

1 **THE INFLUENCE OF AGE ON THE ANTHROPOMETRIC AND PERFORMANCE**  
2 **CHARACTERISTICS OF HIGH LEVEL YOUTH FEMALE SOCCER PLAYERS**

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37 **ABSTRACT**

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39 The purpose of this study was to evaluate the anthropometric and performance characteristics  
40 of high level youth female soccer players by annual-age category (U10-U16). Data were  
41 collected from 157 female soccer players (U16;  $n=46$ , U14;  $n=43$ , U12;  $n=38$ , U10;  $n=30$ ),  
42 recruited from three high level female soccer academies in England. Players completed  
43 assessments of anthropometry (height and body mass), isometric mid-thigh pull strength  
44 (IMTP), jump height (CMJ), aerobic capacity (YYIRL1), change of direction (505-left/right), and  
45 speed (10 and 30 m). Magnitude based-inferences were used to assess for practical significance  
46 between consecutive age groups. Height (*very likely – most likely*), body mass (*very likely – most*  
47 *likely*), absolute strength (*most likely*), jump height (*likely – very likely*), and distance on the  
48 YYIRL1 (*possibly – most likely*) were greater in older players. Both speed and change of  
49 direction time were *most likely to very likely* lower in older players. However, only *most likely*  
50 *trivial-possibly trivial* differences were observed in relative strength between age groups.  
51 Findings suggest that physical characteristics except for relative strength differentiate by age  
52 categories. These findings provide comparative data and target reference data for such  
53 populations and can be used by coaches and practitioners for player development purposes.  
54 Practitioners should be aware that relative strength does not differ between age categories in  
55 high level youth female soccer players.

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57 Key words: soccer, youth, fitness, performance, anthropometry

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## 59 INTRODUCTION

60

61 Soccer is an intermittent team sport, played worldwide at amateur to professional levels at all  
62 ages<sup>1</sup>. In recent years an increased popularity of female soccer has resulted in an increase in  
63 participation and more opportunities to play soccer professionally in Europe and the United  
64 States of America (USA)<sup>2</sup>. During matches, elite female soccer players have been reported to  
65 cover a total distance of ~10 km, with 1.53–1.68 km at high speeds ( $>15\text{-}16\text{ km}\cdot\text{h}^{-1}$ )<sup>3</sup>. The  
66 distance covered during high-intensity and sprinting activities are known to be the main  
67 determinants between higher and lower standards of play with elite female players reported to  
68 complete 28% more high speed running and 24% greater distance sprinting compared to non-  
69 elite level players<sup>4</sup>. Furthermore, it is the explosive actions such as sprinting, jumping, tackling  
70 and change of direction (CoD) that appear to influence the outcome of games<sup>5</sup>. Such demands  
71 necessitate that players demonstrate a high level of athleticism (i.e. speed, power, strength,  
72 aerobic capacity). As such it is important that these physical qualities are developed through  
73 structured and progressive strength and conditioning training, in conjunction with field based  
74 technical/tactical sessions. Furthermore, the English Football Association (FA) have suggested  
75 female soccer players require more ‘athleticism’ compared to current levels observed in order  
76 to compete at an international level and coaches should look to develop athleticism in young  
77 players<sup>6</sup>.

78

79 To support this growth and development of female soccer, the FA in England have created elite  
80 Regional Talent Centre’s (RTC’s) for the identification and development of the next generation  
81 of female soccer players, similar to the processes in the men’s game (e.g., English Player  
82 Performance Plan; EPPP;<sup>7</sup>). The RTC’s operate within youth age categories (i.e., Under 10 [U10],  
83 U12, U14 and U16), whereby girls are selected to train and compete to develop technical,  
84 tactical, psychological and physical qualities, all paramount to soccer performance<sup>3</sup>. Within the  
85 RTC’s players regularly undertake fitness testing to monitor their physical development.

