

## Letter to the Editor

# Comment on: “*In vivo* measurements of human bone deformation using optical segment tracking: surgical approach and validation in a three-point bending test”

To the editor,

Ganse B and colleagues<sup>1</sup> have done an excellent study on *in vivo* measurements of human bone deformation using optical segment tracking, which finished the first assessment of *in vivo* tibia deformation angles in humans successfully. We have tried several times to finish it, but give up halfway due to the difficulty in getting appropriate method.

However, we find several shortcomings in Ganse B's study which just happened in our previous study. Firstly, the choice of three points for inserting into screws, which are approximately 10 cm distal of the tibia plateau, in mid-shaft and approximately 10 cm proximal from the medial malleolus respectively, are not perfect. Because the length of each patient's leg is not consistent, so the point of approximately 10 cm distal of the tibia plateau and approximately 10 cm proximal from the medial malleolus are always changed in the tibia of different length. We advise that the three points should be changed for the midpoint of the upper half of the tibia, the midpoint of the tibia and the midpoint of the lower half of the tibia respectively. So that their position is constant in proportion, which will give more meaningful results.

Secondly, all the results from this paper were not real tibial deformation, which affected by the fibula deformation simultaneously. It is easy to understand because the phenomenon of both tibia and fibula deformation in clinical<sup>2</sup>. So we also advise the author can study the effects of the fibula deformation to the tibia. However, this is still missing in their another recently similar article, published in Plos ONE<sup>3</sup>.

Thirdly, the author used the screws' resonance frequency for evaluating whether screws remain fixed in the bone stably, which is a creative method. But the author does not tell us the laboratory temperature and humidity at the time. In our previous study, the temperature and humidity will change the resonance frequency. So lack of such data, may affect the reproducibility of the experiment.

Finally, we recommend drop cold saline of 0°C to the drill when drilling, which can minimize friction and heat development effectively.

**Y. Liu**

Third Hospital of Hebei Medical University, Shijiazhuang 050051, P.R. China;  
Key Orthopaedic Biomechanics Laboratory of Hebei Province, Shijiazhuang, P.R. China

**H. Li**

Third Hospital of Hebei Medical University, Shijiazhuang 050051, P.R. China;  
Key Orthopaedic Biomechanics Laboratory of Hebei Province, Shijiazhuang, P.R. China

## References

1. Ganse B, Yang PF, Brüggemann GP, et al. *In vivo* measurements of human bone deformation using optical segment tracking: surgical approach and validation in a three-point bending test. J Musculoskelet Neuronal Interact 2014;14(1):95-103.
2. Neumann L. Acute plastic bowing fractures of both the tibia and the fibula in a child. Injury 1990;21: 122–123.
3. Yang PF, Sanno M, Ganse B, et al. Torsion and antero-posterior bending in the *in vivo* human tibia loading regimes during walking and running. PLoS One 2014;9(4):e94525.

\*Corresponding address: Yueju Liu, MD, Department of Orthopedic Center, Third Hospital of Hebei Medical University, No. 139 Zi Qiang Road, Shijiazhuang, Hebei 050051, P.R. China liuyueju1983@gmail.com