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Do judo athletes utilize ukemi falling techniques during unexpected sideways falls?
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Introduction: Certain sports activities provide participants with training in safe falling strategies that might be utilized to advantage during unexpected real-life falls. A notable example is training of ‘ukemi’ in judo, which involves impacting the ground with a rolling motion, to distribute impact energy and contact force. However, it is not known whether judo athletes utilize ukemi during unexpected fall.

To test this, we compared the falling patterns of judo athletes and control participants who attempted to maintain their balance when subjected to a strong postural perturbation. We hypothesized that, in the event of a fall, judo athletes would exhibit quantitatively different landing strategies than untrained participants.

Methods: Study participants consisted of 15 male judo athletes with at least 5 years of experience (mean age=34 years (SD 9)) and 13 healthy male controls (mean age=21 year (SD 2)). During the experiment, the participant stood on top of a large platform (covered with gym mats) that was made to translate horizontally by means of a linear motor. The primary focus of analysis was the first trial, where we instructed participants that ‘your balance will be perturbed, and your goal is to maintain your balance.’ In order to minimize pre-planning of the postural response, no information was provided about the compliance of the ground, or the direction or speed of the perturbation.

Results: 60% of judo athletes and 85% of control participants fell and impacted their trunk or pelvis. Both groups exhibited similar falling strategies, characterized by failed attempts to recover balance by stepping, followed by ground impact to the knee and outstretched hands, and finally impact to the hip. Furthermore, there were no differences between groups in mean values of hip impact velocity (p=0.630) and trunk angle at hip impact (p=0.056).

Conclusions: Our results suggest that judo training has little effect on the sideways falling strategy that emerges following a failed attempt to recover balance. When participants focused on ‘maintaining balance’ (a common goal in real-life falls), a similar falling strategy emerged in judo athletes and control participants. However, our results also suggest that falling patterns can be influenced by central set (i.e., priority on balance recovery versus safe landing). This supports the notion that, with sufficient time and attention, individuals can voluntarily select from a repertoire of falling strategies that is safest for a given perturbation and environment.