

Changes in ground reaction force during jump landing in subjects with functional instability of the ankle joint

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The objective of this study was to identify changes in ground reaction force during jump landing in subjects with functional instability of the ankle joint. The authors have recently demonstrated significantly altered patterns of ankle and knee movement immediately pre- and post-impact in subjects with functional instability compared to healthy control subjects. Their purpose here was to examine the changes in timing and magnitude of forces sustained by the unstable ankle during jump landing. The basic design of the study was to compare ground reaction force during jump landing between subjects with functional instability and healthy control subjects. Fourteen subjects with unstable

ankles and 10 age, sex and activity matched controls performed five single leg jumps onto a force platform whilst ground reaction forces were sampled. The timing and magnitudes of forces during the first 150ms following impact were analysed and compared between groups. The results were that lateral and anterior force peaks occurred significantly earlier in subjects with functional instability. Significant differences were seen between groups' time-averaged vertical, frontal and sagittal components of ground reaction force. These ranged from 5% (frontal force) to 100% (vertical force) of body mass. These changes occur immediately post-impact and too early for reflex correction/modification. The authors conclude that the disordered force patterns observed in subjects with functional instability are likely to result in repeated injury due to significant increase in stress on ankle joint structures during jump landing. They suggest that these are most likely to result from deficits in feet-forward motor control.

Pulley systems in sprint training

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A major goal for coaches of 100m sprinters is to improve the athletes' capacity to accelerate effectively to maximal speed. A common problem identified by coaches is the inability of sprinters to make smooth transitions from one phase of a race to the

next. Pulley systems used in sprint training should aim to improve the transition between the phases. This article focuses on different forms of acceleration training, their similarities and differences. It can be summarised that different muscles and different activity patterns are at work in the "pushing" and "striding" phases. These activity patterns must be trained differently. The authors discuss the application of pulley systems and various implications for coaching. They also give details of correct loading (distances, assistances, durations and quality considerations).

The effects of a sensorimotor training and strength training on postural stabilisation, maximum isometric contraction and jump performance

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Previous studies reveal that adaptations following sensorimotor training, performed to improve functional joint or postural stability, were characterised by improvements in the rate of force development during maximum voluntary isometric contraction. In classical strength training studies using intense loads, it has been shown that improvements in the rate of force development are mainly due to adaptations in intramuscular coordination. The purpose of the present study was to compare possible neuromuscular adaptations in two training groups following either sensorimotor or classical strength training over a period of four weeks. In addition, a control

group was investigated to contrast the adaptations seen after training. Postural stability, maximum voluntary isometric contraction and performance in squat-jump and drop-jump were measured before and after training. The results confirmed the positive effects of both training regimens on rate of force development, on maximum strength during maximum voluntary contraction and on jump performance, but only the improvements after strength training were significant. Strength training reduced iMEG but this was enhanced after sensorimotor training in most testing situations. Strength training also had positive effects on concentric contractions like squat-jump. The sensorimotor training improved performance in the reactive drop-jump by enhancing neuromuscular activity immediately after ground contact. It is concluded that classical strength training with high loads improves the mechanical efficiency of the efferent drive on the motor-neurons, whereas sensorimotor training alters the afferent input on the central nervous system. Both adaptations yield to specific effects during force development.



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