86 However, to date research examining the physical qualities of youth female players is limited. As  
87 such it is difficult for practitioners working with this cohort to evaluate the physical  
88 characteristics of players and develop physical development programmes for these players  
89 accordingly. Taylor et al.<sup>8</sup> explored the physical characteristics of youth female soccer players,  
90 however the sample size was limited with only 2 age categories (U13 and U15) included and 9-  
91 10 participants per age group which are not representative of the current age group structuring  
92 at the FA and therefore are limited. Povoas et al.<sup>9</sup> investigated the development of aerobic  
93 fitness in 9-16 year old trained Portuguese female soccer players, however different versions of  
94 the Yo-Yo test were used at different age groups making comparisons difficult. The physical  
95 characteristics of U12-U21 female soccer players from the USA have been investigated<sup>10</sup> but the  
96 testing battery did not include anthropometry, aerobic capacity or strength, which are  
97 important considerations in the physical assessment and development of youth soccer  
98 players<sup>11</sup>. Furthermore, the training systems implemented in female soccer in Portugal and the  
99 USA are different to the RTC's in England. Finally, with the increased professionalism within  
100 female soccer (i.e., structured strength and conditioning), data presented by Vesocovi et al.<sup>10</sup>  
101 may not be reflective of the physical characteristics of current youth female players in England.  
102 Therefore, the presentation of up to date sex specific physical characteristics of youth female  
103 soccer players is necessary for use by strength and conditioning coaches to inform training  
104 prescription design.

105

106 the purpose of the current study was to present the anthropometric and performance  
107 characteristics of high level youth female soccer players aged 9-16 years in England. The  
108 secondary purpose was to evaluate the differences in anthropometric and performance  
109 characteristics between age categories (i.e., U10, U12, U14 and U16).

110

111 **METHODS**

112

## 113 Experimental Approach to the Problem

114 A cross-sectional study design was conducted to evaluate the anthropometric and performance  
115 characteristics of high level youth female soccer players by age category. All participants  
116 undertook an anthropometric and physical testing battery at the start of the 2016-2017 season  
117 (i.e., September). Testing was conducted a minimum of 48 hours post competitive match play or  
118 training at each respective RTC. The testing battery included assessments of anthropometry  
119 (height and body mass), strength (isometric mid-thigh pull [IMTP]), lower body power  
120 (countermovement jump [CMJ]), change of direction (505 test; left and right), speed (10 and  
121 30m) and Yo-Yo intermittent recovery test level 1 (YYIRL1). The YYIRL1 was not conducted at  
122 U10 as this was not current practice at the RTC's and not routinely part of the clubs testing  
123 battery. With the exception of IMTP, the testing battery was consistent with the testing battery  
124 players regularly undertake within the academies. A standardized warm-up, including jogging,  
125 dynamic movements, and stretches was carried out before testing, followed by full instruction  
126 and demonstrations of the assessments. The sprint, CoD and YYIRL1 tests were all carried out  
127 on an indoor surface with players wearing trainers to ensure consistency in the surface and  
128 conditions. All testing was undertaken by the lead researcher.

129

## 130 Subjects

131 One hundred and fifty seven female soccer players (U10,  $n=30$ ; U12,  $n=38$ , U14,  $n=43$ , U16,  
132  $n=46$ ) were recruited from three Tier 1 female soccer RTC's in England. All subjects were free  
133 from injury at the time of the study. U10 and U12 groups trained twice per week and U14 and  
134 U16 groups trained three times per week. Each age group had one competitive fixture per week  
135 during the season. Prior to participation, institutional ethics approval and assent was provided  
136 by players and their parents/guardians after being made aware of the benefits and risks of the  
137 study. Age categories were defined by chronological age on the 1st September 2016, which  
138 established their status for competition.

139

140 Procedures

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142 Anthropometry

143 Participants standing height (cm) was recorded to the nearest 0.1cm using a 132 Seca Alpha  
144 stadiometer (model 2251821009, Germany). Body mass (kg) was measured to the nearest 0.1kg  
145 using calibrated Seca Alpha (model 770, Germany) scales.

146

147 Strength

148 The IMTP was performed on a portable force platform (AMTI, ACP, Watertown, MA) with a  
149 sampling rate of 1,000 Hz, which is consistent with previous methodologies<sup>12</sup>. Participants  
150 performed the IMTP on a customized pull rack, using a self-selected position similar to that of  
151 the second pull of a power clean, with a flat trunk position and their shoulders in line with the  
152 bar<sup>11</sup>. The self-selected position was preferred, as differences in knee and hip joint angles during  
153 the IMTP have previously been shown to have no influence on kinetic variables<sup>13</sup>. Participants  
154 were given two practice maximal trials prior to testing commencing. Participants were  
155 instructed to pull as “fast and hard” as possible, and received loud, verbal encouragement<sup>12</sup>.

