

Implementasi Antropometri, Biomotor dan Psikologi Pada Pelatih SSB KU 12 di Jawa Tengah

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Abstrak. Dalam pemanduan bakat atlet sepakbola pada SSB KU 12 menggunakan teknik pengamatan yang beragam. Penelitian ini bertujuan mengetahui pemahaman pelatih SSB KU 12 pada antropometri. Metode penelitian ini adalah kuantitatif non eksperimen. Jumlah sampel dalam penelitian ini 44 pelatih SSB di Jawa Tengah. Pelatih Laki laki Pemilihan sampel dilakukan melalui purposive sampling. Hasil dari penelitian ini aspek pengetahuan dan pertimbangan, pelatih tahu dan mempertimbangkan aspek antropometri, biomotor, dan psikologi pada perekrutan atlet. Namun, pada pelaksanaan dari ketiga aspek tersebut maksimal 14%. Pelatih mengetahui dan memahami manfaat dari melaksanakan tes dan pengukuran pada aspek antropometri, biomotor dan psikologi namun pada pelaksanaannya belum dilaksanakan secara komperensif. Penelitian ini bisa dijadikan acuan pentingnya antropometri, biomotor dan psikologi dalam pemanduan bakat SSB KU 12.

Kata kunci: pelatih; antropometri; biomotor; psikologi.

Abstract. Talent scouting of football athletes at SSB KU 12 using various observation techniques. This study aims to determine the understanding of the SSB KU 12 trainer on anthropometry, biomotoric and psychology. This research method is non-experimental quantitative. The number of samples in this study was 44 SSB trainers in Central Java. Male coaches sample selection purposive sampling. The results of this study are knowledge and consideration aspects. Coaches know and consider anthropometric, biomotor and psychological aspects of athlete recruitment. However, in implementing these three aspects, there is a maximum of 14%. The trainer knows and understands the benefits of conducting tests and measurements on the anthropometric, biomotor, and psychological aspects, but in practice, carried out comprehensively. This research can reference the importance of anthropometry, biomotor, and psychology in scouting SSB KU 12 talent.

Key words: coach; antropometri; biomotor; psychology.

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PENDAHULUAN

Saat ini permainan sepakbola berkembang sangat pesat, hal ini ditandai dengan banyaknya sekolah-sekolah sepakbola (SSB) yang didirikan yang bertujuan untuk mengembangkan bakat, minat dan potensi bibit usia dini agar nantinya bisa membanggakan negara untuk berprestasi didunia spakbola baik dalam negeri maupun luar negeri. Untuk tim sepak bola, ada banyak faktor penting untuk sukses karakteristik antropometrik dan fisiologis sebagai faktor penting dalam kinerja olahraga (Sutton et al., 2009). Namun, evaluasi komposisi tubuh pada pemain sepak bola membantu meningkatkan kinerjanya dan mengevaluasi hasil rencana latihan yang diterapkan (Sutton et al., 2009).

Selain hubungan dengan risiko cedera, juga dimungkinkan untuk menemukan hubungan antara massa lemak dan beberapa karakteristik kinerja fisiologis, seperti kecepatan (Lago-Peñas et al., 2011). Sehubungan dengan ini, kita tahu bahwa persentase lemak tubuh (% BF) variabel penentu penting dalam kinerja pemain sepak bola (Nikolaidis et al., 2016). Namun, penilaian

komposisi tubuh menggabungkan beberapa kesulitan. Setiap Teknik menyajikan keuntungan, namun juga memiliki keterbatasan (Ackland et al., 2012). Kita tahu bahwa ada berbagai macam metode digunakan, tanpa standarisasi (Meyer et al., 2013), yang menyebabkan hasil yang cukup berbeda (Leão et al., 2017), sehingga seringkali tidak mungkin untuk membuat perbandingan antara sampel dari studi yang berbeda. Meskipun validitas menggunakan persamaan berdasarkan lipatan kulit (*Skin Fold Caliper*) sebagai metode penilaian komposisi tubuh, salah satu asumsinya adalah pilihan formula yang digunakan telah divalidasi pada populasi yang sama (Meyer et al., 2013).

