

# Is obesity a problem in primary hip replacement in the elderly?

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# BMI impact on Osteoarthritis

- Obesity is one of the leading public health problems. Adults obesity increased 2 times and youth obesity increased 3 times in last 20 years.
- Number of people with morbid obesity (**BMI > 40**) and super obesity (**BMI > 50**) is growing most rapidly.
- There is a relationship between obesity and expansion of osteoarthritis.
- Overweighted patient requires endoprosthesis **~13 years** earlier than the one with regular weight.

# BMI impact on Osteoarthritis

**BMI > 25 accelerates** development of osteoarthritis

Hrnack SA i wsp.: Correlation of BMI and blood loss during TKA and THA. Am J Orthop, 2012; 41(10): 467-471

BMI	Endoptosthesis requirement depending on BMI level
>30	8,5 x higher
>35	18,7 x higher
>40	32,7 x higher



# BMI impact on complications

- Overweight is **5-th cause of death** globally
- Overweight is **an independent risk factor** responsible for:
  - **50% diabetes mellitus**
  - **25% ischaemic heart diseases**
- **Obesity** generates **5-7%** of health care costs for patients **over 75** years old

# BMI impact on complications

- Operative treatment of obese patients (**BMI >30**) means:
  - **17% increase of complications** related to following **comorbidities**:
    - **diabetes mellitus**
    - **circulatory system diseases**
    - **respiratory system diseases**
  - longer hospitalization time

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Se: 1  
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Gornoslaskie Centrum Medyczne  
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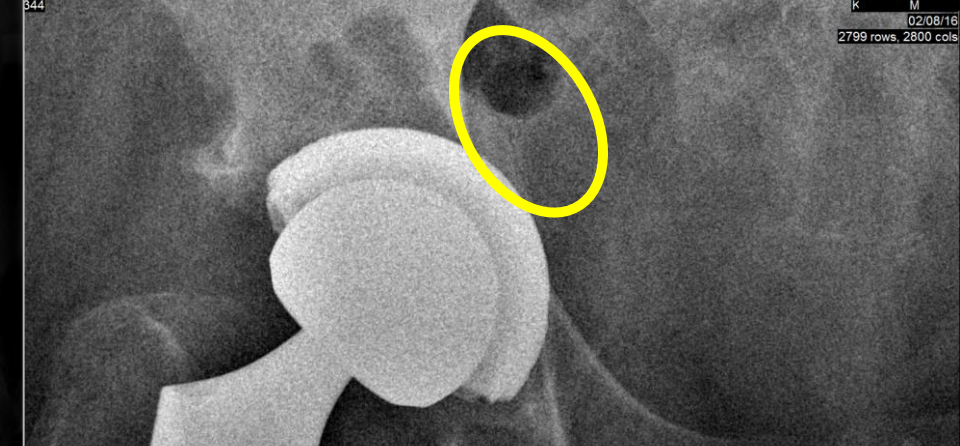
- **BMI >30** increases risk of **sciatic** or **femoral nerve** damage by **40%**

The obese patient. Perry KI i wsp, BJJ; 98-B, supp A 2016: 5-7



- **BMI >30 increases risk of superficial and deep infections 6,7 Times**

William M. Mihalko i wsp. Obesity, Orthopaedics and Outcomes BMI: William M i wsp. J Am Acad Orthop Surg 2014; 22: 683-690



