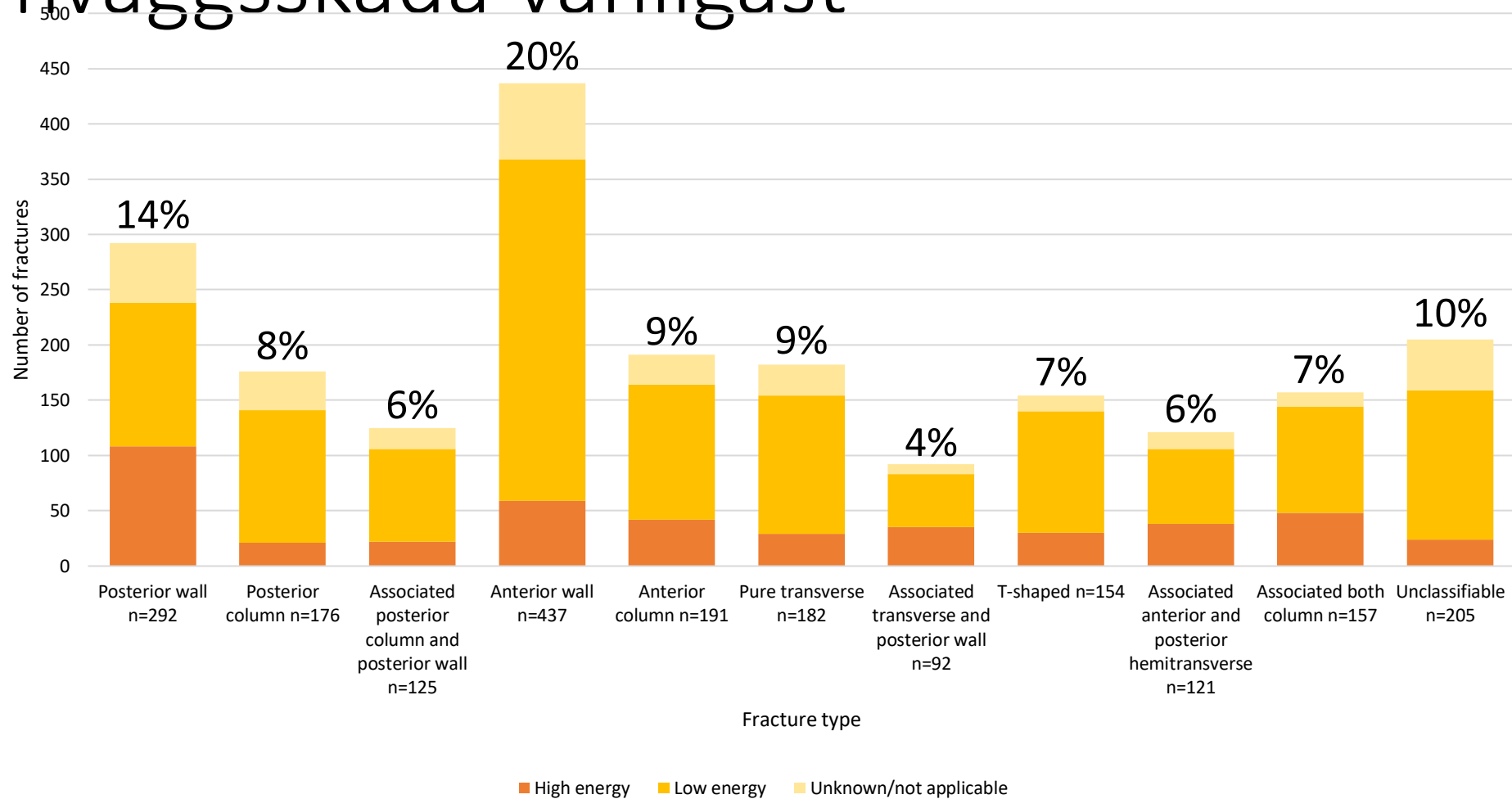
We retrieved information from the Swedish Fracture Register (SFR) on all patients with acetabular fractures, of the native hip joint in the adult skeleton, sustained between 2014 and 2020. Study variables included patient age, sex, injury date, injury mechanism, fracture classification, treatment, and mortality.

# En lågenergi-fraktur hos de äldre med mortalitet som höftfraktur (24% @1år) men högenergiskada hos de yngre männen



- 62% av patienterna >70 år, median 76 år
- 63% lågenergi och 21% högenergi
- >70 år: 8% mortalitet inom 30 dagar; 24% mortalitet inom 1 år

# Framväggsskada vanligast



- Högenergi: 24% bakvägg
- Lågenergi: 23% framvägg (svår klassifikation?) *Albrektsson M, Validation of the classification of surgically treated acetabular fractures in the Swedish Fracture Register. Injury. 2022;53(6):2145–2149.*

# 75% behandlas icke-operativt

**Table IV.** Distribution of fracture types, and the proportion of primary surgical treatment for each fracture type, for 1,995 fractures with registered treatment information.