Sepak bola, salah satu olahraga paling menonjol di seluruh dunia, pelatih adalah bagian dari profesional yang sangat tinggi identifikasi bakat dan sistem pengembangan (Mills et al., 2012; Lobinger, 2015). Penulis melihat terjadi beragam cara dalam mengidentifikasi bakat pada SSB KU 12. KU 12 dipilih sebagai awal pengembangan karir atlet tersebut. Penelitian ini bertujuan untuk mengobservasi pelatih pada item

antropometri, biomotor dan psikologi.

METODE

Penelitian ini berjenis kuantitatif dengan desain non eksperimen. Sampel merupakan pelatih olahraga dari ssb yang berada di jawa

tengah. Sampel berjumlah 44 pelatih. Pemilihan sampel menggunakan purposive sampling. Sampel yang dipilih pada pelatih KU 12. Data yang didapat diolah menggunakan prosentase.

HASIL DAN PEMBAHASAN

Tabel 1. Hasil Penelitian

Item	Tahu/Dipertimbangkan/ Digunakan	TidakTahu/Tidak Dipertimbangkan/Tidak Digunakan
Pengetahuan Biomotor	89%	11%
Pengetahuan Antropometri	84%	16%
Pengetahuan Psikologi	90%	10%
Pertimbangan Biomotor dalam Penjaringan Atlet	98%	2%
Pertimbangan Antropometri dalam Penjaringan Atlet	86%	14%
Pertimbangan Psikologi dalam Penjaringan Atlet	89%	11%
Penggunaan Biomotor Pada Seleksi	5%	95%
Penggunaan Antropometri Pada Seleksi	10%	90%
Penggunaan Psikologi Pada Seleksi	14%	86%

Berdasarkan hasil diatas pada aspek pengetahuan dan pertimbangan, pelatih tahu dan mempertimbangkan aspek antropometri, biomotor, dan psikologi pada perekrutan atlet. Namun, pada pelaksanaan dari ketiga aspek tersebut maksimal 14%. Peneliti berasumsi jika pelatih tahu dan paham namun tidak diimplementasikan. Peneliti melakukan wawancara pada pelatih, ditemukan yang biasa dilakukan dilapangan oleh pelatih hanya melakukan pengamatan. Pelatih mengikuti pertumbuhan siswa SSB. Pertumbuhan remaja mengikuti pola normal untuk usia (Canhadas et al., 2011). Namun, perbedaan tinggi badan, berat badan dan massa lemak tubuh dalam kaitannya dengan posisi bermain telah dijelaskan (Nikolaidis & Vassilios Karydis, 2011), memperhatikan bahwa ada perbedaan signifikan selama proses pengembangan yang berdampak pada posisi bermain pertunjukan. Keadaan pematangan pemain muda telah ditunjukkan sebagai faktor seleksi, yang mengarah untuk berat dan tinggi yang lebih besar dari pemain yang dipilih dibandingkan dengan yang tidak dipilih (Gil et al., 2007), memberikan menonjol pada diskusi tentang usia relatif dan dampak potensial pada masa depan para atlet ini.

Tinjauan literatur tentang pemain sepak bola

menunjukkan perbedaan yang signifikan dalam antropometrik mengukur di seluruh posisi bermain (Arnason et al., 2004; Carling et al., 2012; Carling & Orhant, 2010; Dellal et al., 2015; Milanese et al., 2015; Peñas et al., 2014; Reilly et al., 2009; Sutton et al., 2009; Towlson et al., 2017), serta antara kategori usia (Canhadas et al., 2011; D. N. Deprez et al., 2015; Lago-Peñas et al., 2011; le Gall et al., 2010). Karakteristik antropometri atlet dianggap menjadi faktor penting keberhasilan dalam olahraga (Brunkhorst & Kielstein, 2013).

