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Quantifying the Effects of Various Football Shoulder Pads on Reach Distance and Player Perception of Comfort and Fit

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The majority of sports equipment research to date has focused on their protective capabilities, and not on how they impact player performance and comfort while using them. Therefore, the purpose of this study was to quantify the reach distances of football players during three shoulder pad conditions (no shoulder pad, standard shoulder pad, prototype shoulder pad). Player perceptions of shoulder pad comfort and fit were also evaluated following a standardized reach distance protocol including three trials of repeated shoulder flexion, extension, abduction, horizontal flexion, and horizontal extension. Reach distances were recorded using five GoPro Hero 9 cameras and analyzed using ProAnalyst® motion tracking software. Reach distances were significantly impacted during several movements, but especially in the vertical direction, for flexion and abduction, with mean differences between the prototype pad and standard pad of 10.3cm and 23.1cm, respectively. Differences in reach distance were greater for the standard shoulder pad than the prototype shoulder pad on average, compared to when no shoulder pad was worn. This suggests that the prototype shoulder pad was less restrictive, which aligned with what players reported. Participants also found the prototype shoulder pad to be significantly lighter, and more breathable. There was also significantly more discomfort reported in the neck collar and armpit regions for the standard shoulder pad compared to the prototype pad. These results provide manufacturers with valuable insights from a redesign standpoint, and offer athletes who are looking for superior sport protective equipment key evidence regarding shoulder pad performance, fit, and comfort.