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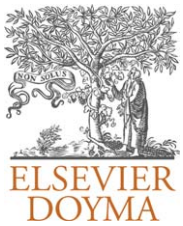

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ORIGINAL ARTICLE

Kinanthropometry of world champion junior male field hockey players

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KEYWORDS
Somatotype;
Proportionality;
Anthropometry;
Birth-day effect

Abstract
Introduction and purpose: There is a lack of published data on the anthropometric and relative-age effect of elite youth field hockey players.
Purposes: (a) To establish the anthropometric characteristics of elite junior Argentine male field hockey players; (b) to look for differences in physique, years of playing and birth-date effect between the final players selected to make up the team and those who were not selected out of the original pre-selected sample; and (c) to establish whether there are any differences in proportional limb lengths between elite junior hockey players and a local reference sample.
Methods: Thirty five elite Argentine junior field hockey players pre-selected to form the base of the national junior team for the 2005 Junior World Cup (Age 19.0 ± 1.0 years; weight 70.7 ± 5.4 kg; height 176.4 ± 6.4 cm). A full anthropometric battery including lengths, heights, breadths, girths, and skinfolds, plus number of years playing and date of birth.
Results: No statistically significant differences were found in skeletal structural dimensions when compared to a reference sample, nor between finally selected and non-selected players in anthropometric dimensions, playing history ($P = .11$) and relative-age effect ($P = .11$).
Conclusion: Male field hockey is a sport with normal bone-structural requirements, and with a lack of birth-date effect in Argentina.

PALABRAS CLAVE
Somatotipo;
Proporcionalidad;
Antropometría;
Efecto fecha de nacimiento

Cineantropometría de jugadores juveniles varones campeones mundiales de hockey sobre hierba

Resumen
Introducción y objetivos: Existe un vacío de información sobre la antropometría y el efecto de fecha de nacimiento sobre jugadores de hockey de elite juvenil masculino.
Objetivos: a) Describir las características antropométricas de jugadores de hockey de elite juvenil masculino de Argentina; *b*) establecer diferencias en el físico, la edad deportiva y el

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efecto de la fecha de nacimiento entre los jugadores seleccionados para el mundial juvenil y quienes quedaron afuera, y *c*) establecer si existen diferencias en las longitudes de los miembros entre estos jugadores de elite y una muestra normal de referencia adulta local.
Métodos: Se evaluaron longitudes, alturas, diámetros, perímetros, pliegues y masa corporal en 35 jugadores de hockey juveniles que componían la base y la selección Argentina para el mundial de 2005 (edad 19,0 ± 1,0 años; peso 70,7 ± 5,4 kg; estatura 176,4 ± 6,4 cm). Paralelamente se encuestó sobre la edad deportiva y la fecha de nacimiento.
Resultados: No se encontraron diferencias estadísticamente significativas en las variables estructurales del esqueleto entre esta muestra y una referencia normativa local, ni entre la submuestra seleccionada y los no-seleccionados, ni en la edad deportiva (p = 0,11) ni en el efecto de fecha de nacimiento (p = 0,11).
Conclusiones: El hockey sobre hierba masculino es un deporte con requerimientos de estructura ósea normales, y sin efecto de la fecha de nacimiento, en Argentina.

Introduction

Field hockey is a team sport with heavy demands on the player's physiology[1,2]. As a consequence, elite players show a high degree of leanness[3]. Furthermore, team mean percentage body fat was found to bear a relation with finishing position in a sample of 12 teams playing the South African Senior Provincial tournament. On the contrary, in Australia, sub elite male field hockey players did not differ from Senior or Youth select sides in mass, height, nor body fat levels[4].

Elite level sport tends to self-select individuals with morphological characteristics which respond optimally to its physical demands[5]. Since field hockey requires players to spend time in a crouched position, having long arms may be an advantage in this activity. Data on 33 male field hockey players from the Montreal Olympic Games showed them to have proportionally longer arm and forearm lengths when compared to a reference Canadian university student sample[6]. Scott[3] did not find any correlation between functional arm length and playing ability in his large sample of players.

The birth-date effect is often found in under-age squads, where age categories are delimited by at least a one-year period, favoring those who are biologically more mature from being born earlier in the year[7]. This effect may carry on to senior select sides if early selection processes have discouraged late-year birth daters away from high-level competition[8]. Again, we have not found such information in male field hockey.

Purpose

The aims of our study are: (a) to establish the anthropometric characteristics of elite junior Argentine male field hockey players who won the International Hockey Federation (IHF) Junior World Cup in 2005; (b) to look for differences in physique, years of playing and birth-date effect between the final players selected to make up the team and those who were not out of the original pre-selected sample; and (c) to establish whether there are any differences in proportional limb lengths between elite junior hockey players and a local reference sample. In this manner we wish to contribute to the anthropometric database on successful elite junior athletes and the characteristics that set them apart for the processes of talent identification.

Methods

Design

The study is observational, cross-sectional, and prospective. We measured the players on one occasion, in August 2004, after being selected to form the base from which the final select squad will emerge, to compete in the June 2005 IHF Rabo Hockey Junior World Cup held in Rotterdam, The Netherlands. The final chosen players make up the selection team that is compared to those who were left out.

Subjects

Thirty five junior male field hockey players from all regions of Argentina (age 19.1 ± 1.0 years, weight 70.7 ± 5.4 kg, height 176.4 ± 6.4 cm), chosen by coaches to make up a preselection from which the final 17 players would compete in the IHF Junior World Cup of 2005. In the month preceding their evaluation battery at the national sports centre in Buenos Aires, players were sent an informed consent formulary via electronic mail detailing the scope and intent of the measurements, and were asked to sign it or have their parent or legal tutor do it if underage. Approval for the study was granted by the Ethics Committee at the Medical Department of Club Atlético River Plate. We excluded the four goalkeepers from this analysis, since they have different morphologic characteristics than the other playing positions which could affect the general average, such as higher skinfolds, perhaps because their activity profile is very different from field players; nevertheless their data is shown for descriptive purposes. The other two goalkeepers selected as part of the final team were unavailable for measurement at the time. Selection criteria were based on