

Martial arts fall techniques decrease the impact forces at the hip during sideways falling.

Groen BE, Weerdesteyn V, Duysens J.

Sint Maartenskliniek Research, Development and Education, P.O. Box 9011, 6500 GM, Nijmegen, The Netherlands. b.groen@maartenskliniek.nl

Falls to the side and those with impact on the hip are risky for hip fractures in the elderly. A previous study has indicated that martial arts (MA) fall techniques can reduce hip impact force, but the underlying mechanism is unknown. Furthermore, the high impact forces at the hand used to break the fall have raised concerns because of the risk for wrist fractures. The purpose of the study was to get insight into the role of hand impact, impact velocity, and trunk orientation in the reduction of hip impact force in MA techniques. Six experienced judokas performed sideways falls from kneeling height using three fall techniques: block with arm technique (control), MA technique with use of the arm to break the fall (MA-a), and MA technique without use of the arm (MA-na). The results showed that the MA-a and MA-na technique reduced the impact force by 27.5% and 30%, respectively. Impact velocity was significantly reduced in the MA falls. Trunk orientation was significantly less vertical in the MA-a falls. No significant differences were found between the MA techniques. It was concluded that the reduction in hip impact force was associated with a lower impact velocity and less vertical trunk orientation. Rolling after impact, which is characteristic for MA falls, is likely to contribute to the reduction of impact forces, as well. Using the arm to break the fall was not essential for the MA technique to reduce hip impact force. These findings provided support for the incorporation of MA fall techniques in fall prevention programs for elderly.