A comparison of speed and high intensity running ability between Canadian and Uruguayan professional academy soccer players.

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Introduction and Purpose

Linear running speed and high intensity running ability are two important physical performance characteristics of elite youth soccer players, and recent research has indicated that elite youth soccer players can be distinguished from sub-elite players based on both strength and speed characteristics. Differences in training methodologies exist between Canadian and Uruguayan youth soccer, and they can manifest themselves in the development of different physical abilities in elite youth academy players. A greater emphasis on developing or selecting for specific physical abilities in youth soccer may be evident from examining fitness assessment data. To date, there has been no research examining the differences in physical performance characteristics, with regards to linear running speed and high intensity running ability, between elite Canadian and Uruguayan youth soccer players. The aim of this study was to determine if any differences in speed characteristics exist between Canadian and Uruguayan professional academy soccer players

Methods

Under-14, 15, 16, and 19 boys' teams of two youth academies from professional clubs – one from Toronto, Canada (n=77), and the other from Montevideo, Uruguay (n=72), participated in this study. Measurements of linear running speed (10, 20, and 35-metre distances) as well as the Yo-Yo Intermittent Recovery Tests (YYIRT), were compared between the Canadian and Uruguayan academy teams. The U14-U15 teams completed the YYIRT Level 1, while the U19 teams completed the YYIRT Level 2. Mean sprint times, and scores on the YYIRT, were compared and analysed. A brief summary of the linear running speed and Yo-Yo Intermittent Recovery Tests is provided below:

10, 20, and 35 Metre Linear Sprint (10SPRINT, 20SPRINT, 35SPRINT) – Infrared timing gates were set at the start and finish lines, as well as at the 10- and 20-metre marks. Athletes began from a stationary position with one foot on the start line and sprinted maximally through the finishing gates. Two trials were performed with the fastest time recorded.

Yo-Yo Intermittent Recovery Test-Level 1 and Level 2 (YYIRTL1 and YYIRTL2) – The 20 metre course and 5 metre recovery zone were marked with cones. Athletes traveled out and back on the course keeping pace with audible beeps from the YYIRT CD and had 10 seconds recovery between each shuttle (40 metres). A warning was given after the first unsuccessful shuttle and the test was terminated after the second. The final stage completed was recorded. Participants from teams in the U14, U15 and U16 categories performed the YYIRTL1, while participants from teams in the U19 and Senior categories performed the YYIRTL2, as these are the recommended tests to use with these particular age groups.

Statistical Analysis

All statistical analyses were performed using SPSS 23.0 for Windows (SPSS Inc., Chicago, IL, USA). Data were analyzed by two-way mixed model analysis of variance (ANOVA) for age category (U14, U15, U16, U19, and Senior) versus club (CAN and URU). All underlying assumptions were verified. Bonferroni *post-hoc* test was applied where significance was found. Effect size values of <0.2, 0.2-0.6, 0.6-1.2, 1.2-2.0, and >2.0 were considered trivial, small, moderate, large, and very large respectively, and based on Cohen, J (1998), and Batterham & Hopkins (2006). Data are presented as mean ± SD. A significance level of $p \leq 0.05$ was chosen.

Results

10m Linear Sprint

Canadian players had significantly lower times ($p<0.001$) in the 10m linear sprint when compared to the Uruguayan players in the U14, U15, and U19 age categories. There was no significant difference in the 10m sprint times between U15 and U16 age categories between clubs. In the Canadian club, U19 players were significantly faster ($p<0.001$) than the other age categories, while there was no significant difference between U14, U15, and U16 players. In the Uruguayan club, U14 players had significantly higher 10m sprint times ($p<0.001$) than the other age categories, while no significant difference was found between U15, U16, and U19 Uruguayan players.

20m Linear Sprint

Canadian players had significantly lower 20m sprint times ($p<0.05$) across all age categories when compared to Uruguayan players. Canadian U19 players were significantly faster ($p<0.05$) than all other age groups, while U14 players were significantly slower than only U15 players. Uruguayan U14 players had significantly lower ($p<0.01$) 20m sprint times when compared to other age groups, while U19 players were significantly faster ($p<0.01$) than U14 and U15. No significant differences were found between U15 and U16 Canadian players, and U15, U16, and U19 players in Uruguay.

35m Linear Sprint

No interactions between factors were observed ($p>0.10$). There was a main effect of 35m sprint time ($p<0.001$) for age ($\eta^2 = 0.492$) and for club ($\eta^2 = 0.389$). *Post hoc* analyses revealed U19 players were significantly faster ($p<0.001$) when compared to all other age categories in both clubs. However, overall Canadian players have significantly lower ($p<0.001$) 35m sprint times compared to Uruguayan players.

Results

YYIRT_L1

Canadian U15 players had significantly greater ($p<0.05$) YYIRT_L1 results than Uruguayan U15 players, however, there was no significant difference between U14 players. While there was no significant difference between Canadian U14 and U15 players, U14 Uruguayan players had significantly higher ($p<0.01$) YYITR_L1 results than U15 Uruguayan players.

