Documento de lectura

Copiado con fines educacionales

Fuente : Footballscience.net

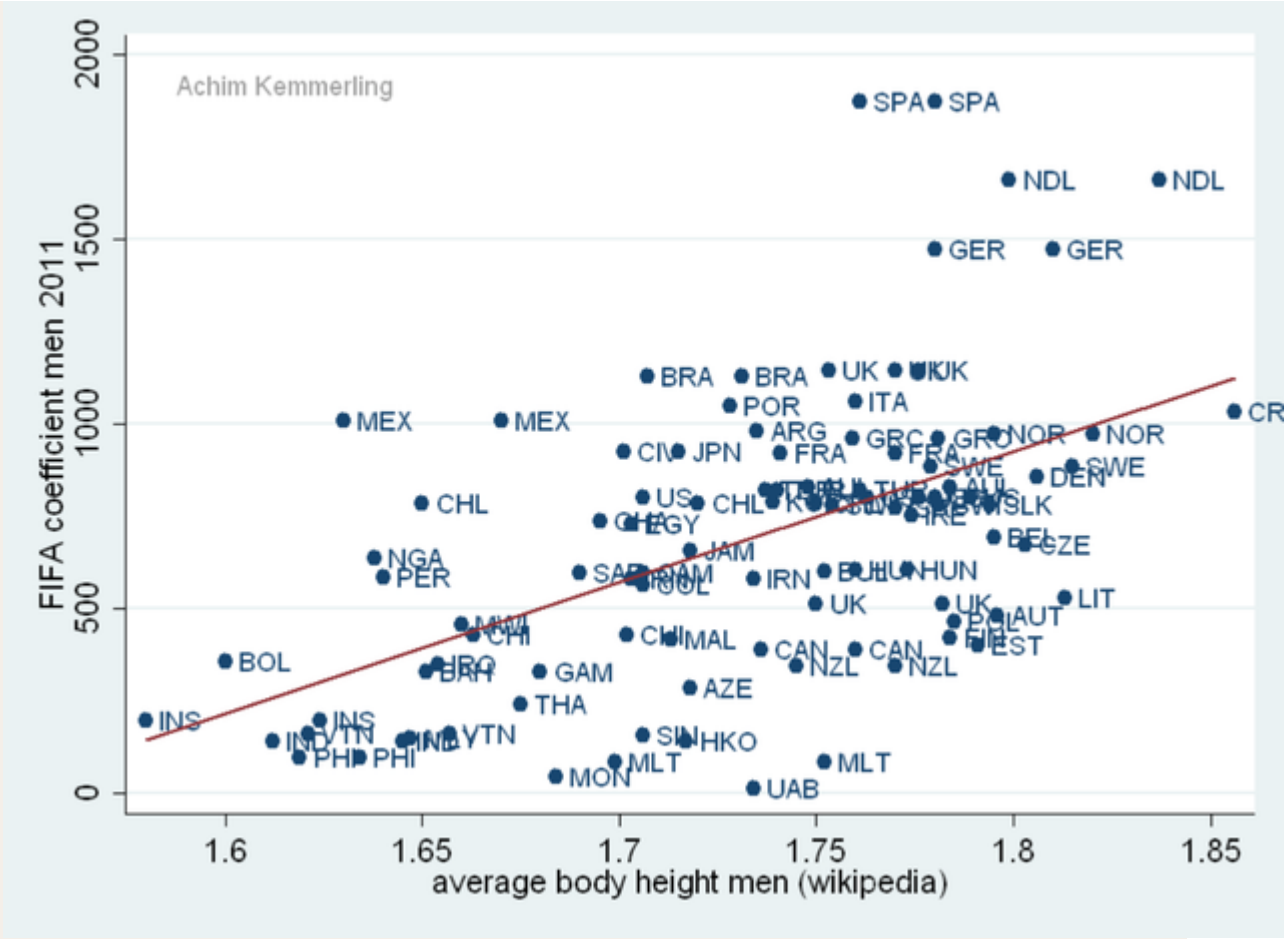
Anthropometry in football

In accordance to Wikipedia “Anthropometry” itself derives from the greek anthropos (άνθρωπος - "man") and metron (μέτρον - "measure") therefore "measurement of man". Generally, physiotherapists or sport scientists take height, weight, and percentage of body fat of players when talking about anthropometry.

