Citation for published version:
Pegg, E, Pandit, H, Dodd, CAF & Murray, D 2014, 'Minimising risk of tibial fracture after cementless unicompartmental knee replacement', British Association for Surgery of the Knee, Norwich, UK United Kingdom, 8/04/14 - 9/04/14.

Publication date:
2014

Document Version
Early version, also known as pre-print

University of Bath

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.

Take down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.
Title: MINIMISING RISK OF TIBIAL FRACTURE AFTER CEMENTLESS UNICOMPARTMENTAL KNEE REPLACEMENT

Abstract

Tibial fractures are a potential risk after unicompartmental knee replacement (UKR). The aim of this study was to (1) characterise the typical depth and positioning of saw cuts made by surgeons performing mobile UKR, and (2) to assess which bone cuts have the greatest influence on the risk of tibial fracture. In twenty four tibial sawbones used during a training course for UKR surgery the depth of the vertical and horizontal cuts and the depth and angle of the pin hole were measured.

All the vertical bone cuts measured were most excessive posteriorly; cuts were 4.25±3.9mm (max:12mm) excessively deep posteriorly and 0.46±1.0mm (max:4mm) excessive anteriorly. The horizontal bone cuts posterior/anterior were not statistically different, and were excessive by 1.26±2.1mm (max:7.5mm) and 0.73±0.9mm (max:3mm), respectively. The tibial resection depth was 8.79±1.7mm on average. Of the 24 sawbones analysed, in 14 the pin hole penetrated the keel and one went through the posterior cortex.

Based upon the sawbone measurements, three finite element simulations were performed; an implanted component with (1) no excessive bone cuts, (2) a vertical cut excessive 1mm anteriorly and 10mm posteriorly, (3) a horizontal cut 5 mm excessive both anteriorly and posteriorly.

These preliminary experiments found the greatest bone strain in simulation (2). Therefore, to minimise the risk of tibial fracture care must be taken to ensure the vertical cut is not too deep posteriorly. One possible technique to prevent a deep vertical cut would be to saw down onto a shim inserted into a previously performed horizontal cut.
<table>
<thead>
<tr>
<th>Email address</th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author 4</td>
<td><a href="mailto:dwmurray@tesco.net">dwmurray@tesco.net</a></td>
</tr>
<tr>
<td>Author 5</td>
<td></td>
</tr>
<tr>
<td>Author 6</td>
<td></td>
</tr>
</tbody>
</table>

**Registration**  
Confirm

**Presentation**  
BOTH

**Conflict**  
Yes

**Conflict details**  
One or more of the authors have received funding from the manufacturer of the implant being investigated in this study.

**Previously presented**  
No

**Previously submitted**  
No

*Contact us if you have a problem or wish to withdraw a submission:* Hazel.Choules@virginmedia.com