

# No pain, no gain? Studies of the ideal way of making jump shots in handball

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For handball players, ankle sprains are just part of life. But this may be about to change: Christian Peham and colleagues at the University of Veterinary Medicine, Vienna have undertaken a detailed analysis of the three most important ligaments in the ankle. The group investigated the ligaments' movements and the strains to which they are subjected during the jump shot, the most frequent shot at goal. Peham's study is published in the *Journal of Biomechanics*.

Handball is one of the top four sports, at least as far as the risk of injury is concerned. In particular, the jump shot frequently causes sprained ankles, tears to the [ligaments](#) connecting the bones of the foot and the lower leg. One of the goals of [sports science](#) is to minimize sporting injuries while also improving performance. To this end, many trainers and sports scientists are making increasing use of hi-tech methods, such as the computer modelling of moving joints.

## Virtual ankle

To understand why the ankle is so prone to injury during the jump shot, a team of scientists headed by Christian Peham at the University of Veterinary Medicine, Vienna (Vetmeduni Vienna) has now investigated the stresses and [strains](#) to which the three most important ligaments in the ankle are subjected in a jump shot. Peham himself is Head of the Movement Science Group at the Vetmeduni Vienna and the work was performed together with researchers at the University of Vienna and the

Vienna University of Technology. The scientists studied digitized videos of handball players in action in combination with an anatomically precise and movable [computer model](#) of the human body. The measurements showed that there was more strain on the ligaments when the athletes land than when they jump. The ankle turned out to be particularly instable in the very short period of landing. Peham summarizes the findings, "When you land, there are additional strains on the ligaments that are hard to predict in advance and that have a particularly [high risk](#) of causing injury."

## Special training for fewer injuries

The results can be used as a starting point for the development of training techniques for handball players to help them reduce the risk of injury. Junior players could particularly benefit from improved training methods, as the new and improved movements could be learned from the very start. As Peham says, "If we understand the anatomy of the [ankle](#), its movements and the strains on it, we'll be able to give trainers tips on how to approach training to minimize the chances of injury."

**More information:** The article "The jump shot – A biomechanical analysis focused on lateral ankle ligaments" by M. Lindner, A. Kotschwar, R.R. Zsoldos, M. Groesel and C. Peham is published in the current issue of the *Journal of Biomechanics* (Vol. 45, pp. 202-206). [www.sciencedirect.com/science/.../ii/S0021929011006117](http://www.sciencedirect.com/science/.../ii/S0021929011006117)

Provided by University of Veterinary Medicine -- Vienna

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