Karakteristik psikologis telah diintegrasikan dalam model identifikasi dan pengembangan bakat (misalnya, ulasan khusus sepak bola dari Morris, 2000 dan Williams dan Reilly, 2000) dan penelitian telah mengidentifikasi karakteristik psikologis "sebagai prediktor yang signifikan keberhasilan" dalam olahraga (Vaeyens et al., 2008). Pemain U-12 dalam program pengembangan bakat Jerman (Feichtinger & Höner, 2014; Höner & Feichtinger, 2016) menilai karakteristik psikologis dari bidang motivasi, kemauan, kognisi referensi diri, dan emosi menggunakan kuesioner online. Dengan demikian, karakteristik psikologis yang dinilai dengan kuesioner standar dan hasil yang diperoleh sejauh ini seharusnya tidak

memberikan dasar untuk memilih atau membatalkan pemilihan pemain dalam hal identifikasi bakat (Feichtinger & Höner, 2014; Höner & Feichtinger, 2016). Di satu sisi, klub meminta pelatih mereka untuk menilai pemain mereka pada lembar kepanduan yang dirancang sendiri dan tidak dievaluasi. Di sisi lain, penelitian sebagian besar berfokus pada laporan diri pemain. Memang, perspektif pelatih ahli dan klub tentang karakteristik kinerja yang penting sebagian besar telah diabaikan dalam penelitian sejauh ini (Gledhill et al., 2017; Huijgen et al., 2014; Mills et al., 2012). Ulasan oleh (Gledhill et al., 2017) mengungkapkan bahwa dalam studi yang memeriksa karakteristik psikologis kurang dari 1% peserta adalah pelatih.

Performa motorik, performa motor khusus sepak bola, dan keterampilan khusus sepak bola dinilai secara khusus. Dua puluh lima penelitian (Carvalho et al., 2017; Coutinho et al., 2018; D. Deprez et al., 2014; D. Deprez, Valente-Dos-Santos, et al., 2015b, 2015a; Forsman et al., 2016; Francioni et al., 2018; Fransen et al., 2017; Gonaus & Müller, 2012; Leyhr et al., 2018; Moran et al., 2020; Sarmiento et al., 2018; Saward et al., 2020; Valente-dos-Santos, Coelho-e-Silva, Simões, et al., 2012; Valente-Dos-Santos, Coelho-e-Silva, Vaz, et al., 2014; Williams et al., 2011; Wrigley et al., 2014) menggunakan tes seperti plate tapping, sit and reach, sit-up, membungkuk lengan menggantung, berdiri lompat jauh, lompat vertikal dengan dan tanpa bebas lengan, lari jarak jauh daya tahan, sprint (10, 15, 20, dan 30 m), lempar bola obat 2 kg, lari ketahanan multi-tahap, kelincuhan (ujian 505, lari zigzag barrow, 8 angka, lari gawang Uji-T, kursus slalom, lari slalom dengan rintangan) dan tes kebugaran bertingkat. Tujuh belas penelitian

(Carvalho et al., 2014, 2017; D. Deprez et al., 2014; D. Deprez, Buchheit, et al., 2015; Fransen et al., 2017; Gonaus & Müller, 2012; Huijgen et al., 2010; Mirkov et al., 2010; Roescher et al., 2010; Valente-Dos-Santos, Coelho-e-Silva, Duarte, et al., 2014; Valente-dos-Santos, Coelho-e-Silva, Martins, et al., 2012; Valente-Dos-Santos, Coelho-e-Silva, Vaz, et al., 2014; Valente-Dos-Santos et al., 2012; Wrigley et al., 2014; Zuber et al., 2016) menilai performa motor spesifik sepak bola, yaitu: 30 m sprint berulang (RSA), agility shuttle lari 5-10 m (SHR), daya tahan intermiten (ISRT), Tes Pemulihan Intermiten Yo-Yo, slalom sprint dan shuttle sprint. Selain itu, selusin (Forsman et al., 2016; Francioni et al., 2016, 2018; Huijgen et al., 2010; Leyhr et al., 2018; Rebelo-Gonçalves et al., 2017;

