Investigating External Interventions Applied to Football Headgear to Decrease Mean Peak Acceleration as Measured by a Single Axis Accelerometer Array

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Peak acceleration has been used in many studies to explore Football helmet safety. In this experiment, a linear drop test from 152 cm (6 feet) was performed in the NOCSAE (National Operating Committee on Standards for Athletic Equipment) fashion with four interventions to explore differences in peak accelerations when compared the control, a bare helmet. Several systems were explored; a Schutt helmet liner (liner Pro Air 2 XL EA) inflated to 89631.8 newton's per meter squared (13 psi), Guardian Cap (XL), Hutchinson Inner tube a 31.8 centimeter (12.5 in) filled with air at (3psi), and a Dilatant solution (C27H48O20 and H2O). A Vernier Logger Pro 3 software program with a Go link interface was used to calculate the amount of peak acceleration. A number of quality measures including a blinded slow motion video were devised to improve the drop testing. The peak acceleration was found for each test trial. Eight drops tests were performed per every intervention. The results suggest the Guardian System and the Dilatant solution showed a significant difference in peak acceleration when compared to the control, a bare helmet. These interventions may help to improve safety and quality of the football helmets.

Awards Won:

Society for Experimental Mechanics, Inc.: Third Award of $500 for excellence in Behavioraland Social Sciences.