

## C9

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### **Measuring the Notch: New Proposed Radiographic Measurements for Quantifying Notching in Total Knee Arthroplasty**

Notching the anterior femoral cortex may occur during total knee arthroplasty (TKA) and may increase the risk of periprosthetic fracture. Several studies have assessed notching; however, no standardized protocol exists on how to measure and report notching. By evaluating a series of primary TKAs with notching, we propose a standardized methodology for reporting notch data. Based on prior literature, we identified several measures: (1) maximal notch depth (mm); (2) notch depth (mm) at the anterior flange; (3) notch extent (mm) proximal to the femoral prosthesis; and (4) component flexion/extension. Additionally, we propose the (5) maximal notch ratio, defined as the maximal notch depth divided by the femoral cortex thickness and (6) the implant notch ratio (defined as the ratio of the notch depth to the cortex thickness at the anterior flange).

Two hundred consecutive patient records between 2007 and 2015 from a single-surgeon and a single facility were collected. Patient charts were reviewed for demographic information, perioperative documentation, and postoperative lateral knee radiographs. Evaluation of records and radiographs resulted in 39 patients with notching of the cortex. All measurements were calibrated on Picture Archiving and Communication Software.

Mean values of each measurement were 2.1mm 95% confidence interval (CI) (1.79–2.39 mm) for the maximal notch depth, 1.79mm (1.50–2.07mm) for the implant notch depth; 10.0mm (7.49–12.42mm) for the notch position, 0.87 (0.77–0.98) for maximal notch ratio, 0.75 (0.65–0.85) for the implant notch ratio, and 2.8 degrees (1.8–3.7 degrees) for the component flexion/extension.

Femoral component notching may represent a marked loss of the anterior femoral cortex. Even a small absolute measure of notching (1 to 2mm) may represent a greater than 50% loss of the anterior femoral cortex. The notch ratio is a reliable way to quantify the extent of notching which may facilitate interreportability between studies.