156

157 Each participant completed two trials lasting 5 secs, with 5 mins rest between each trial. The  
158 start of the IMTP was identified in the software using a 5 standard deviations (SD) gathered  
159 from a 1 second standing noise period before the start of the pull. Previous literature has  
160 suggested an onset threshold of 5 SD as it accounts for the signal noise during the weighing  
161 period and therefore there is a greater certainty that the onset of contraction identifies a true  
162 meaningful change in force<sup>11</sup>. The highest peak force (PF) achieved over the 2 trials was  
163 considered the participants ‘best trial’ and recorded for analysis. Relative PF was calculated  
164 using the ratio scaling method (i.e. PF / body mass)<sup>14</sup>. Intraclass correlation coefficients (ICC)  
165 and coefficient of variation (CV) for PF were  $r=0.933$ ,  $CV=3.6\%$ .

166

167 Lower Body Power

168 Lower body power was assessed using a CMJ. The CMJ were performed as described by Le Gall  
169 et al.<sup>10</sup>, using a portable photoelectric cell system (Optojump; Microgate, Bolzano, Italy). This  
170 equipment has been reported to be reliable (CV=6%) and valid for CMJ assessment compared  
171 with a biomechanical force plate<sup>15</sup>. Jump height was calculated using the cell system software  
172 (Optojump Next v1.7.9; Microgate). Participants completed 3 submaximal CMJ efforts prior to  
173 testing commencing. The CMJ started from an upright position. When given a verbal command,  
174 the subject made the downward countermovement to their preferred depth and then jumped as  
175 high as possible. Subjects were allowed to use their arms during the swing phase of the jump<sup>5,11</sup>,  
176 and were required to maintain straight legs while airborne. The highest jump was selected for  
177 analysis from the 3 repetitions completed with 2 mins recovery between jumps. ICC and CV's for  
178 CMJ were  $r=0.957$ ,  $CV=4.5\%$ .

179

180 Change of Direction Speed

181 Change of direction (CoD) speed was assessed using the 505 test<sup>17</sup>. Timing gates (Brower  
182 Timing Systems, IR Emit, USA) were placed 10m from the start point. The participants  
183 accelerated from the start, through the timing gates, turning 180° at the 15m mark and sprinted  
184 back through the timing gates. Participants completed 3 alternate attempts of turning off each  
185 foot, separated by a 2–3 mins rest period. Only attempts whereby the participant's foot crossed  
186 the 15m mark were recorded. Times were recorded to the nearest 0.01 sec with the quickest of  
187 the 3 attempts used. Data are presented as dominant (D) or non-dominant (ND) foot based on  
188 preferred kicking foot. ICC and CV for the 505 test were  $r=0.99$ ,  $CV=2.2\%$ .

189

190 Speed

191 Sprint time was assessed over 10 and 30m using timing gates (Brower Timing Systems, IR Emit,  
192 USA). Participants started 0.5m behind the initial timing gate and were instructed to set off in  
193 their own time and run maximally past the 30m timing gate. Each subject had 3 attempts,

194 separated by a 3 min rest period. Times were recorded to the nearest 0.01 sec with the quickest  
195 of the three attempts used for the 10m and 30m speed score. ICC and CV's for 10 and 30m sprint  
196 time were  $r=0.76$ ,  $CV=4.8\%$  and  $r=0.78$ ,  $CV=3.9\%$ , respectively.

197

#### 198 Aerobic Capacity

199 The YYIRL1 was used as a *proxy* measure of aerobic capacity, due to the validity of the test for  
200 the assessment of soccer specific fitness<sup>16</sup>. The test consisted of repeated 20m shuttle runs at  
201 progressively increasing speeds dictated by an audio bleep emitted from a CD player. Between  
202 each shuttle there was a recovery period of 10 sec, involving walking around a marker placed 5  
203 m behind the finishing line. Failure to achieve the shuttle run in time on two occasions resulted  
204 in termination of the test. Total running distance, including the last missed shuttle was recorded  
205 and reported. ICC and CV for the YYIRL1 test have been reported as  $r=0.98$ ,  $CV=4.9\%$ <sup>16</sup>.

