

# Perioperative care of hip fracture patients

Citation for published version (APA):

Smeets, S. (2019). *Perioperative care of hip fracture patients*. [Doctoral Thesis, Maastricht University]. Ipskamp Printing BV. <https://doi.org/10.26481/dis.20191011ss>

## Document status and date:

Published: 01/01/2019

## DOI:

[10.26481/dis.20191011ss](https://doi.org/10.26481/dis.20191011ss)

## Document Version:

Publisher's PDF, also known as Version of record

## Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

## General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

[www.umlib.nl/taverne-license](http://www.umlib.nl/taverne-license)

## Take down policy

If you believe that this document breaches copyright please contact us at:

[repository@maastrichtuniversity.nl](mailto:repository@maastrichtuniversity.nl)

providing details and we will investigate your claim.

# VALORIZATION ADDENDUM

## RELEVANCE

Hip fractures are a major socioeconomic- and health burden. This thesis contributes to the improvement of various aspects of care for hip fracture patients. Even with optimal care, improved techniques and implants, elderly hip fracture patients suffer from high morbidity and mortality rates, which is associated with increased health care costs [1].

In the Netherlands more than 20.000 patients sustained a hip fracture in 2010 [6]. Prognostic calculations predict that the proportion of the population aged 65 and above will increase from 18% in 2017 to 26% in 2040 [7]. An increasing proportion of the population will be over 80 years old [7]. This will result in an increased incidence of hip fractures in the future. This thesis showed that the consequences of a fractured hip are serious for elderly patients. Up to 9% of patients die within 30-days, 29% within 1 year and 38% within 2 years after surgery [8]. Postoperatively, expensive aftercare is needed for rehabilitation, but the chance of full recovery to pre-fracture level of mobility is low [2-4]. Institutionalized elderly regained only in 17% of their overall functional ability and 13% returned to their pre-injury ambulatory status [5]. This thesis offers an extensive overview of perioperative care of hip fracture patients.

## TARGET POPULATION

The results of this thesis are relevant for health care professionals who are involved in the treatment of hip fracture patients such as orthopaedic and trauma surgeons, anesthesiologists, geriatricians, emergency physicians, cardiologists but also general practitioners, emergency staff, ambulance staff and nursing home physicians. In addition, the results of this thesis are of interest for (medical) companies (profit and non-profit), which are developing medical devices, products, apps and more to improve care for hip fracture patients.

## THIS THESIS

With the patella pubic percussion test (PPPT) we propose a bedside technique to guide for further imaging when no clear fracture is found on X-rays, but clinically suspected (occult hip fracture). The PPPT has the potential to prevent missed

fractures and the costs associated with it. Missed hip fractures lead to secondary hip displacement, with increased risk of avascular necrosis of the femoral head, non-union and higher chances of morbidity after future operations [10]. We have organized local hands-on workshops for emergency staff, ambulance personal, general practitioners and surgeons about the PPPT. During these workshops we discussed the use of PPPT in a prehospital setting vs. the use of the PPPT in the case of expected occult hip fracture on an emergency department.

With a proper preoperative assessment we aim to reduce the risk associated with surgery and anaesthesia, to increase the quality of perioperative care, to restore the patient to the desired level of function, and to obtain the patients informed consent [11]. We have demonstrated shortcomings in preoperative cardiac screening of elderly with hip fracture. This thesis showed that 'cardiac overscreening' is a commonly occurring phenomenon and leads to increased delay to surgery, which poses a risk for perioperative complications and early mortality. These results show that it is important for treating teams to evaluate their own hip fracture care path and preoperative screening. National guidelines and quality indicators for Dutch hospitals advocate definitive treatment within 24 hours [12]. Preoperative cardiac screening should be executed in accordance with the American College of Cardiology & American Heart Association (ACC / AHA) guidelines, in this way unnecessary delay or excessive use of medical recourses and costs are prevented.

Finally, we performed a clinical study on implant failure after intramedullary nailing with dual lag screws for extracapsular hip fractures. The secondary purpose of this study was to evaluate the use of such implants for different fracture types in our institution. Studies on implant failure, are of great value for medical industries and indirectly lead to further improvement of their products.

## REFERENCES

1. Carpintero P, Caeiro JR, Carpintero R, Morales A, Silva S, Mesa M: Complications of hip fractures: A review. *World J Orthop* 2014, 5(4):402-411.
2. Osnes EK, Lofthus CM, Meyer HE, Falch JA, Nordsletten L, Cappelen I, Kristiansen IS: Consequences of hip fracture on activities of daily life and residential needs. *Osteoporos Int* 2004, 15(7):567-574.
3. Shah MR, Aharonoff GB, Wolinsky P, Zuckerman JD, Koval KJ: Outcome after hip fracture in individuals ninety years of age and older. *J Orthop Trauma* 2001, 15(1):34-39.

4. Vochteloo AJ, Moerman S, Tuinebreijer WE, Maier AB, de Vries MR, Bloem RM, Nelissen RG, Pilot P: More than half of hip fracture patients do not regain mobility in the first postoperative year. *Geriatr Gerontol Int* 2013, 13(2):334-341.
5. Folman Y, Gepstein R, Assaraf A, Liberty S: Functional recovery after operative treatment of femoral neck fractures in an institutionalized elderly population. *Arch Phys Med Rehabil* 1994, 75(4):454-456.
6. Statistiek CBvd: Ziekenhuisopnamen heupfracturen; geslacht, leeftijd en diagnose-indeling. National database. 2014.
7. (CBS) CBvdS: Prognose: 18,4 miljoen inwoners in 2060. 2017.
8. Smeets SJ, Poeze M, Verbruggen JP: Preoperative cardiac evaluation of geriatric patients with hip fracture. *Injury* 2012, 43(12):2146-2151.
9. Mundi S, Pindiprolu B, Simunovic N, Bhandari M: Similar mortality rates in hip fracture patients over the past 31 years. *Acta Orthop* 2014, 85(1):54-59.
10. Parker MJ: Missed hip fractures. *Arch Emerg Med* 1992, 9(1):23-27.
11. Garcia-Miguel FJ, Serrano-Aguilar PG, Lopez-Bastida J: Preoperative assessment. *Lancet* 2003, 362(9397):1749-1757.
12. Nederlandse Vereniging van Heelkunde NVvH, Nederlandse Orthopaedische Vereniging NOV: Proximale femurfracturen (guideline). <https://richtlijnendatabasenl> 2016.