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Short-Term Results of Ultra-Short Anatomic vs Ultra-Short Non-Anatomic Proximal Loading Uncemented Femoral Stems

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ABSTRACT

Background: Question arises as to whether rigid fixation of ultra-short anatomic or ultra-short non-anatomic proximal loading uncemented femoral stem can be obtained without diaphyseal stem fixation. The purpose of this study is to compare the short-term clinical results, radiographic results, revision and survival rates, and complication rates of ultra-short anatomic versus ultra-short non-anatomic uncemented femoral stems.

Methods: This study consisted of 50 patients (56 hips) in the ultra-short anatomic uncemented stem group (mean age 61.4 ± 14.7 years) and 50 patients (56 hips) in the ultra-short non-anatomic uncemented stem group (mean age 59.5 ± 15.2 years). The mean follow-up was 3.4 years (range 3-4) in the ultra-short anatomic stem group and 3.5 years (range 3-4) in the ultra-short non-anatomic stem group.

Results: At the final follow-up, the mean Harris hip scores (92 vs 93 points), Western Ontario and McMaster Universities Osteoarthritis scores (16 vs 15 points), University of California at Los Angeles activity scores (6.5 vs 6.8 points), the incidence of thigh pain (0% vs 4%), revision rates (0% vs 4%), aseptic loosening rate (0% vs 2%), and complication rates (2% vs 4%) were not significantly different between 2 groups.

Conclusion: Both ultra-short anatomic and ultra-short non-anatomic proximal loading uncemented femoral stems obtained rigid fixation without diaphyseal stem fixation in the short-term follow-up. This finding suggests that an ultra-short anatomic uncemented femoral stem can be replaced with an ultra-short non-anatomic uncemented stem to reduce inventory of the femoral stems, and consequently reduce manufacturing and delivery cost of these femoral stems.

Numerous studies have reported the excellent long-term survival of conventional uncemented femoral stems [1–6]. Considering that most uncemented stems are used in younger, heavier, and more active patients, preservation of the femoral bone stock and reduction in thigh pain, stress shielding, and periprosthetic fracture become more important. In an effort to reduce thigh pain, bone loss, stress shielding, periprosthetic fracture, revision, and anatomical proximodistal mismatch, an ultra-short proximal loading uncemented femoral stem was developed. Ultra-short uncemented stem requires less resection of the upper femur and/or less reaming of the femoral canal. This serves a dual purpose of facilitating future revision while providing a postoperative state closely mimicking the originally functioning hip [7,8].

Among numerous short bone conserving proximal loading uncemented stems, ultra-short anatomic and ultra-short non-anatomic proximal loading uncemented femoral stems were introduced to facilitate osseointegration of the implant without diaphyseal stem fixation. Ultra-short anatomic uncemented stem (Proxima; DePuy, Leeds, UK; Fig. 1) provides vertical stability by the wedge shape of the stem with the addition of a lateral flare and preservation of the femoral neck. Preservation of femoral neck provides greater torsional stability and reduces distal migration of the femoral stem [9]. The absence of the distal stem fixation is allowed because of the effective stability given by the lateral flare and preservation of the femoral neck. The absence of the diaphyseal anchorage attempts proximal load transfer to reduce stress shielding and thigh pain. It also attempts preservation of the femoral canal and femoral elasticity, and ease of revision [7,8].

Ultra-short non-anatomic proximal loading uncemented stem (Short Modular Femoral [SMF]; Smith & Nephew, Memphis, TN) (Fig. 2) provides vertical stability by the wedge shape of the stem with 3-point fixation in the femoral canal and preservation of the femoral neck. Preservation of the femoral neck and wedge shape of

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Fig. 1. Photograph showing the ultra-short anatomic uncemented femoral stem (Proxima).

the stem provides greater torsional stability and reduces distal migration of the femoral stem. The absence of the distal stem fixation is allowed because of the effective stability given by the wedge shape of the stem with preservation of the femoral neck. The absence of the diaphyseal stem fixation attempts proximal load transfer to reduce stress shielding and thigh pain. In addition, it attempts preservation of the femoral canal and femoral elasticity, and ease of revision.

The purpose of our investigation is to determine how ultra-short anatomic versus ultra-short non-anatomic proximal loading

Fig. 2. Photograph showing the ultra-short anatomic uncemented femoral stem (SMF).