10:28:26  
W=4094,L=2248 | 10mm/div

Fluorospot Compact FD  
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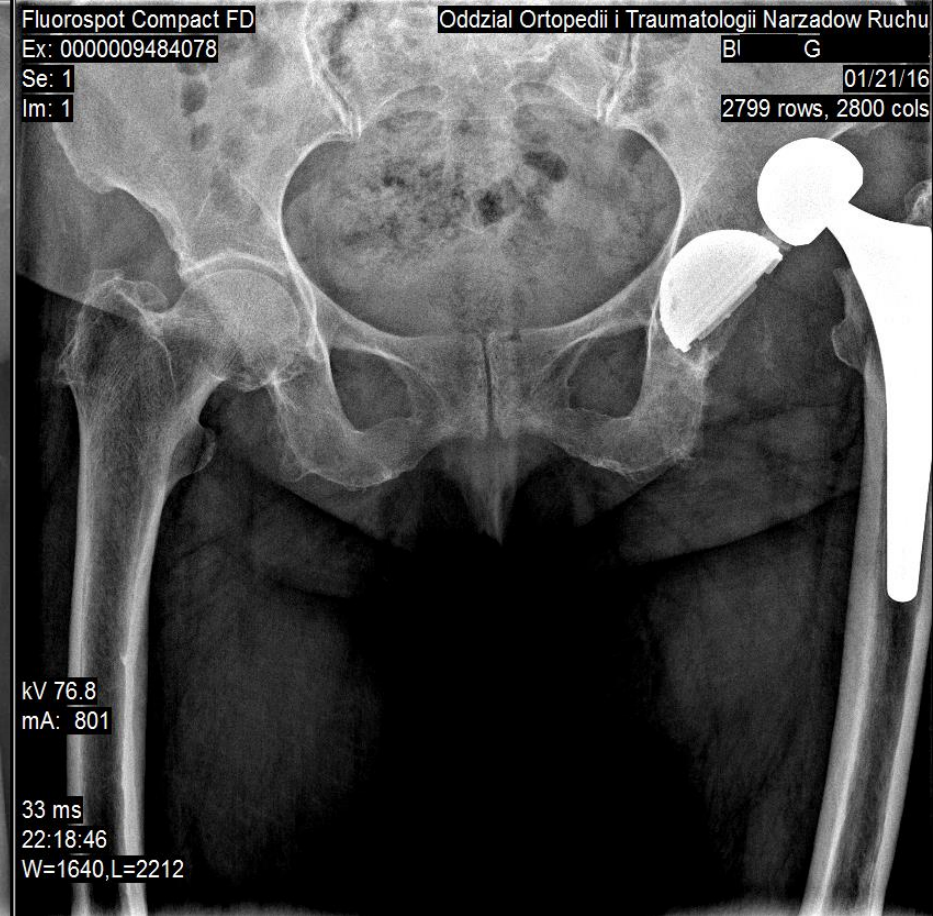
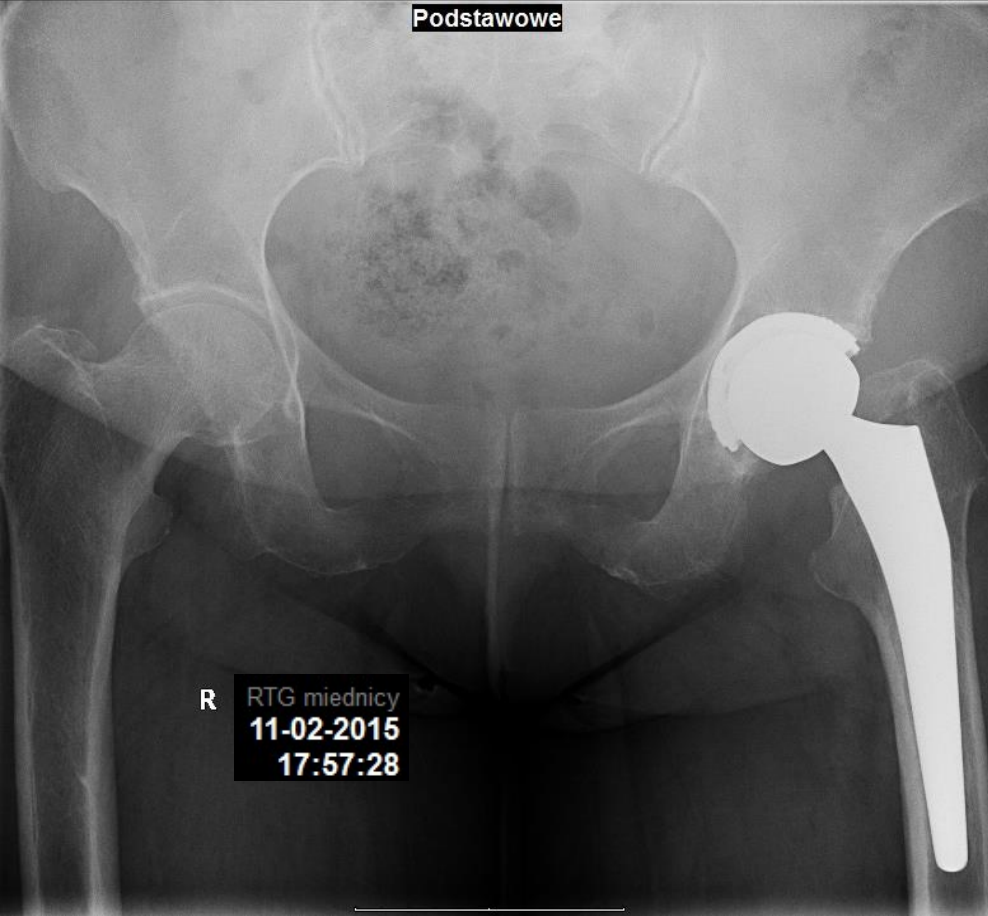
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- **BMI >30 increases risk of perioperative mistakes and improper endoprosthesis implantation**