YYIRT_L2

Both senior and U19 Canadian players had significantly higher ($p<0.05$) YYIRT_L2 scores than respective Uruguayan players. There was significant difference ($p<0.01$) between age categories within the clubs, whereby, Canadian club senior players had significantly higher ($p<0.01$) YYIRT_L2 scores than U19 players, while U19 had higher scores than senior players in the Uruguayan club.

Table 1. 10m, 20m, and 35m linear sprint times and Yo-Yo Intermittent Recovery Test scores for Canadian and Uruguayan club U14, U15, U16, U19, and Senior players.

		10m	20m	35m	YYIRT_L1 (m)	YYIRT_L2 (m)
U14	URU	1.95 ± .084 $^{\hat{\partial},\hat{\alpha},\ddagger}$	3.41 ± 0.16 $^{\hat{\partial},\hat{\alpha},\ddagger}$	5.57 ± 0.28	1656.84 ± 451.04 $^{\hat{\partial}}$	-
	n = 18	(1.91 - 1.99)	(3.33 - 3.49)	(5.43 - 5.71)	(1439.45 - 1874.23)	-
	CAN	1.74 ± 0.073 $^{\alpha}$	3.11 ± 0.13 $^{\#,\$,\infty}$	5.09 ± 0.24 ^{b}	1535.24 ± 305.54	-
	n = 21	(1.71 - 1.78)	(3.05 - 3.17)	(4.98 - 5.20)	(1396.16 - 1674.32)	-
U15	URU	1.82 ± 0.099	3.21 ± 0.17	5.23 ± 0.29	1268.00 ± 474.37	-
	n = 20	(1.78 - 1.87)	(3.13 - 3.29)	(5.10 - 5.37)	(1045.99 - 1490.01)	-
	CAN	1.69 ± 0.065 $^{\alpha}$	2.99 ± 0.11 $^{\#}$	4.85 ± 0.21 ^{b}	1600.00 ± 404.68 $^{\#}$	-
	n = 18	(1.66 - 1.73)	(2.94 - 3.04)	(4.75 - 4.96)	(1398.76 - 1801.24)	-
U16	URU	1.82 ± 0.071	3.17 ± 0.10	5.14 ± 0.21	-	-
	n = 17	(1.78 - 1.85)	(3.12 - 3.22)	(5.03 - 5.25)	-	-
	CAN	1.74 ± 0.11	3.07 ± 0.18 $^{\#}$	4.92 ± 0.27 ^{b}	-	-
	n = 25	(1.70 - 1.79)	(2.99 - 3.14)	(4.81 - 5.03)	-	-
U19	URU	1.78 ± 0.051	3.05 ± 0.070 $^{\beta,\hat{\partial}}$	4.86 ± 0.11	-	746.67 ± 247.35
	n = 17	(1.75 - 1.81)	(3.01 - 3.08)	(4.80 - 4.92)	-	(609.69 - 883.64)
	CAN	1.53 ± 0.050 $^{\alpha,\beta,\hat{\partial},\delta}$	2.76 ± 0.068 $^{\#,*,\$,\Delta}$	4.47 ± 0.13 ^{a,b}	-	1247.27 ± 252.87 $^{\#,\varepsilon}$
	n = 13	(1.50 - 1.56)	(2.71 - 2.80)	(4.40 - 4.55)	-	(1077.39 - 1417.15)
SENIOR	URU	-	-	-	-	1152.73 ± 348.06 $^{\varepsilon}$
	n = 16	-	-	-	-	(1029.31 - 1276.14)
	CAN	-	-	-	-	932.63 ± 221.93 $^{\#}$
	n = 19	-	-	-	-	(825.66 - 1039.60)

α: denotes significant difference between clubs ($P < 0.001$); #: denotes significant difference between clubs ($P < 0.05$). Significantly ($P < 0.01$) different from U14 (β), U15 (∂), U16 (δ), U19 ($\ddagger$), and Senior (ε). Significantly ($P < 0.05$) different from U14 (*), U15 ($), U16 (Δ), U19 ($\infty$), and Senior (∇). a: Significant effect for age ($P < 0.001$). b: Significant effect for club ($P < 0.001$).

Discussion and Conclusions

Canadian players were significantly faster than their Uruguayan counterparts and had higher anaerobic fitness, as evidenced by the higher YYIRT Level 2 score in the U19 category. However, Canadian and Uruguayan U14 teams had similar aerobic fitness, as evidenced by their similar YYIRT Level 1 scores.

It may be possible that the different training methodologies in Canadian youth soccer have led to greater development of anaerobic fitness in Canadian players. For example, in North America, due to the popularity of American football, basketball, baseball and hockey – all of which require a significant contribution to total energy expenditure from the anaerobic energy system – the training methods for soccer may involve more types of training that are aimed at improving anaerobic fitness. These may include weight training, plyometric training, and speed/acceleration training.

Another possible explanation for the higher anaerobic fitness level of the Canadian professional academy players is that a selection bias exists in Canadian youth soccer, towards youth players with better speed and anaerobic fitness. Due to the aforementioned popularity in North America of other, more anaerobic sports, it may be possible that coaches in Canadian professional youth academies prefer players who are faster and more powerful, and thus have selected for these physical traits to a greater extent than their Uruguayan peers. Further research comparing the differences in physical abilities between Canadian and Uruguayan elite youth soccer players may be warranted.

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