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Invited Editorial

Commentary on: Finite element analysis of the effect of sagittal angle on ankle joint stability in posterior malleolus fracture: A cohort study

Dear Editor,

I read with great interest the article "Finite element analysis of the effect of sagittal angle on ankle joint stability in posterior malleolus fracture: a cohort study" by Guan et al., published in the Int J Surg. 2019; 70:53-9.

Guan et al., applied finite element analysis technology (FEA) to establish posterior malleolus fracture models with different sagittal angles. These models could serve as a monitor to access the ankle joint stability [1]. In their research, they first used FEA to create 5 groups of posterior malleolar fracture models with different angles on the ankle joint of the same volunteer. Then they established links between the stability of ankle joint with posterior malleolar fracture, and the sagittal angle of the fracture which was analyzed as a risk factor. Guan et al., showed that the sagittal angle not only reflected the three-dimensional structure of posterior malleolus fracture, but it also reflected the extent of ankle stability.

The traditional method to evaluate ankle stability of posterior malleolus fracture is to measure the fracture size of the articular surface and displacement of the fracture fragments [2]. Yao et al., regarded the sagittal angle to be an important index of the relative height of fracture fragments in three-dimensional structure of posterior malleolus fracture [3]. Many studies have focused on the impact of fracture size in the horizontal axis on ankle stability. However, the fracture fragments are actually three-dimensional structures, and their performances on the neutral axis can be different. It is, therefore, necessary to evaluate stability of posterior malleolus fracture using 3D views. The sagittal angle is useful to evaluate the three-dimensional size of fracture fragments. The sagittal angle not only shows the height of the fragment, but it also reflects the relationship between the height and the length of the fragment.

Guan et al., only simulated the patient's ankle standing on the injured foot, and evaluated stability of the ankle with 600N stress loaded vertically in a neutral position [1]. This is not representative on stability of the ankle in all ranges of motion. The reason may well be that the ankles could not be moved in all ranges of motion due to the ankle joints being immobilized in patients with posterior ankle fracture but without internal fixations.

The sagittal angle could serve as a monitor to access ankle joint stability in posterior malleolus fracture. More clinical studies should be conducted to verify the role of sagittal ankle in assessing posterior ankle joint stability in patients with posterior malleolus fracture.

Conflicts of interest

Authors declare no conflict of interest related to their submitted article.

Provenance and peer review

Invited commentary, internally reviewed.

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