The obese patient. Perry KI i wsp, BJJ; 98-B, supp A 2016: 5-7





- Operative treatment of obese patients (**BMI >30**) carries 12,2% risk of **habitual endoprosthesis dislocation**

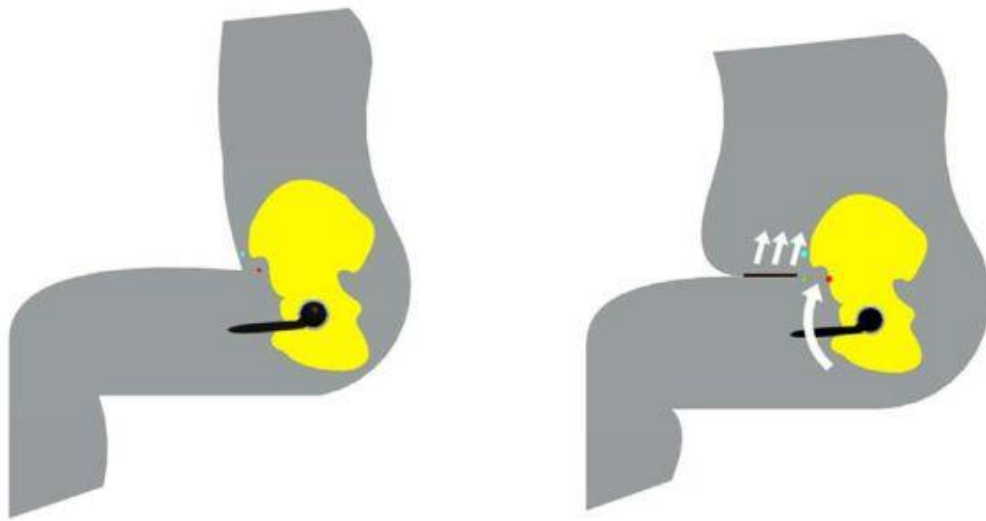


Figure 27: Possible soft tissue impingement leading to decreased stability post-THA for obese patients. Left: Sagittal plane schematic at the instant of maximum flexion prior to lift-off of the buttocks during a sit-to-stand maneuver. Right: Adverse kinetics involved in the obese sit-to-stand, demonstrating panniculus impingement, which creates an additional abdominal force and subsequent torque tending to cause subluxation of the hip joint.

