processes that underpin competitive behaviour. Further procedural improvements need to be made, specifically to reduce the time needed to complete the analysis and to refine player information to reduce ambiguity and improve interpretation.

Validity of the Speedchek™ Personal Sports Radar device using limits of agreement

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Accurate and objective measurement of projectile speed in sport has relied upon complex and sophisticated filming procedures, sonic beams and, more recently, laser beams. Owing to the price of this equipment, availability has been limited to a small portion of the sporting population. Recently, a new batch of commercially available radar devices has been made readily available throughout the UK. The English Cricket Board endorses the Speedchek™ Personal Sports Radar device (Tribar Ind., Canada), claiming excellent reliability under a variety of conditions and configurations. However, no details have been produced about its validity in sport. The aim of this study was to ascertain the validity of the Speedchek™ radar device.

To analyse the validity of the Speedchek™ radar device over a range of speeds, a BOLA® bowling machine (Nye & Williams, Bristol, UK) was used to deliver balls at 16 $km \cdot h^{-1}$ increments between 64 and 144 $km \cdot h^{-1}$ at a target 17 m away (with the trajectory constant). Criterion evidence was provided by a Speedar™ (Ottery Electronics, West Sussex, UK) hand-held radar gun certified to be accurate to ±1.6 $km \cdot h^{-1}$. The Speedar™ was located directly below the point of delivery, while the Speedchek™ was positioned directly in line, approximately 7 m away at ground level, as recommended by the manufacturer. A total of 10 pairs of measurements were taken at each 16 $km \cdot h^{-1}$ increment (60 pairs). Based on the assumption that air resistance was negligible, 95% limits of agreement analysis (Bland and Altman, 1986: *Lancet*, **i**, 307–310) was then applied.

The results indicated minimal random error between 56 and 120 $km \cdot h^{-1}$, but the random error increased with the magnitude of measurement. Heteroscedasticity was formally identified by plotting the absolute differences against the individual means (Nevill and Atkinson, 1997: *British Journal of Sports Medicine*, **31**, 314–318), producing a positive correlation of 0.48 ($P = 0.00$). Using logarithmic (natural) transformation of the two measurements, this correlation was reduced to 0.198 ($P = 0.13$). The resulting anti-logged data allowed the interval to be expressed as the 95% ratio limits of agreement, which were 0.98 ×/÷ 1.15 (Fig. 1). From these results, the Speedchek™ radar device appears to have good agreement at speeds of less than 112 $km \cdot h^{-1}$, suggesting adequate validity. However, at higher speeds, random variation increases to a maximum of 15%, which may be considered too large for scientific investigation.

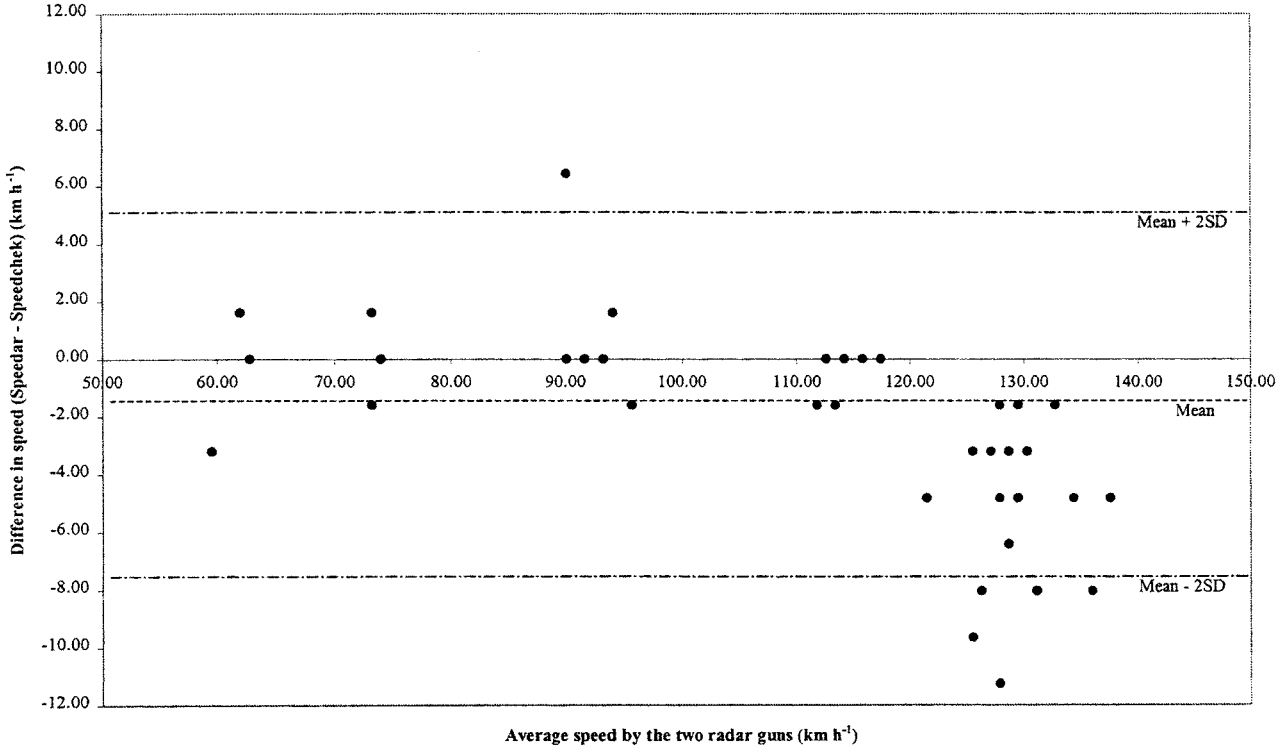

Fig. 1. Difference against mean with '95% limits of agreement' for the radar devices.