Abstract Submitted for the NEF15 Meeting of The American Physical Society

Biomechanical Fracture Risk Analysis of the Human Femur Bone JAE HOON CHOI, HAYOUNG KYUNG, JIMIN DAVID SHIN, CRG(Choice Research Group) — The femur is the longest and the strongest bone in the human body. In this research, biomechanical simulation of the loads and energies required to fracture the proximal part of the femur has been carried out in various cases under fixed variables. Factors such as loading conditions, mass of the colliding objects, speed of the mass, speed of the femur, and human weights were all considered as possible variables simulating one particular type of collision. Quantitative computed energy absorbed from the collision or fall was used to estimate the risk of fracture of the femur bone. Average bone density of 1500 kilograms per cubic meter, 1.3cm in radius and 27 percent of a person's height were used to calculate different masses of the femur in different heights of adults. By calculating the energy or work to fracture the isolated femur, we expect the use of the proposed variables to show improved assessments of the degree of fracture and of the component of risk of fracture that is associated with different types of collision. Data shows that the speed of the colliding object and moving speed of the human during collision or fall, rather than bone strength itself, can be the dominant factors causing the fracture of the femur bone.

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Date submitted: 19 Oct 2015

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