Roescher et al., 2010; Saward et al., 2020; Valente-Dos-Santos, Coelho-e-Silva, Vaz, et al., 2014; Valente-Dos-Santos, Coelho-e-Silva, Duarte, et al., 2014; Valente-dos-Santos, Coelho-e-Silva, Simões, et al., 2012; Zuber et al., 2016)

dari mereka juga menilai keterampilan khusus sepak bola termasuk menggiring bola, menggiring bola dengan umpan, menembak, akurasi menembak, kontrol bola, sentuhan dari bola dengan tubuh dan kepala, juggling, passing, dan wall pass.

KESIMPULAN

Aspek pengetahuan dan pertimbangan, pelatih tahu dan mempertimbangkan aspek antropometri, biomotor, dan psikologi pada perekrutan atlet. Namun, pada pelaksanaan dari ketiga aspek tersebut maksimal 14%. Peneliti berasumsi jika pelatih tahu dan paham namun tidak diimplementasikan. Peneliti melakukan wawancara pada pelatih, ditemukan yang biasa dilakukan dilapangan oleh pelatih hanya melakukan pengamatan.

REFERENSI

- Ackland, T. R., Lohman, T. G., Sundgot-Borgen, J., Maughan, R. J., Meyer, N. L., Stewart, A. D., & Müller, W. (2012). Current status of body composition assessment in sport: review and position statement on behalf of the ad hoc research working group on body composition health and performance, under the auspices of the I.O.C. Medical Commission. *Sports Medicine (Auckland, N.Z.)*, 42(3), 227–249. <https://doi.org/10.2165/11597140-000000000-00000>
- Arnason, A., Sigurdsson, S. B., Gudmundsson, A., Holme, I., Engebretsen, L., & Bahr, R. (2004). Physical fitness, injuries, and team performance in soccer. *Medicine and Science in Sports and Exercise*, 36(2), 278–285. <https://doi.org/10.1249/01.MSS.000011347.8.92945.CA>
- Brunkhorst, L., & Kielstein, H. (2013). Comparison of anthropometric characteristics between professional triathletes and cyclists. *Biology of Sport / Institute of Sport*, 30, 269–273. <https://doi.org/10.5604/20831862.1077552>
- Canhadas, I., Silva, R., Chaves, C., & Portes, L. (2011). Características antropométricas e de aptidão física de meninos atletas de futebol. *Revista Brasileira de Cineantropometria e Desempenho Humano*, 12. <https://doi.org/10.5007/1980->

