

# Incidence of postoperative periprosthetic femoral fracture in a geriatric population after short stem primary THA. A multicenter prospective case series.

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# Disclosure

The main author has no relevant financial disclosure

# Introduction

- THA is one of the most clinically successful and cost-effective interventions in health care<sup>1</sup>

**TABLE II Model Estimates and Projections Based on the National Health Expenditure for Primary and Revision Total Joint Replacement Procedures\***

Procedure	2005	2010	2015	2020
Primary total hip arthroplasty	231,648 (184,165 to 279,132)	293,094 (237,717 to 348,472)	378,089 (308,449 to 447,729)	511,837 (413,092 to 610,583)
Primary total knee arthroplasty	471,088 (386,256 to 555,920)	655,336 (555,891 to 754,782)	926,527 (799,578 to 1,053,476)	1,375,574 (1,193,173 to 1,557,975)
Revision total hip arthroplasty	42,451 (26,279 to 58,623)	48,209 (29,296 to 67,122)	55,647 (31,851 to 79,442)	65,964 (32,030 to 99,898)
Revision total knee arthroplasty	47,262 (31,724 to 62,800)	64,129 (45,861 to 82,397)	88,274 (64,869 to 111,679)	127,510 (93,614 to 161,405)

<sup>1</sup> Bozic et al. JBJS Am. 2009

<sup>2</sup> Kurtz et al. JBJS Am. 2014

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# Introduction

- Ageing of the population
- More THAs in older patients (>75yo)
- Increased risk of PPFx<sup>3</sup>
  - Qualitative and quantitative bone properties (osteoporosis, osteopenia)
  - Low-energy trauma (falls etc)

• <sup>3</sup>Cox et al. Journal of Arthroplasty 2016

# Introduction

- Increased use of short stems<sup>4</sup>
  - Facilitate tissue sparing approaches
  - Preserve proximal femur bone stock
  - Improve reconstruction of hip biomechanics
  - Protection against proximal stress shielding
- Encouraging short and mid-term results<sup>4,5</sup>.

• <sup>4</sup> van Oldenrijk et al, Acta Orthopaedica 2014  
<sup>5</sup> Kim YH et al, JBJS (Br) 2011

# Introduction

- A periprosthetic fracture after THA is a devastating event
  - Post-op complications
  - Poor clinical result
  - Increased mortality (17.7% 1-year mortality) <sup>6</sup>
- Risk factors <sup>7</sup>
  - Trauma
  - Age
  - Gender
  - Osteoporosis
  - Osteolysis / Aseptic loosening
  - Index diagnosis
  - Implants / Technique

<sup>6</sup> Shield et al. Geriatr Orthop Surg Rehabil. 2014 Dec

<sup>7</sup> Franklin J, Malchau H INJURY 2007



# Question

Is there a higher incidence of postoperative periprosthetic fractures in the elderly after short stem THA compared to younger patients?



# Study design

- Data prospectively collected in five centers in Switzerland and Germany
- Demographics:
  - 766 patients = 873 THAs
  - 434 males and 439 females
  - Mean age 64.9 yo (range 24.3 - 91.3 yo)
- Three age classes:
  - Class 1 (<60yo): 257 hips
  - Class 2 (60-75yo): 481 hips
  - Class 3(>75yo): 135 hips



# Study design

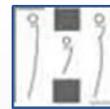
- Partial collum preserving, metaphyseal engaging, cementless stem (range 84-118 mm)  
(Optimys™, Mathys Ltd Bettlach, Switzerland)



- Mean follow up: 24.3 months (range 1.2 – 51.9 months)

# Results

- Five periprosthetic fractures, all due to documented falls in the first postoperative year
- Two B1, Two B2 and one B3 type according to the Vancouver classification



# Results

- Overall incidence: 0.57%
- Individual class values:
  - Age class 1: 0.39% (1/257)
  - Age class 2: 0.21% (1/481)
  - Age class 3: 2.22% (3/135)

# Results

- Overall incidence (Fisher's exact test):  $p=0.0425$
- Pairwise comparison with the Fisher's exact test
  - Age class 1 vs Age class 2:  $p=1.00$
  - Age class 1 vs Age class 3:  $p=0.12$
  - Age class 2 vs Age class 3:  $p=0.034$
- After Bonferroni correction the significance level was set to 0.0167
- We found **no statistically significant differences** of the PPFx incidence between the three age classes

# Discussion

- Short stems can provide stable fixation
  - Stability and osseointegration are independent of poor bone quality<sup>8</sup>
- No statistically significant differences between younger (<60yo) and elderly (>75yo) receiving a short stem<sup>9</sup>:
  - Clinical assesement (Harris Hip Score, VAS)
  - Radiological assesement

● <sup>8</sup> Kim YH et al., Int Orthopaedics (SICOT) 2013

<sup>9</sup> Gkagkalis G et al., SwissOrthopaedics 75th annual congress, Basel



# Conclusion

- The use of a short stem in the elderly is not associated with a higher incidence of postoperative PPFx
- A short stem can be a safe choice for primary THA in the geriatric population
- Longer follow-up and RCTs are necessary in order to further back up our hypotheses

Thank you for your attention

