SAW CUT ACCURACY IN TOTAL KNEE REPLACEMENT

M Barrow, A Ajuied, C Carlos, P Gibb and A Davies

Introduction

Computer navigated orthopaedic surgery which is becoming more widely employed in recent years was introduced primarily to improve the accuracy of implantation of the prosthetic device. There are however other aspects of the surgery and implantation where errors of accuracy may occur.

Aim

The purpose of this study is to assess the degree of accuracy of the osteotomy cuts during total knee replacement (TKR) when using a conventional oscillating saw.

Hypothesis

Our primary hypothesis is that a slotted guide will yield a more accurate cut than an unslotted cutting guide and secondarily that a 'second pass' of the saw blade will improve the accuracy.

Materials and Methods

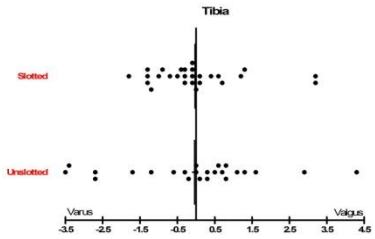
Three pairs of fresh frozen human cadaver knees were harvested and prepared in a holder, and positioned as for primary TKR. Standard cutting guides were used in conjunction with a clinical navigation system, and the difference between the planned resection and the achieved resection for each osteotomy was measured. A second 'tidying' pass of the saw blade was made and the error re-measured.

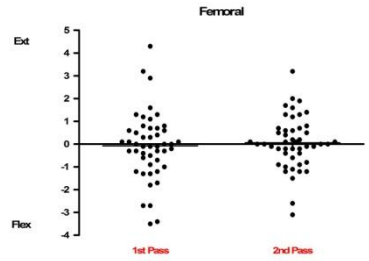
48 cuts for each of the slotted and unslotted guides were made using the right and left knees respectively. A single experienced surgeon performed all 96 osteotomies.

Results

Using the slotted guide for tibial osteotomies were more accurate than the unslotted guide in the sagittal (p=0.01) and coronal (p=0.04) planes.

Second pass cuts reduced variability in femoral (p=0.07) and tibial (p=0.17) osteotomies.





Discussion

Bone cutting by conventional oscillating saw is prone to high levels of random error that can result in implant Malalignment, thereby predisposing to early failure of the implant. Navigated surgery gives the surgeon the opportunity to check the accuracy of the resection relative to that which was planned, and to make adjustments to correct these errors where necessary. Dual pass of the oscillating saw to fine tune the osteotomy cut is recommended to improve accuracy. The need for new systems which afford more accurate osteotomy cuts is highlighted by the results.

Acknowledgment

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References

Jeffery et al. JBJS 73B 1991