- 0037.2010v12n4p239
- Carling, C., Le Gall, F., & Malina, R. M. (2012). Body size, skeletal maturity, and functional characteristics of elite academy soccer players on entry between 1992 and 2003. *Journal of Sports Sciences*, 30(15), 1683–1693. <https://doi.org/10.1080/02640414.2011.637950>
- Carling, C., & Orhant, E. (2010). Variation in body composition in professional soccer players: interseasonal and intraseasonal changes and the effects of exposure time and player position. *Journal of Strength and Conditioning Research*, 24(5), 1332–1339. <https://doi.org/10.1519/JSC.0b013e3181cc6154>
- Carvalho, H. M., Bidaurrazaga-Letona, I., Lekue, J. A., Amado, M., Figueiredo, A. J., & Gil, S. M. (2014). Physical growth and changes in intermittent endurance run performance in young male Basque soccer players. *Research in Sports Medicine (Print)*, 22(4), 408–424. <https://doi.org/10.1080/15438627.2014.944301>
- Carvalho, H. M., Lekue, J. A., Gil, S. M., & Bidaurrazaga-Letona, I. (2017). Pubertal development of body size and soccer-specific functional capacities in adolescent players. *Research in Sports Medicine (Print)*, 25(4), 421–436. <https://doi.org/10.1080/15438627.2017.1365301>
- Coutinho, D., Santos, S., Gonçalves, B., Travassos, B., Wong, D. P., Schöllhorn, W., & Sampaio, J. (2018). The effects of an enrichment training program for youth football attackers. *PloS One*, 13(6), e0199008. <https://doi.org/10.1371/journal.pone.0199008>
- Dellal, A., Lago-Peñas, C., Rey, E., Chamari, K., & Orhant, E. (2015). The effects of a congested fixture period on physical performance, technical activity and injury rate during matches in a professional soccer team. *British Journal of Sports Medicine*, 49(6), 390–394. <https://doi.org/10.1136/bjsports-2012-091290>
- Deprez, D., Buchheit, M., Fransen, J., Pion, J., Lenoir, M., Philippaerts, R. M., & Vaeyens, R. (2015). A longitudinal study investigating the stability of anthropometry and soccer-specific endurance in pubertal high-level youth soccer players. *Journal of Sports Science & Medicine*, 14(2), 418–426.
- Deprez, D. N., Fransen, J., Lenoir, M., Philippaerts, R. M., & Vaeyens, R. (2015). A retrospective study on anthropometrical, physical fitness, and motor coordination characteristics that influence dropout, contract status, and first-team playing time in high-level soccer players aged eight to eighteen years. *Journal of Strength and Conditioning Research*, 29(6), 1692–1704. <https://doi.org/10.1519/JSC.0000000000000806>
- Deprez, D., Valente-Dos-Santos, J., Coelho-E-Silva, M. J., Lenoir, M., Philippaerts, R., & Vaeyens, R. (2015a). Longitudinal Development of Explosive Leg Power from Childhood to Adulthood in Soccer Players. *International Journal of Sports Medicine*, 36(8), 672–679. <https://doi.org/10.1055/s-0034-1398577>
- Deprez, D., Valente-Dos-Santos, J., Coelho-E-Silva, M. J., Lenoir, M., Philippaerts, R., & Vaeyens, R. (2015b). Multilevel Development Models of Explosive Leg Power in High-Level Soccer Players. *Medicine and Science in Sports and Exercise*, 47(7), 1408–1415. <https://doi.org/10.1249/MSS.0000000000000541>
- Deprez, D., Valente-Dos-Santos, J., Coelho-e-Silva, M., Lenoir, M., Philippaerts, R., & Vaeyens, R. (2014). Modelling Developmental Changes in Yo-Yo IR1 in Elite Pubertal Soccer Players. *International Journal of Sports Physiology and Performance*, 9. <https://doi.org/10.1123/ijssp.2013-0368>
- Feichtinger, P., & Höner, O. (2014). Psychological diagnostics in the talent development program of the German Football Association: Psychometric properties of an Internet-based test battery. *Sportwissenschaft*, 44, 203–213. <https://doi.org/10.1007/s12662-014-0341-0>
- Forsman, H., Gråstén, A., Blomqvist, M., Davids, K., Liukkonen, J., & Kontinen, N. (2016). Development of perceived competence, tactical skills, motivation, technical skills, and speed and agility in young soccer players. *Journal of Sports Sciences*, 34(14), 1311–1318. <https://doi.org/10.1080/02640414.2015.1127401>
- Francioni, F. M., Figueiredo, A. J., Terribili, M., & Tessitore, A. (2016). Analysis of the

