

4.65 and 4.55 m: midpoint mark for approach run phase to eight steps hurdlers

González Frutos, Pablo^{1,2}; Mallo, Javier²; Veiga, Santiago³; Navarro, Enrique³.

¹Francisco de Vitoria University, Faculty of Education and Humanities, Madrid, Spain.

²Technological University of Madrid, Faculty of Sciences for Physical Activity and Sport-INEF, Madrid, Spain.

³Technological University of Madrid, Health and Human Performance Department, Madrid, Spain.

Introduction

There is clear evidence that the high hurdle step length increases progressively (as in the sprint races) until the penultimate stride. However, the distribution of the step length has barely been treated experimentally. This is why theoretical references provided by Schmolinsky (1981) and Hünckekemkes (1990) are used in various athletic technical manuals. As the distance to the first hurdle is limited to the hurdlers who perform eight steps in the approach run phase, poor distribution of the length of these strides often ends with short take-off distance (even causing a fall). To avoid this issue some athletes implementing an approach run phase with seven steps, which has not always resulted in an improved final result or an available solution to all athletes. Hence, the aim of this study is to provide a reference to help coaches and athletes to solve the problems of using eight steps in this phase of the race.

Methods

All the races were filmed during the 44th Spanish Indoor Championship and 12th IAAF World Indoor Championship (Valencia 2008) and analyzed with 2D-DLT (Abdel-Aziz y Karara, 1971). The best result of the athletes who performed an approach run phase of eight steps (Males: n=55; Females: n=51) was included in the study. The trials were further divided into two groups, in both genders, according to the official times achieved during the competition.

Results

International-level male athletes presented a shorter fourth stride ($p > 0.01$) and a longer ($p > 0.05$) take-off distance (2.05 ± 0.03 m) than national-level male athletes (1.97 ± 0.03 m).

Discussion & Conclusion

With the aim of providing a simple and practical reference to control this phase, a 4.65 m mark (for males) and a 4.55 m mark (for females) are proposed. These values represent a 10 cm difference with the same midpoint presented by the theoretical models of Schmolinsky (1981) and Hünckekemkes (1990). With this division of the approach run phase in two parts coaches can have a cue to remember, which is related to the ability to anticipate the visual setting of the athletes (as it is done with the passing reference in jumping disciplines). A performance improvement could be expected when transferring this methodology to hurdles and using the 4,65 and 4,55 m midpoint marks.

References

Abdel Aziz, Y.I. & Karara, H.M. (1971) Direct linear transformation: from comparator coordinates into object coordinates in close-range photogrammetry. Proceedings ASPUI Symposium on Close-Range Photogrammetry. American Society of Photogrammetry, Church Falls, VA, pp. 1-19.

Hünckekemkes, J. (1990). Model technique analysis sheets for the hurdles. Part VI: The Women's 100 m Hurdles. *New Studies in Athletics*, 5, 4, pp.33-58.

Schmolinsky, G. (1981) *Atletismo*, Editorial Pila Teleña. Madrid.