206

#### 207 Statistical Analyses

208 Data are presented as mean  $\pm$  SD by annual-age category, with comparisons made between  
209 consecutive age groups (e.g., U10 vs. U12). All data were log transformed to reduce bias as a  
210 result of non-uniformity error. Magnitude based-inferences were used to assess for practical  
211 significance<sup>18</sup>. The threshold for a difference to be considered practically important (the  
212 smallest worthwhile difference; SWD) was set at 0.2 x between subject SD for the comparison  
213 groups, based on Cohen's *d* effect size (ES) principle. The probability that the magnitude of  
214 difference was greater than the SWD was rated as  $<0.5\%$ , *almost certainly not*;  $0.5-5\%$ , *very*  
215 *unlikely*;  $5-25\%$ , *unlikely*;  $25-75\%$ , *possibly*;  $75-95\%$ , *likely*;  $95-99.5\%$ , *very likely*;  $>99.5\%$ , *almost*  
216 *certainly* (16). Where the 90% Confidence Interval (CI) crossed both the upper and lower  
217 boundaries of the SWD ( $ES\pm 0.2$ ), the magnitude of difference was described as *unclear*<sup>18</sup>.

218

## 219 RESULTS

220



221 The performance characteristics of elite youth female soccer players by annual age category and  
222 standardized differences between consecutive age groups are presented in Table 1.

223

224 \*\*\*Insert Table 1 here\*\*\*

225

226 Height and body mass were *most likely to very likely* greater in each successive older age groups.

227 Peak force was *most likely* greater for older age groups, however relative PF was *possibly to*

228 *most likely trivial* between consecutive age groups. Differences in CMJ height were *likely to very*

229 *likely* greater in older players. YYIRL1 was *most likely to possibly* greater in older players. Both

230 10 and 30 m sprint times were *most likely to very likely* lower in older players between U10-U12

231 and U14-16, and *possibly* lower between U12-U14. 505 CoD was *very likely to very likely* lower in

232 older age groups.

233

## 234 **DISCUSSION**

235

236 This is the first study to present the anthropometric and performance characteristics of youth

237 female soccer players in England. The findings from this research provide novel reference data

238 for high level youth female soccer players, aged 9-16 years and suggest that height, body mass,

239 absolute strength, lower body power, CoD and speed improved in older youth female soccer

240 players, although no differences for relative strength were observed. The findings of this study

241 can be used for both player development purposes and to inform the design of individual

242 specific strength and conditioning programmes for youth female soccer players.

243

244 This study showed that the mean height and body mass of players in this study were smaller

245 and lighter than that reported for female Portuguese players at 9-11 years (Age 9.7±0.7 yrs.,

246 Height: 141.0±5.3 cm, body mass: 36.1±6.8 kg), 12-13 years (Age: 12.5±0.9 yrs., Height:

247 155.7±6.4 cm, body mass: 55.2±14.0 kg) and 14-16 years (Age: 14.8±0.8 yrs., Height: 164.6±7.6

248 cm, body mass:  $57.5 \pm 8.5$  kg<sup>9</sup>). Anthropometric characteristics were greater in older players,  
249 with a similar likelihood of difference demonstrated between each consecutive age group for  
250 height and body mass. Differences in height and body mass are associated with increased  
251 maturity with increasing chronological age, along with the biological, morphological, hormonal  
252 and neurological changes that occur during this period of development<sup>21</sup>.

253

254 The strength data presented in this study is the first in either male or female youth soccer  
255 players, assessed via an IMTP. The IMTP was used rather than a three or five repetition  
256 maximum, which has been used in previous research with older players<sup>13</sup>, as it offers a safe and  
257 reliable strength assessment when working with young athletes and has a strong correlation  
258 with dynamic performance<sup>22</sup>. Peak force was greater in older age groups, however relative PF  
259 demonstrated only *possibly to most likely trivial* differences between age categories. The greater  
260 absolute strength in older players is likely two-fold, attributed to biological changes including  
261 increased body mass with age<sup>23</sup> and an increased exposure to a structured strength and  
262 conditioning programme, with older players undertaking two structured strength and  
263 conditioning session per week. The limited difference in relative strength is important for  
264 practitioners, whom should acknowledge that relative strength does not increase with age.  
265 Changes in strength are likely a consequence of body mass increases with age. Although  
266 relative strength did not differentiate between age categories, specific training interventions  
267 may be warranted in this cohort. Strength is important for injury prevention, and soccer  
268 performance, given the known relationship with anterior-cruciate ligament (ACL) injuries in  
269 female athletes<sup>24</sup> and explosive activities<sup>25</sup>. There is limited contact time within an RTC, and  
270 strength and conditioning training is still a relatively new in youth female soccer<sup>25</sup>.

