

Towards a patient-specific estimation of intraoperative femoral fracture risk

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Abstract: Total Hip Arthroplasty requires pre-surgical evaluation between un-cemented and cemented prostheses. A Patient with intra-operative periprosthetic fracture and another with a successful outcome were recruited, and their finite element models were constructed by processing CT data, assuming elastic-plastic behavior of the bone as function of the local density. To resemble the insertion of the prosthesis into the femur, a fictitious thermal dilatation is applied to the broach volume. Strain-based fracture risk factor is estimated, depicting results in terms of the total mechanical strain expressed using a simple “traffic lights” color code to provide immediate, concise, and intelligible pre-operative information to surgeons.