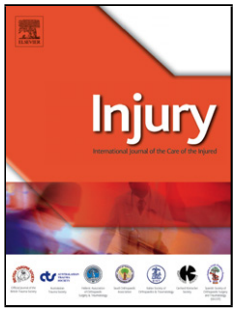

Title: Implications of three-dimensional modeling of the proximal femur for cephalomedullary nailing: An Asian cadaver study

Authors: Chang-Soo Chon, Bokku Kang, Han Sung Kim, Gu-Hee Jung

PII: S0020-1383(17)30428-X
DOI: http://dx.doi.org/doi:10.1016/j.injury.2017.07.009
Reference: JINJ 7299

To appear in: *Injury, Int. J. Care Injured*

Received date: 19-2-2017
Revised date: 24-6-2017
Accepted date: 9-7-2017

Please cite this article as: Chon Chang-Soo, Kang Bokku, Kim Han Sung, Jung Gu-Hee.Implications of three-dimensional modeling of the proximal femur for cephalomedullary nailing: An Asian cadaver study.*Injury* http://dx.doi.org/10.1016/j.injury.2017.07.009

Implications of three-dimensional modeling of the proximal femur for cephalomedullary nailing: An Asian cadaver study

Chang-Soo Chon[1], Bokku Kang[1], Han Sung Kim[1] and Gu-Hee Jung✉[2]

(1) Department of Biomedical Engineering, Yonsei University, Wonju, Gangwon-Do, 26493, Korea

(2) Department of Orthopaedic surgery, Gyeongsang national university Changwon hospital, 1, Samjeongja-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, 51472, Republic of Korea

✉ **Gu Hee Jung**

E-mail: jyujin2001@hotmail.com

Tel.: +82.55-214-3822

Abstract

Purpose: To determine the variability in the ideal entry point of cephalomedullary (CM) nail around the greater trochanter (GT) and the consequent conformity with the proximal femur by analyzing three-dimensional (3D) modeling and virtual implantation

Materials and Methods: A total of 105 cadaveric femurs (50 males and 55 females) underwent continuous 1.0 mm slice computed tomography (CT) scans. CT images imported into Mimics® software to reconstruct the 3D model of the proximal femur and medullary canal. PFNA-II® was processed into a 3D model using a 3D-sensor at the actual size and optimally implanted in the proximal femur model using Mimics® software. The ideal entry point, nail conformity with the proximal femur, and the relationship between the entry point and adjacent structures were assessed.

Results: The ideal entry point was located a mean of 2.38 mm (SD, 3.53 mm) medial to the tip of GT. No lateral cortex impingement of the proximal femur occurred in the coronal plane based on the recommended point. However, a disparity in the sagittal plane between the proximal shaft and nail curvature was found in 47 models (44.8%). Rotation and magnification of the 3D model exposed all nails above the surface of the medial side of the GT. The proximal nail end was