271

272 Countermovement jump height was greater for older age groups However, CMJ height was less  
273 than previously observed in female soccer players (Junior [17.3 years]  $33.1 \pm 3.2$  cm and Senior  
274 [23.4 years]  $38.8 \pm 4.8$  cm<sup>5</sup>). Given body mass and CMJ height were greater in older groups, this

275 would suggest an exponential increase in power output with increasing age. Previous literature  
276 has also reported improvements in vertical jump performance until 15-16 years in youth female  
277 soccer players<sup>10</sup>, likely due to growth-related changes in both leg length and muscle mass<sup>28</sup> and  
278 hormonal, muscular, and mechanical factors caused by the onset of puberty<sup>29</sup>.

279

280 U16 players in the current study were quicker than 15-19 year old elite Australian female  
281 soccer players (U16:  $2.53 \pm 0.09$  vs.  $2.64 \pm 0.09$ s) on the 505 test<sup>31</sup>. CoD ability improved by age,  
282 with the greatest changes occurring between U12-U14. This is consistent with youth American  
283 female soccer players on the Illinois agility test, where large changes between 12-13 years were  
284 observed, followed by modest improvements between 15-16 years<sup>10</sup>. The underpinning  
285 mechanisms to explain such development in CoD are likely via nervous system development,  
286 governed by improvements in intra-muscular and inter-muscular coordination and general  
287 motor control improvement that children and adolescents experience between such  
288 chronological ages<sup>21</sup>. Warm ups prior to training may provide a good opportunity to develop  
289 CoD technique with supplementary strength training in the gym, further improving CoD ability.

290

291 Sprint times for U16 players in this study were quicker than observed in 15 to 19 year old elite  
292 Australian (U16:  $1.96 \pm 0.14$  vs. 10m;  $2.01 \pm 0.08$ s<sup>31</sup>) players but slower than that reported for  
293 18 to 20 years university female soccer players (10m  $1.92 \pm 0.13$ ; 30m  $4.78 \pm 0.22$ s<sup>32</sup>). Speed  
294 has been suggested to develop to a similar magnitude in both male and females up until the age  
295 of 12 years<sup>8</sup>. Differences between younger male and female players may therefore be due to  
296 training exposure, or differences of expertise between the two training environments.

297 Furthermore, speed development by age is based on population data<sup>33</sup>, whereby the data  
298 discussed within this study is from trained soccer players that are selected (e.g., identified and  
299 invited to join the respective club). As such, deviations around mean population data may  
300 explain why male athletes are quicker than female athletes, if indeed females as a population

301 are more homogenous than males. This again may have implications for mixed-sex soccer in  
302 England up to the age of U16.

303

304 Both 10 and 30m speed were quicker in older players. The greatest changes in speed were  
305 observed from U10-U12 (both 10 and 30m), which is likely due to very large increases in height  
306 and therefore stride length, as well as central nervous system adaptation that occur around this  
307 age<sup>34</sup>. Literature specific to adult athletes has suggested, sprinting ability over short (10m) and  
308 longer distances (30m) is considered to require separate and specific biomechanical and  
309 neuromuscular qualities and therefore training techniques<sup>35,36</sup>. However, findings from this  
310 study suggest that indices of acceleration and maximal running speed in young soccer players  
311 might share common factors, which is consistent with findings in previous literature for female  
312 youth athletes<sup>38</sup> and suggests that both acceleration and maximal sprint speed can be developed  
313 using the same training variables in youth soccer players. Given the time restraints within a  
314 soccer academy, warm ups prior to field based sessions may provide a good opportunity to  
315 work on acceleration and maximum running speed in youth soccer players.

316

317 The YYIRL1 distance achieved by players in this study was less than observed in Portuguese  
318 trained female soccer players of a similar age (U12:  $635 \pm 241$ m vs. U9 to U11 Portuguese  
319 players;  $705 \pm 316$ m, U14:  $886 \pm 334$  m vs. U12 to U13 Portuguese players;  $1214 \pm 487$ m, Povoas  
320 et al.<sup>9</sup>). Unfortunately, Povoas et al.<sup>9</sup> evaluated the aerobic capacity in U14 to U16 players using  
321 the YYIRL2, thus comparisons with the U14 and U16 players in this study are not possible.

