

COMPARISON OF FIVE IMPLANTS FOR TREATMENT OF SUPRACONDYLAR PERIPROSTHETIC FEMORAL FRACTURE BY FINITE ELEMENT MODEL

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The supracondylar periprosthetic fracture of distal femur is one of complications after total knee replacement (TKR) surgery with incidence of about 0,3 % to 2,5 % and occurs mainly in patients over 60 years of age or osteoporotic patients [1]. Several implants are being used for treatment of such fracture with various advantages and disadvantages but the surgeons still have no exact information how particular implant affects the response of the bone, the implant and the behavior of the fracture line under load.

Therefore, a finite element model of femur with a simple extra-articular fracture and a TKR has been created. The model was completed by models of five implants: Distal Femoral Nail, Angled Blade Plate, Dynamic Compression Screw, Less Invasive Stabilization System, and Non-Contact Bridging. Three variables were chosen for assessment under axial load and torque: the displacement of the bone, the stress distribution in implants, and the change in the distance between the proximal and the distal surface of the fracture.

The work extends the preliminary study [2] and analyzes whether the monitored variables show the same tendency in response to axial load and torque both for osteoporotic bone and for normal bone. In addition, it discusses the influence of implant material on the response and compares the bone displacement to the one of non-fractured bone.

REFERENCES

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