

August 06-07, 2018
Prague, Czech Republic

Dominique P Andre Misselyn et al., J Univer Surg 2018, Volume: 6
DOI: 10.21767/2254-6758-C1-002

3D IMAGING ADDED VALUE IN THE INTER-OBSERVERS RELIABILITY OF THE SANDERS CLASSIFICATION OF CALCANEAL FRACTURES

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The Sanders classification is the most used classification of calcaneal fractures, but it has a moderate inter-observer agreement. To improve this reliability, several authors tested the added value of 3D imaging but they were not really successful. After segmentation (virtual disarticulation), 11 intra-articular calcaneal fractures corresponding to different types of the Sanders classification were 3D-printed with a standard 3D-printer. The 3D-prints and their 2D-CT counterparts of the same fractures were presented separately to 24 observers (trainees, radiologists, foot surgeons). Inter-observer agreement for the Sanders classification was assessed by using the kappa coefficient values (Fleiss kappa, Brennan and Prediger weighted kappa). Three versions of the classification were considered: Sanders classification with subclasses, without subclasses and combining Sanders III and IV subclasses. The gold standard for classification was the peroperative findings by a single surgeon. The 3D print always yielded higher values for agreement and chance-corrected agreement. The (Brennan and Prediger) weighted kappa equaled 0.35 (for 2D) and 0.63 (for 3D) for Sanders with subclasses; ($p=0.004$), 0.55 (2D) and 0.76 (3D) for Sanders without subclasses ($p=0.003$); and 0.58 (2D) and 0.78 (3D) for the fusion of Sanders III and IV ($p=0.027$). There was also greater agreement with the peroperative evaluation, 88% vs 65% (3D vs 2D, $p<0.0001$), and a higher percentage of Sanders III-IV with 2D compared to 3D, 56% vs 32% ($p<0.0001$). Based on this study we strongly advocate the use of 3D imaging of calcaneal fracture, with virtual disarticulation prior to perform osteosynthesis.

Biography

Dominique P Andre Misselyn has graduated from Leuven University in 2003 as Surgeon. He is currently Trauma Surgeon at Gasthuisberg University Hospital. He has published several papers about calcaneal fractures and 3D imaging of this injury.

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