322 YYIRL1 distance for youth male soccer players (U11;  $802 \pm 259$ m and U13;  $1199 \pm 358$ m, Deprez  
323 et al.<sup>27</sup>) was greater than observed in the female players, which may have implications for  
324 mixed-sex soccer, which occurs in England up to the age of U16. Mean distance covered on the  
325 YYIRL1 for U16 players was  $959 \pm 299$ m, which is less than that previously reported for elite  
326 senior female players ( $1224$ - $1379$ m<sup>5,20</sup>). Speculatively this is likely to be even higher now given  
327 the increased professionalism of the women's game over the last 10 years.

328

329 Older players achieved greater scores in the YYIRL1. The greater difference between U12-U14  
330 compared to U14-U16 demonstrates different development trajectories between specific age  
331 groups. Developments in aerobic capacity from U12-U14 are likely associated with maturational  
332 increases in peak oxygen uptake, which is associated with the attainment of peak height  
333 velocity<sup>29</sup>. Furthermore, there is an increased training and match exposure for older players,  
334 whereby match duration is increased from 60 mins (U12) to 80 mins (U14). With an increase in  
335 match intensity with age previously reported in male youth soccer players<sup>39</sup> this would likely  
336 result in enhanced physiological adaptation beyond normal growth and development. Older  
337 players also undertake an additional 90-minute pitch based soccer session per week, which  
338 included specific aerobic development drills, as well as an additional gym based strength and  
339 conditioning work, which may further contribute to the development of more advanced  
340 physical qualities.

341

342 Given the biological differences in players that likely exist within an annual age category, a  
343 limitation of this study was that maturation status was not considered. Future research should  
344 look to explore the influence of maturation status on the physical characteristics of youth  
345 female soccer players. However, the current structure within the RTC's is based on  
346 chronological age (i.e., U10, U12, U14, U16), therefore despite biological differences within an  
347 age group, the current data provides normative standards for fitness qualities regularly tested  
348 within an academy structure. A second limitation of this study was that it was not possible to  
349 obtain training age data of the participants. Therefore, future research should also look to  
350 consider the influence of how many years a participant has been within a structured training  
351 environment on the physical development of players.

352

353 **CONCLUSION**

354

355 This study provides anthropometric and performance characteristics comparative data for 9-16  
356 year old high level female soccer players. Findings demonstrate that anthropometric and  
357 performance characteristics develop with increasing age except for relative strength in this  
358 cohort. Athletic development of players in addition to technical/tactical development of should  
359 be a key focus of training with appropriate strength and conditioning sessions incorporated in  
360 to the weekly training structure to develop the athleticism of players.

361

362

### 363 **PRACTICAL APPLICATIONS**

364

365 The overall athletic development of female soccer players should be a long-term priority for  
366 coaches working with this cohort. The development of good movement qualities<sup>38</sup>, alongside  
367 strength should form the basis of the physical conditioning programme. Aerobic fitness has  
368 been shown to discriminate between elite and sub-elite senior female soccer players<sup>20</sup>. Given  
369 the strong relationship between high-intensity running in match-play and performance on the  
370 YYIRL1<sup>20</sup>, it is important that the development of the aerobic capacity of players is strategically  
371 planned within the training structure. The concurrent development of the aforementioned  
372 performance qualities, within a limited contact time environment can be achieved by  
373 prescribing specific strength training sessions, and using warm ups prior to training to develop  
374 physical qualities, such as speed and CoD ability. Manipulation of small-sided games combined  
375 with short duration intermittent high-intensity running drills may provide an efficient training  
376 stimulus to develop the aerobic system whilst concurrently developing technical/tactical skills  
377 within the same session<sup>39</sup>.

378

379 Given that athletes within an elite environment do not likely strive to be average (i.e.,  
380 comparison to mean data), assessing physical performance in comparison to benchmark  
381 percentile data may provide a more useful assessment value<sup>40</sup>. Therefore Table 2 presents

382 the testing data for each annual age group by percentiles. It is recommended that such data  
383 should be used by coaches working with youth players to evaluate player physical  
384 development

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386 \*\*\*Insert Table 2 here\*\*\*

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