- intraseasonal stability of field test performances in young academy soccer players. *Journal of Sports Sciences*, *34*(10), 966–972.
<https://doi.org/10.1080/02640414.2015.1082612>
- Francioni, F. M., Figueiredo, A., Lupo, C., Terribili, M., Condello, G., & Tessitore, A. (2018). Intra-seasonal variation of anthropometrical, conditional, and technical tests in U14 soccer players. [Variación en los parámetros antropométricos, condicionales y test técnicos de jugadores de fútbol SUB-14]. *RICYDE. Revista Internacional de Ciencias Del Deporte*, *14*, 219–232.
<https://doi.org/10.5232/ricyde2018.05303>
- Fransen, J., Bennett, K., Woods, C., French Collier, N., Deprez, D., Vaeyens, R., & Lenoir, M. (2017). Modelling age-related changes in motor competence and physical fitness in high-level youth soccer players: implications for talent identification and development. *Science and Medicine in Football*, *1*.
<https://doi.org/10.1080/24733938.2017.1366039>
- Gil, S., Ruiz, F., Irazusta, A., Gil, J., & Irazusta, J. (2007). Selection of young soccer players in terms of anthropometric and physiological factors. *The Journal of Sports Medicine and Physical Fitness*, *47*(1), 25–32.
- Gledhill, A., Harwood, C., & Forsdyke, D. (2017). Psychosocial factors associated with talent development in football: A systematic review. *Psychology of Sport and Exercise*, *31*.
<https://doi.org/10.1016/j.psychsport.2017.04.002>
- Gonaus, C., & Müller, E. (2012). Using physiological data to predict future career progression in 14- to 17-year-old Austrian soccer academy players. *Journal of Sports Sciences*, *30*(15), 1673–1682.
<https://doi.org/10.1080/02640414.2012.713980>
- Höner, O., & Feichtinger, P. (2016). Psychological talent predictors in early adolescence and their empirical relationship with current and future performance in soccer. *Psychology of Sport and Exercise*, *25*, 17–26.
<https://doi.org/https://doi.org/10.1016/j.psychsport.2016.03.004>
- Huijgen, B. C. H., Elferink-Gemser, M. T., Lemmink, K. A. P. M., & Visscher, C. (2014). Multidimensional performance characteristics in selected and deselected talented soccer players. *European Journal of Sport Science*, *14*(1), 2–10.
<https://doi.org/10.1080/17461391.2012.725102>
- Huijgen, B. C. H., Elferink-Gemser, M. T., Post, W., & Visscher, C. (2010). Development of dribbling in talented youth soccer players aged 12-19 years: a longitudinal study. *Journal of Sports Sciences*, *28*(7), 689–698.
<https://doi.org/10.1080/02640411003645679>
- Lago-Peñas, C., Casais, L., Dellal, A., Rey, E., & Domínguez, E. (2011). Anthropometric and physiological characteristics of young soccer players according to their playing positions: relevance for competition success. *Journal of Strength and Conditioning Research*, *25*(12), 3358–3367.
<https://doi.org/10.1519/JSC.0b013e318216305d>
- le Gall, F., Carling, C., Williams, M., & Reilly, T. (2010). Anthropometric and fitness characteristics of international, professional and amateur male graduate soccer players from an elite youth academy. *Journal of Science and Medicine in Sport*, *13*(1), 90–95.
<https://doi.org/10.1016/j.jsams.2008.07.004>
- Leão, C., Simões, M., Silva, B., Clemente, F. M., Bezerra, P., & Camões, M. (2017). Body Composition Evaluation Issue among Young Elite Football Players: DXA Assessment. *Sports (Basel, Switzerland)*, *5*(1).
<https://doi.org/10.3390/sports5010017>
- Leyhr, D., Kelava, A., Raabe, J., & Höner, O. (2018). Longitudinal motor performance development in early adolescence and its relationship to adult success: An 8-year prospective study of highly talented soccer players. *PloS One*, *13*(5), e0196324.
<https://doi.org/10.1371/journal.pone.0196324>
- Meyer, N. L., Sundgot-Borgen, J., Lohman, T. G., Ackland, T. R., Stewart, A. D., Maughan, R. J., Smith, S., & Müller, W. (2013). Body composition for health and performance: a survey of body composition assessment practice carried out by the Ad Hoc Research Working Group on Body Composition, Health and Performance under the auspices of the IOC Medical Commission. *British Journal of Sports Medicine*, *47*(16), 1044–1053.
<https://doi.org/10.1136/bjsports-2013-092561>
- Milanese, C., Cavedon, V., Corradini, G., De Vita, F., & Zancanaro, C. (2015). Seasonal DXA-