Fracture type	Total fractures, n (%)	Early surgically treated fractures, n	Primary surgical treatment, %
Posterior wall	271 (14)	96	35
Posterior column	166 (8)	14	8
Associated posterior column and posterior wall	111 (6)	37	33
Anterior wall	418 (21)	31	7
Anterior column	181 (9)	60	33
Pure transverse	170 (9)	23	14
Associated transverse and posterior wall	89 (4)	37	42
T-shaped	138 (7)	45	33
Associated anterior and posterior hemitransverse	117 (6)	70	60
Associated both column	148 (7)	78	53
Unclassifiable	186 (9)	12	6

- 42% operativ behandling  $\leq 70$ , vs 15% op behandling  $>70$  år
- Operativ behandling:
  - 60% av Främre pelare bakre hemitransvers
  - 53% av tvåpelarskador
- 73% ORIF
- 15% ORIF+protes
- 7% protes



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## Is the Robinson classification of clavicle fractures accurate enough within the setting of the Swedish Fracture Register?

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Klassificering av fraktur

Robinson-klassifikation

Mediala frakturer	1A1	1B1	1A2	1B2
Diafysära frakturer	2A1	2A2	2B1	2B2
Laterala frakturer	3A1	3B1	3A2	3B2

Ej kunnat klassificera/ej klassificerbar

Enligt Robinson:

Dislocerad= 100% translation mellan huvudfragmenten

# Överensstämmelse SFR och Gold Standard 47%! (Kappa 0.35)= Fair

**Table 1**

Distribution of fracture type registered in the SFR and distribution of fracture type in the gold standard classification.

SFR		Gold standard	
Fracture type	Number of fractures	Fracture type	Number of fractures
1A1	1	1A1	5
1B1	6	1B1	1
1A2	0	1A2	0
1B2	0	1B2	1
2A1	3	2A1	3
2A2	18	2A2	23
2B1	28	2B1	41
2B2	19	2B2	1
3A1	14	3A1	29
3B1	21	3B1	8
3A2	1	3A2	2
3B2	4	3B2	1
Total	115	Total	115

Framförallt felställda klavikelfrakturer som var felklassifierade!

# Nästan perfekt inter/intraobserver agreement

**Table 2**

Interobserver agreement. *PA* Percentage of agreement, *CI* Confidence interval.

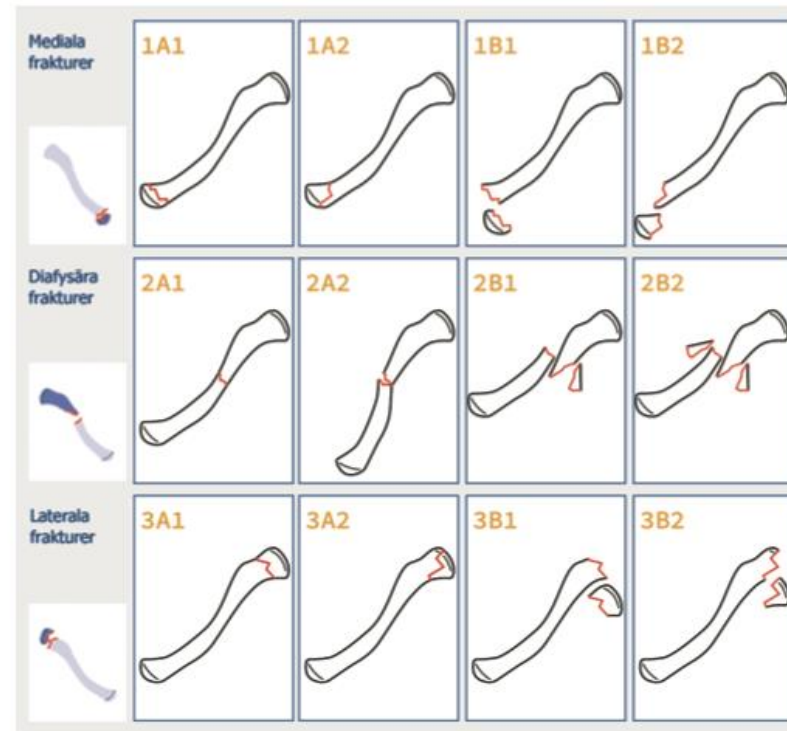
	Session 1			Session 2		
	PA	Kappa	95% CI	PA	Kappa	95% CI
Rater 1 vs Rater 2	89%	0.86	0.79–0.94	84%	0.81	0.72–0.89
Rater 1 vs Rater 3	89%	0.85	0.78–0.93	91%	0.87	0.81–0.94
Rater 2 vs Rater 3	84%	0.81	0.73–0.89	84%	0.81	0.72–0.89

**Table 3**

Intraobserver agreement between session 1 and 2. *PA* Percentage of agreement, *CI* Confidence interval.