Height

A relative simple answer to the question about importance of height in football would be with regards to the most successful team(s) in the last couple of years – FC Barcelona and/or the Spanish national team. The average height of the players from FC Barcelona (in 2011) were relatively low (Barcelona 177.38 cm so less than 5’10), yet, they won all titles possible.

However, this would be a very simplistic conclusion. Indeed, in their book “The numbers game” from 2011, Anderson & Sally demonstrated, based on Prof. Achim Kemmerling’s data, that Spain performed better than the average height of the starting players would suggest. The data average height of the team was plotted against the FIFA coefficient (showing below including a regression line).



Taken from: http://achimkemmerling.files.wordpress.com/2013/10/men.png

The regression line suggest that countries above the line were more successful than their height would predict and countries below the line underperformed than their height would predict. However, a 0.53 correlation shows that the taller the average height of the team the more success, Spain being an outliers in this aspect. By the way, 0.36 was the regression correlation in women's football and the picture was not as clear with regards to outliers. However, and again as a result – the taller the better.

As it is in science generally, longitudinal studies might show if the statement holds truth or not.

Without denying one or the other fact, what does that mean to a football team. Well, it certainly helps to have tall players (with greater arm-span) to cover a greater area (inside the goal) or for air challenges (14 - *see reference below*) for example and no wonder why goalkeepers (7, 12, 19, 20), defenders (central defender in particular) and (target) strikers (20) tend to be taller than midfielders (16).

With regards to the original question – it therefore seems plausible to recruit tall players with regards to these positions (goalkeepers, central defenders and target strikers).

Body mass

Similar to height, weight seems to show a similar trend. Goalkeepers were the heaviest followed by defenders, strikers and midfielders (7, 12, 14, 17, 19-21, 24). A simple explanation would be that there is a high correlation between height and weight. However, and due to the positional differences in running (2, 6, 15, 23), (especially) goalkeepers, but also central defenders and central strikers seem to have more muscle mass. (If the body mass is a result or the cause of the running however is not clear.)

With regards to body mass it also seems relevant to talk about body composition as muscle mass weighs more than fat-mass.

Body composition

Again goalkeepers had the highest percent body fat (3, 4, 12, 20) compared to other positions, followed by strikers, defenders and midfielders (3).

As there are different

1. populations (male vs. female, different nationalities, different leagues)
2. tools (fat caliper, MRI, bioelectrical impedance) (22) and
3. calculations (sum of 3 vs. 5 vs. 7 body sights) (22), the following data should be noted with caution and not taken as a guideline

Percent body fat (%)

	Male footballers	Female footballers
Goalkeepers	20.2% (12), 11.7% (3), 14.2% (20)	13.7% (19)
Defenders	3.9 (12), 10.4% (3), 12.2% (20), 8.90 – 11.0% (13)	16.8% (19)
Strikers	15.0% (12), 10.7% (3), 10.2% (20), 11.2 – 15.3% (13)	14.3% (19)
Midfielders	14.4% (12), 10.0% (3), 8.40% (20), 12.3 – 13.5% (13)	12.6% (19)

Sum of skinfolds (mm)

	4 sites	5 sites	8 sites
Goalkeepers	29.5 (8), 41.2 (17)	36.8 (8)	57.9 (8)
Defenders	30.0 (8), 36.9 (17)	37.7 (8)	59.3 (8)
Strikers	30.4 (8), 37.8 (17)	39.8 (8)	61.5 (8)
Midfielders	30.7 (8), 36.7 (17)	38.8 (8)	62.5 (8)

Other average skinfolds (7 sites) was 61.6 – 63.7 mm in Brazilian football players (11).

