

Trunk loading and expectation

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Much of the epidemiological literature has reported that there is a link between sudden unexpected load handling and the risk of a low back injury. However, few biomechanical studies have investigated the effect of this type of loading on trunk muscular response. An experiment was performed to test the hypothesis that sudden unexpected loads would create excessive forces upon the trunk due to the overcompensation of the trunk muscles, and to quantify the degree of overcompensation. Twelve male subjects were asked to hold a box in a static lift position while weights ranging from 2.27 to 9.07 kg were dropped into the box from a constant height. Under some conditions (expected) the subjects were permitted to observe the weight drop while under other conditions (unexpected) the subjects were deprived of visual and auditory cues during the weight drop. Several components of the trunk response were observed. Mean muscle forces for the unexpected condition exceeded those in the expected condition by nearly two-and-a-half times, and peak muscle forces in the unexpected condition were on average 70% greater. In addition, the unexpected condition produced longer periods of force exertion, as well as more rapid increases in trunk force development. Generally, it was found that during sudden unexpected loading the trunk response resembled an expected loading of twice the weight value. These findings may provide guidelines for work situations where unexpected loading conditions are common.