	PA	Kappa	95% CI
Rater 1	95%	0.94	0.89–0.99
Rater 2	87%	0.84	0.77–0.92
Rater 3	91%	0.88	0.81–0.95

# Uppdaterade klassifikationsbilder med info- text om 100% felställställning



**Figure 6.** Suggestion for improving the classification guidelines for clavicle fractures in the SFR. Permission to reprint the image in this thesis has been collected from the SFR and illustrator Pontus Andersson.

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2023



RESEARCH ARTICLE

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# Age, sex, primary tumor type and site are associated with mortality after pathological fractures: an observational study of 1453 patients from the Swedish Fracture Register



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# Resultat

1453 patienter; 52% män

Median 73 år (18-100)

Operativ behandling 66%

Primary tumör vid frakturdiagnos:

Okänd 21%

Prostata 20%

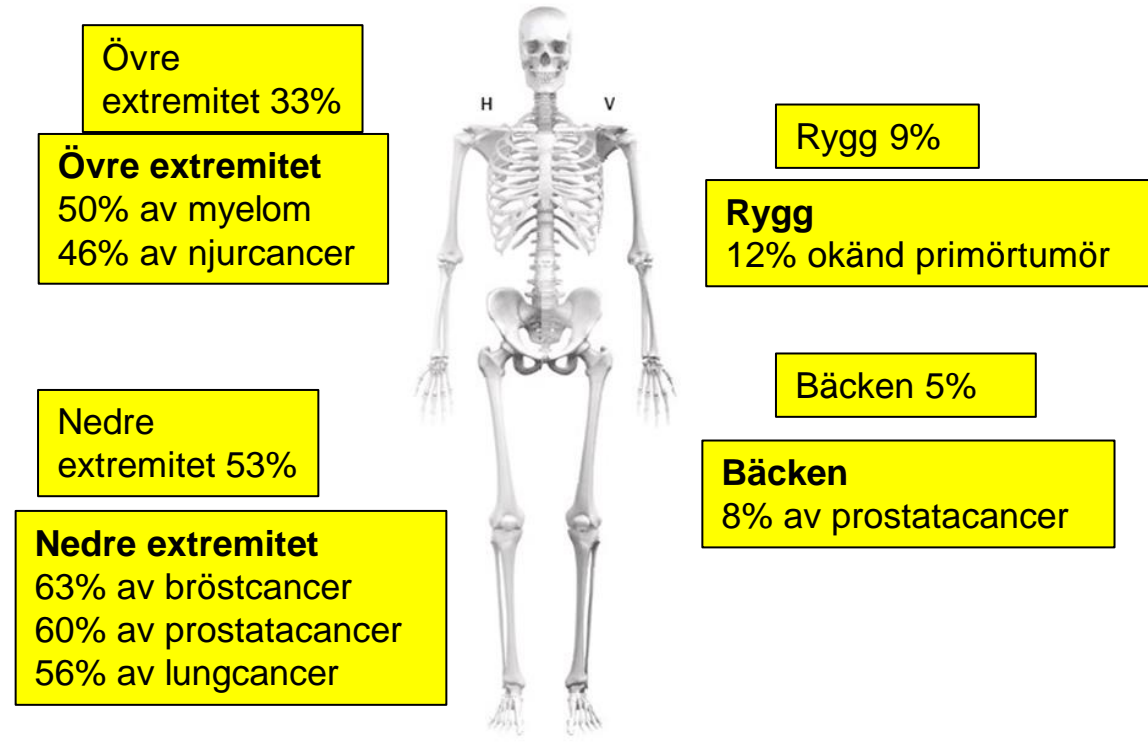
Bröst 15%

Myelom 13%

Lunga 9%

Njure 5%

# Distribution and metastasering



# Överlevnad efter patologisk fraktur

Median överlevnad 213 dagar (95% CI 185-241)

Lungcancer kortast (78 dagar)

Myeloma längst (432 dagar)

Mortalitet 12% inom 30 days & 60% inom 1 år

Ålder, kön (man) , primärtumör (lungcancer) & frakturlokalisering (extremiteter) associerad med högre mortalitet.