Interestingly, there was also a significant difference between top vs. middle vs. bottom ranked teams in Greece for body fat (10). Discrepancies were also observed for starters (11.1 – 11.5%) vs. non-starters (13.4 – 13.9%) from the University of Conneticut Men's Soccer team collegiate division

I and elite (20.1%) vs. non-elite (24.6%) Spanish regional female football players (18).

Other values were 12.3% in elite Kuwaiti football players (1), 11.6-15.1% in elite Indian footballers (5) and 12.3 – 12.6 % in Brazilian football players (11).

Also there was no significant association between (football) exposure time (sum of match and training time), body-fat and fat-free mass over a course of a season. However, midfielder tended to decrease body-fat significantly from start of pre-season until mid-season end increase again until end of season (3).

From a health perspective it also seems acceptable for players that are prone for sicknesses to have a slightly higher body fat, which is needed in those cases.

Despite the above mentioned positional differences, there were no differences in any variable for height, body mass or body composition in male English Premiership footballers (8) and female Norwegian first and second division footballers (9).

Limb length

Limb length might be of particular interest for goalkeepers as from anecdotal experience, height and (but not exclusively) arm-span might be crucial for goalkeepers.

Generally, taller players will have longer limbs. However, Goalkeepers were also shown to have significant longer limbs (arm-span) than other positions (14).

Conclusion

It seems that anthropometry is an important component in football performance; more particularly in positional roles (16) and probably even with regards to a specific style of play. Therefore it seems appropriate to recruit players with specific anthropometric profiles for specific positions. For example, if scoring from set-pieces is not a desired outcome, coaches not necessary need to look for tall players that are exceptionally good in the air. However, I guess many coaches would choose a taller player over a shorter player if they are identical for the remaining attributes in order to defend set-pieces.

However, as footballers (outliers) on a professional/world level proofs the above statement wrong. Coaches need to look for true footballers (however that is defined).

References

1. Al-Jaser, T.A. and Hasan, A.A. Fluid loss and body composition of elite Kuwaiti soccer players during a
soccer match. J Sports Med Phys Fitness 46: 281-285, 2006.

2. Barros, R.M., Misuta, M.S., Menezes, R.P., Figueroa, P.J., Moura, F.A., Cunha, S.A., Anido, R., and

Leite, N.J. Analysis of the distances covered by first division Brazilian soccer players obtained with an automatic tracking method. J. Sci. Med. Sport. 6: 233-242, 2007.

3. Carling, C. and Orhant, E. Variation in body composition in professional soccer players: interseasonal
and intraseasonal changes and the effects of exposure time and player position. J. Strength. Cond. Res. 24: 1332-1339, 2010.

4. Davis, J.A., Brewer, J., and Atkin, D. Pre-season physiological characteristics of English first and second
division soccer players. J. Sports. Sci. 10: 541-547, 1992.

5. Dey, S.R., Kar, N., and Debray, P. Anthropometric, motor ability and physiological profiles of indian
national club footballers: A comparative study. S. African J. Res. Sport. Phys. Ed. Rec. 32: 43-56, 2010.

6. Di Salvo, V., Baron, R., Tschan, H., Calderon Montero, F.J., Bachl, N., and Pigozzi, F. Performance
haracteristics according to playing position in elite soccer. Int. J. Sports. Med. 28: 222-227, 2007.

7. Hazir, T. Physical characteristics and somatotyp of soccer players according to playing level and position. Journal of Human Kinetics 26: 83-95, 2010.

8. Hencken, C. and White, C. Anthropometric assessment of Premiership soccer players in relation to
playing position. European Journal of Sport Science 6: 205-211, 2006.

