A Mid-term Comparison of Off-the-shelf & Custom Short Stem Metaphyseal Femoral Implants
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Abstract

Introduction:
Short stem metaphyseal engaging femoral implants provide theoretical benefits compared to un cemented stems of conventional length. These include: 1) avoidance of proximal-distal mismatch; 2) decreased proximal stress shielding and; 3) reduction in peri-operative peri-prosthetic fractures. This study compares the minimum four-year clinical and radiographic results obtained with an off-the-shelf metaphyseal filling short stem to the five-year follow-up data obtained with a custom-made short stem implant.

Methods:
A prospective evaluation of 51 hips in 50 patients treated with an un cemented metaphyseal engaging short (91-105mm) stem with minimum 48 month follow-up was performed. The average age of patients in the study group at follow-up was 71 years (range: 32-95) with an average BMI of 28 (range: 19-42). The control group consisted of 69 THAs with CT-based custom-made short stem implants. These patients averaged 61 years of age (range: 22-79) and BMI of 28.9 (range: 20.3-44.1) at follow-up.

Results:
In the off-the-shelf short stem group the average Harris hip score (HHS) was 51 (range:10-70) pre-operatively and 91 (range:70-100) post-operatively; pre-operative WOMAC scores averaged 49 (range:9-91), compared to a post-operative average of 6 (range:0-25). No patients had thigh pain. All stems were radiographically stable with proximal bony in-growth. In the control group with custom short stems, the HHS averaged 55 (range:20-90) pre-operatively and 96 (range:55-100) post-operatively; WOMAC scores average 51 (range 13- 80) pre-operatively and 3 (0 – 35) post-operatively. There was no difference in post-operative pain or function scores between the two groups (two-sample t(179 df)=0.667, p=0.506).

Discussion & Conclusion:
This study confirms that an off-the-shelf short femoral stem designed to fit and fill the metaphysis provides as reliable fixation and function at a minimum four-year follow-up as a short stem custom implant designed to maximize metaphyseal contact.