Biomechanics of failure modalities in total hip arthroplasty,  
Elkins JM, *University of Iowa*, 2013

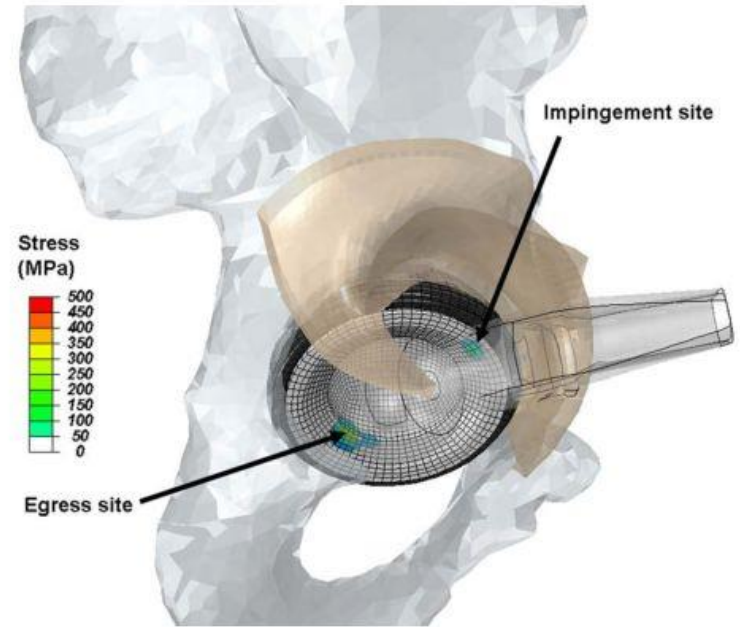


Figure 38: Contour plot of liner von Mises stresses developed during impingement/subluxation of a right hip at high flexion. Stress concentrations occur at two distinct regions of the cup: the impingement site (anteriorly) and the egress site (posteriorly). For visualization clarity, the bony femur is removed, the femoral component is rendered translucent, and only the anterior half of the capsule is shown.

- Reasons of habitual THA dislocation in obese patients (**BMI >30**)

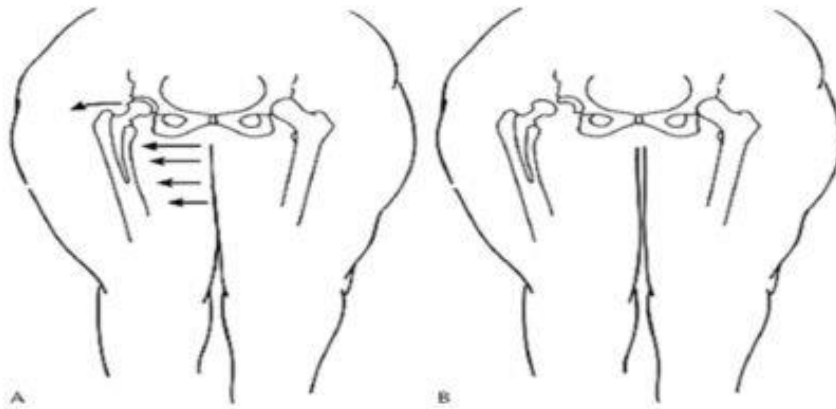


Figure 28: Possible mechanisms for dislocation in obese THA patients. (A) Thigh impingement during adduction creates a laterally directed force on the femoral component. (B) Thigh impingement is relieved if dislocation occurs.