9. Ingebrigtsen, J., Dillern, T., and Shalfawi, S.A. Aerobic capacities and anthropometric characteristics of
elite female soccer players. J. Strength. Cond. Res. 25: 3352-3557, 2011.

10. Kalapotharakos, V.I., Ziogas, G., and Tokmakidis, S.P. Seasonal aerobic performance variations in elite
soccer players. J. Strength. Cond. Res. 25: 1502-1507, 2011.

11. Lollo, P.C., Amaya-Farfan, J., and de Carvalho-Silva, L.B. Physiological and physical effects of different
milk protein supplements in elite soccer players. Journal of Human Kinetics 30: 49-57, 2011.

12. Matkovic, B.R., Misigoj-Durakovic, M., Matkovic, B., Jankovic, S., Ruzic, L., Leko, G., and Kondric, M.
Morphological differences of elite Croatian soccer players according to the team position. Coll. Antropol. 27: 167-174, 2003.

13. Melchiorri, G., Monteleone, G., Andreoli, A., Calla, C., Sgroi, M., and De Lorenzo, A. Body cell mass
measured by bioelectrical impedance spectroscopy in professional football (soccer) players. J Sports Med Phys Fitness 47: 408-412, 2007.

14. Moghadam, M.M., Azarbayjani, M.A., and Sadeghi, H. The Comparison of the Anthropometric Characteristics of Iranian Elite Male Soccer Players in Different Game Position. World Journal of Sport Sciences 6: 393-400, 2012.

15. Reilly, T. Motion analysis of workrate in different positional roles in professional football match-play. J.
Human. Mov. Stud. 2: 87-97, 1976.

16. Reilly, T., Bangsbo, J., and Franks, A. Anthropometric and physiological predispositions for elite soccer.
J. Sports. Sci. 18: 669-683, 2000.

17. Rogan, S., Hilfiker, R., Clarys, P., Clijsen, R., and Taeymansa, J. Positional-specific and team-ranking
related morphological characeristics in German amateur soccer players - A decriptive study. Int. J. Appl. Sport. Sci. 23: 168-182, 2011.

18. Sedano, S., Vaeyens, R., Philippaerts, R.M., Redondo, J.C., and Cuadrado, G. Anthropometric and
anaerobic fitness profile of elite and non-elite female soccer players. J Sports Med Phys Fitness 49: 387-394, 2009.

19. Sporis, G., Canaki, M., and Barisic, V. Morphological differences of elite croatian female soccer players
according to team position. Hrvat. Sportskomed. Vjesn 22: 91-96, 2007.

20. Sporis, G., Jukic, I., Ostojic, S.M., and Milanovic, D. Fitness profiling in soccer: physical and physiologic characteristics of elite players. J. Strength. Cond. Res. 23: 1947-1953, 2009.

21. Vescovi, J.D., Brown, T.D., and Murray, T.M. Positional characteristics of physical performance in
Division I college female soccer players. J Sports Med Phys Fitness 46: 221-226, 2006.

22. Wallace, J., Marfell-Jones, M., George, K., and Reilly, T. A comparison of skinfold thickness measurements and dual-energy x-ray absorptiometry analysis of percent body fat in soccer players, in: Science and Football VI - The Proceedings of the Sixth World Congress on Science and Football. Reilly, T., Korkusuz, F., eds. New York: Routledge, 2009, pp 364-369.

23. Wehbe, G.M., Hartwig, T.B., and Duncan, C.S. Movement Analysis of Australian National League
Soccer Players Using Global Positioning System Technology. J. Strength. Cond. Res., 2013.

24. Yildirim, A., Emre, A.K., Korkusuz, F., and Cicek, S. Physiological profiles of soccer players with respect to playing positions, in: Science and Football VI - The Proceedings of the Sixth World Congress on Science and Football. Reilly, T., Korkusuz, F., eds. New York: Routledge, 2009, pp 370-373.