obesity and orthopaedic surgery, lose weight or operate?

Dr Matthew Hope
Orthopaedic Surgeon
When do we operate?

• No choice – injury, emergency conditions

• Elective - Now?
  - Later?
  - Never?
When do we operate?

- No choice – injury, emergency conditions

- Elective - Now?
  - Later?
  - Never?

- Diabetic
Example – bilateral slipped capital epiphysis – 9 year old

- **Paediatric Growth**
  - *Height*: 161.5 cm
  - *Weight*: 101.4 kg
  - *Body mass index*: 38.88 (Obese = > 19.0 99.8<sup>th</sup> Percentile)

- **Dietary/nutrition support history**
  a very large appetite and "eats constantly" according to mother
  Very large portion sizes
  Large intake of high fat and high energy snack foods and always takes juice and soft drink
  limited water
  limited vegetables
Difficulties

• Anaesthetic
• Positioning
• Equipment
• Length and difficulty of case
• Sub-optimal result
• Radiation dose
• Rehabilitation
‘In the SCFE group [106 patients], 81.1% of individuals had a BMI above the 95th percentile; for the control group [no SCFE], the corresponding figure was only 41.3% (P < 0.0001)’


Relationship between Body Mass Index and slipped capital femoral epiphysis.

Manoff EM¹, Banffy MB, Winell JJ.
Is obesity associated with arthritis?

• Boston – Framingham Cohort

• Review at mean age of 73.
  • 33% (468) developed radiographic knee arthritis

• Risk greatest in heaviest men and women

• Men - RR 1.41 upper weight quintile, not increased in second quintile
• Women - RR 2.07 in upper and 1.44 in second quintile
Is obesity associated with arthritis?

- 1993 – Chingford – 1003 women
- Middle tertile defined as BMI – 23.6 – 26.4
- Knee osteoarthritis RR – 6.17 between upper and lower tertile
- Bilateral OA RR – 17.99 between upper and lower tertile
- CMC and DIPJ OA – RR 1.71 and 1.52

How is arthritis linked to obesity?

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<tr>
<th>Activity</th>
<th>Force</th>
<th>% Body Weight</th>
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<tr>
<td>Walking</td>
<td>850 N</td>
<td>1/2 x BW</td>
</tr>
<tr>
<td>Bike</td>
<td>850 N</td>
<td>1/2 x BW</td>
</tr>
<tr>
<td>Stair Ascend</td>
<td>1500 N</td>
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</tr>
<tr>
<td>Jogging</td>
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<tr>
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<td>Deep Squatting</td>
<td>15000 N</td>
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Biochemical factors?

- Not all overweight people develop arthritis
- Osteo-arthritis found in underweight patients

- Inflammatory environment associated with obesity
- Active agents including adipocytokines, such as leptin
- Disordered glucose and lipid metabolism

- Increased pain in OA associated with obesity
‘I will be able to lose weight if I have this operation’

- 3893 patients THR and TKR – 2015

- Most patients maintained their body mass index after THR or TKR

- Increasing preoperative obesity correlated with a greater likelihood of weight loss

- Greater body mass index, total knee arthroplasty, and female sex were significant predictors of weight loss (p < 0.05)


Weight changes after total hip or knee arthroplasty: prevalence, predictors, and effects on outcomes. 

Ast MP¹, Abdel MP¹, Lee YY¹, Lyman S¹, Ruel AV¹, Westrich GH¹
‘I will be able to lose weight if I have this operation’

- PF Choong – Melbourne - 2010 – JBJS(Br)
- 529 patients. TKR – follow up 12 months

- 60% obese (BMI >30)
- Post-op 12% of obese patients lost weight
- Post-op 21% of obese patients gained weight
- Majority same weight
‘You would face less risks if you lost some weight’


Intra-operative complications – surgical  
DVT / PE (13,459 patients)  - not increased  
**Infection rate** (15,276 patients) - not sig increased (OR 1.19)  
**Revision rate** (12,101 patients) - increased (OR 1.9)  
Outcomes (Oxford knee score)  - increased (OR 1.3)  - poorer outcome (small)

‘We believe that obese patients should be informed of the above-mentioned risks and should be advised to lose weight.’

The Influence of Obesity on the Complication Rate and Outcome of Total Knee Arthroplasty A Meta-Analysis and Systematic Literature Review  
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- 30 (14%) adverse events in non-obese
- 59 (22%) adverse event in obese
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'Come back when you have lost some weight'

- non-surgical, non-pharmacological weight loss interventions

- ‘No significant differences were reported in incidence of superficial surgical site infections in THA or TKA patients who lost weight pre-operatively compared to those who maintained their weight in either study.’