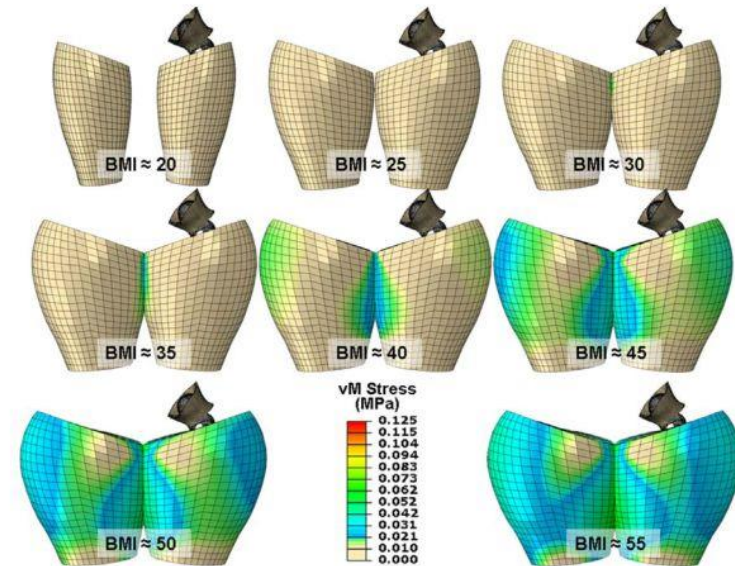


Figure 30: Eight graded levels of BMI were used in the dislocation FE series. Anatomic shape parameters were used for the baseline case (BMI=20), which were then scaled using anthropometric data to assume thigh geometry for an overweight patient (BMI=25) and six grades of obesity. An initial analysis step brings the thighs into appropriate position (as shown) for the beginning of the analysis, resulting in contact occurring between the thighs in all six obese FE models.

Biomechanics of failure modalities in total hip arthroplasty, Elkins JM, *University of Iowa*, 2013

- Reasons of habitual THA dislocation in obese patients (**BMI >30**)

# BMI – recommendations

- Operative treatment may be postponed in patients with BMI > 40 considering high risk of:
  - improper endoprosthesis implantation
  - postoperative complications
  - comorbidities connected complications
- **BMI does not influence** implant survival time. However survival time might be significantly shortened when the implant is improperly seated.



# BMI vs treatment costs

- Treatment costs are unclear:
  - hospitalization time in obese patients is longer, thus they utilize more hospital resources
  - **there is no difference** between obese patients and regular weight patients treatment costs
- **BMI > 25 does not increase** number of readmissions or 30 day mortality

American Academy of Orthopedic Surgeon Annual Meeting News March 11 – 14, 2014

- **BMI >25 lengthens** duration of operation, therefore it **increases** perioperative blood loss (**1 min anesthesia = 3,2 ml of blood**)

Hrnack SA i wsp.: Correlation of BMI and blood loss during TKA and THA. Am J Orthop, 2012; 41(10): 467-471

# BMI vs rehabilitation

- Overweight does not influence negatively endoprosthesis replacement outcomes
- Patients with **BMI > 50** might undergo rehabilitation faster than patients with regular weight

The obese patient. Perry KI i wsp, BJJ; 98-B, supp A 2016: 5-7

- **BMI >30** increases subjective quality of life after operation

William M. Mihalko i wsp. Obesity, Orthopaedics and Outcomes BMI: William M i wsp. J Am Acad Orthop Surg 2014; 22: 683-690

# BMI vs weight loss

- It is hard to lose weight:
  - because of the relation between obesity and lack of activity caused by joint pain
  - most of patients are not able to lose weight despite dieticians recommendations
- After endoprosthesis more patients gained weight than lost it

The obese patient. Perry KI i wsp, BJJ; 98-B, supp A 2016: 5-7

- **Operation may be postponed** until loss of weight, as after endoprosthesis most of patients do not lose weight



William M. Mihalko i wsp. Obesity, Orthopaedics and Outcomes BMI. J Am Acad Orthop Surg 2014; 22: 683-690

## BMI - conclusion

- Most doctors do not support limitations of hip and knee endoprosthesis access for obese patients
- The threshold is **BMI < 40**
- In morbid obese (**BMI > 40**) and super obese (**BMI > 50**) patients complication risk may exceed potential endoprosthesis benefits
- In those patients it is recommended to postpone endoprosthesis **untill BMI is reduced at least to 40**





**Thank you for your attention**