Can you nail it? The “modified notch” view aids in pre-operative planning of periprosthetic distal femur fractures

Alexander D Jeffs[1], Bradley John Lauck, Abigail Smith, Patricia Kirkland Wellborn, Zachary Visco, Judith Siegel[2], Andrew Chen[3]
[1]University of North Carolina At Chapel Hill Depart, [2]University of North Carolina, Chapel Hill, [3]UNC Orthopaedics

INTRODUCTION:

Total knee arthroplasty (TKA), and therefore periprosthetic distal femur (DF) fractures, are increasingly prevalent. Retrograde nailing (rIMN) is increasing as a treatment even in complex fractures. The DF prosthesis dictates whether rIMN is technically feasible due to “open” or “closed” box. Proposed is a “modified notch (MN) view” as a method for assessing whether a DF prosthesis is open or closed.

METHODS:

Radiographs of 17 TKAs were collected from varying manufacturers with/without opening in the notch. MN and standard AP/lateral views were obtained. The “modified notch view” is defined as AP knee with 30-45° knee flexion and the tube caudally angled 25-40°. Orthopaedic attendings and senior residents assessed whether rIMN could be inserted based on AP/lateral or AP/lateral/MN view. Reviewers rated their confidence using 5-point Likert scale (1=not confident, 5=very confident).

RESULTS:

Twelve reviewers were included. Trauma and adult reconstruction surgeons were excluded. With addition of MN view, 85.8% correctly identified whether or not a prosthesis had an opening for rIMN (confidence level 4.23). Without MN view, only 50% were correctly identified (confidence 3.12). There was a statistically significant difference ($p<0.001$) in reviewers’ ability and confidence in identifying an implant as open or closed with then MN view.

DISCUSSION AND CONCLUSION:

The “modified notch view” increased reviewers’ ability to accurately and confidently identify an “open” or “closed” box. This novel view is a reliable and easily utilized tool for pre-operative planning of periprosthetic DF fractures.

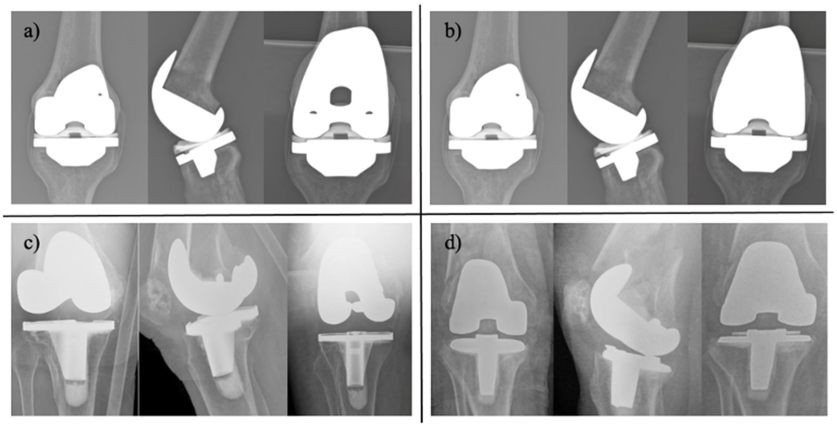

Figure 1. AP, Lateral and ‘modified notch’ views images from left to right, respectively, for the following: a) trial implant with open box, b) trial implant with closed box, c) fracture patient with open box, and d) fracture patient with closed box.