- ‘There is limited evidence to support the recommendation of weight loss in the year prior to TJA’


Effect of non-surgical, non-pharmacological weight loss interventions in patients who are obese prior to hip and knee arthroplasty surgery: a rapid review.

Lui M1, Jones CA2, Westby MD3.
Surgically assisted weight loss before joint replacement?

125 patients. Total knee replacement. Morbidly Obese patients

3 groups

Group 1  No bariatric Surgery
Group 2  Bariatric surgery less than 2 years prior to knee replacement
Group 3  Bariatric surgery greater than 2 years prior to knee replacement

Operative differences
Complications at 90 days

Total Knee Arthroplasty in Morbidly Obese Patients Treated with Bariatric Surgery: A Comparative Study
Erik P. Severson, MD,1,2 Jasvinder A. Singh, MBBS, MPH,2,4,5 James A. Browne, MD,6 Robert T. Trousdale, MD,2 Michael Sarr, MD,3 and David G. Lewallen, MD
Surgically assisted weight loss before joint replacement?

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<td><strong>90-day complications</strong></td>
<td>8/39 (21%)</td>
<td>1/25 (4%)</td>
<td>10/61 (16%)</td>
<td>P = 0.08</td>
<td>P = 0.60</td>
<td>P = 0.16</td>
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<td><strong>Postoperative transfusions</strong></td>
<td>0/39</td>
<td>3/25 (12%)</td>
<td>6/61 (10%)</td>
<td>P = 0.06</td>
<td>P = 0.08</td>
<td>P = 0.72</td>
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No significant differences – small sample size
Surgically assisted weight loss before joint replacement?

- 91 TKRs – BMI mean 51 – bariatric surgery → BMI 37

- Matched with BMI appropriate controls (pre and post bariatric surgery).

- ‘We found that patients undergoing bariatric surgery had a significant decrease in BMI, with a mean improvement of 14 kg/m2 (3 to 31) before TKA ($p < 0.001$). However, we found that the bariatric group performed worse [stiffness, re-operation] than comparison groups.’

- These results were unexpected as bariatric surgery has been advocated as a means of optimising patients before TJA.

- *MJ Taunton BJJ Nov 2015*
‘how long will my joint replacement last?’

- Paucity of evidence and conflicting as to the effect of obesity on implant ‘survival’.

- The long-term impact of BMI on ‘survival’ rates has also been studied. Spicer et al. had similar 10-year ‘survival’ rates (97.2% in the 326 obese patients being better than 95.5% in the non-obese matched control group).

- By contrast Vazquez et al. showed a 10-year survival rate of 92.7% in obese patients versus 98.5% in the non-obese patients.

- ‘Despite this difference being significant, the authors concluded by suggesting that good results were still obtainable in the obese group.’
Weight loss and joint replacement

• Obesity is associated with increased risks
Weight loss and joint replacement

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• Insufficient evidence to suggest immediate pre-op non-surgical weight loss reduces complications
Weight loss and joint replacement

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- Bariatric surgery reduces procedure time
Weight loss and joint replacement

• Obesity is associated with increased risks

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• Bariatric surgery reduces procedure time

• Unclear if bariatric surgery will reduce complications
Diabetic patients

• Diabetes related to obesity
• Neuropathy – non-reversible
• Complications compounded by obesity
• Pressure ulceration – feet and ankles
• Ulcer treatment does not equate to prevention
Neuropathic ulcer treatment – ‘offloading’

- Non-surgical – casts, boots, elevation
Neuropathic ulcer treatment – ‘offloading’

• Non-surgical – casts, boots, elevation

• Surgical – debridement, deformity correction, amputation

• Weight loss
No bone or joint deformity, no peripheral vascular disease

Peripheral neuropathy only

Morbid obesity – pressure related
Neuropathic ulcer treatment – ‘prevention’

• All of above treatment plus

• education

• weight loss
  – non-surgical
  – surgical – evidence - access

  – role for access to multi-disciplinary team
Types of obesity associated risk

• Increased incidence of injury
• Early onset of musculoskeletal disease
• Greater severity of condition
• Increased complexity of procedure
• Greater length of procedure
• Increased infection and revision
Operate or not?

- Patient awareness of increased risk in obesity
- No strong evidence for weight loss advantages in one year prior to surgery wrt complications
- ‘non-measurable factors’
- Bariatric surgery assisted non-operative care
Risks of orthopaedic surgery in the obese patient

Obesity prevention in children and young adults