VISUOMOTOR CONTROL OF SOCCER GOALKEEPERS IN A PENALTY KICK SITUATION

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The purpose of this study was to determine the gaze behaviors of skilled keepers attempting to save penalty kicks against kicks taken with the instep and inside foot, *in situ*.

Seven highly skilled keepers (18.7 ± 2.4 yrs) and seven right-footed kickers (25.4 = 4.7 yrs) with at least varsity level soccer experience volunteered for the study. The vision-in-action (VIA) (Vickers, 2007) system was used to collect the coupled gaze and motor behaviors of the goalkeepers. The goalkeepers faced penalty kicks in accordance with FIFA laws.

Instep penalty kicks were saved significantly more often ($p.<.006$) than inside kicks (28% vs. 12%). Trial duration was significantly faster for the instep (3473 vs. 3575 ms), as was the goalkeeper's hop duration (122 vs. 113 ms). We found this also in goals versus saves (117 vs. 122 ms). Ball speed is a measure of kicking success and in this study reached a velocity of 24.8 m/s (~90 km/h) on the inside penalty kick. Mean QE duration, the final fixation with an onset prior to goalkeeper's hop, was longer on saves than on goals (857 vs. 849 ms) and in instep (898 ms) than inside (804 ms) penalty kicks. Overall, the greatest concentration of fixations were on the ball (31%) (Williams & Burwitz, 1993), near the ball (24%), or on the head (10%) (Savelsbergh et al., 2002) during the kicker's preparation and run-up phases and during ball flight.

The results show, for the first time, that distinctive gaze characteristics occur during instep and inside foot kicks. Longer quiet eye durations on or near the ball were critical for making saves in both kicks.