- measured body composition changes in professional male soccer players. *Journal of Sports Sciences*, 33(12), 1219–1228. <https://doi.org/10.1080/02640414.2015.1022573>
- Mills, A., Butt, J., Maynard, I., & Harwood, C. (2012). Identifying factors perceived to influence the development of elite youth football academy players. *Journal of Sports Sciences*, 30, 710–713. <https://doi.org/10.1080/02640414.2012.710753>
- Mirkov, D. M., Kukolj, M., Ugarkovic, D., Koprivica, V. J., & Jaric, S. (2010). Development of anthropometric and physical performance profiles of young elite male soccer players: a longitudinal study. *Journal of Strength and Conditioning Research*, 24(10), 2677–2682. <https://doi.org/10.1519/JSC.0b013e3181e27245>
- Moran, J., Paxton, K., Jones, B., Granacher, U., Sandercock, G., Hope, E., & Ramirez-Campillo, R. (2020). Variable long-term developmental trajectories of short sprint speed and jumping height in English Premier League academy soccer players: An applied case study. *Journal of Sports Sciences*, 38, 179–189. <https://doi.org/10.1080/02640414.2020.1792689>
- Nikolaidis, P. T., Ruano, M. A. G., de Oliveira, N. C., Portes, L. A., Freiwald, J., Leprêtre, P. M., & Knechtle, B. (2016). Who runs the fastest? Anthropometric and physiological correlates of 20 m sprint performance in male soccer players. *Research in Sports Medicine (Print)*, 24(4), 341–351. <https://doi.org/10.1080/15438627.2016.1222281>
- Nikolaidis, P. T., & Vassilios Karydis, N. (2011). Physique and body composition in soccer players across adolescence. *Asian Journal of Sports Medicine*, 2(2), 75–82. <https://doi.org/10.5812/asjasm.34782>
- Peñas, C., Rey, E., Casais, L., & Gómez López, M. (2014). Relationship Between Performance Characteristics and the Selection Process in Youth Soccer Players. *Journal of Human Kinetics*, 40, 189–199. <https://doi.org/10.2478/hukin-2014-0021>
- Rebello-Gonçalves, R., Coelho-e-Silva, M., Valente-Dos-Santos, J., Tessitore, A., & Figueiredo, A. (2017). Science and Medicine in Football Longitudinal study of aerobic performance and soccer-specific skills in male goalkeepers aged 11–18 years. *Science and Medicine in Football*, 1. <https://doi.org/10.1080/02640414.2016.1252848>
- Reilly, T., George, K., Marfell-Jones, M., Scott, M., Sutton, L., & Wallace, J. A. (2009). How well do skinfold equations predict percent body fat in elite soccer players? *International Journal of Sports Medicine*, 30(8), 607–613. <https://doi.org/10.1055/s-0029-1202353>
- Roescher, C. R., Elferink-Gemser, M. T., Huijgen, B. C. H., & Visscher, C. (2010). Soccer endurance development in professionals. *International Journal of Sports Medicine*, 31(3), 174–179. <https://doi.org/10.1055/s-0029-1243254>
- Sarmiento, H., Clemente, F., Araujo, D., Davids, K., McRobert, A., & Figueiredo, A. (2018). What Performance Analysts Need to Know About Research Trends in Association Football (2012–2016): A Systematic Review. *Sports Medicine*, 48, 836–866. <https://doi.org/10.1007/s40279-017-0836-6>
- Saward, C., Hulse, M., Morris, J. G., Goto, H., Sunderland, C., & Nevill, M. E. (2020). Longitudinal Physical Development of Future Professional Male Soccer Players: Implications for Talent Identification and Development? *Frontiers in Sports and Active Living*, 2, 578203. <https://doi.org/10.3389/fspor.2020.578203>
- Sutton, L., Scott, M., Wallace, J., & Reilly, T. (2009). Body composition of English Premier League soccer players: Influence of playing position, international status, and ethnicity. *Journal of Sports Sciences*, 27, 1019–1026. <https://doi.org/10.1080/02640410903030305>
- Towilson, C., Cogley, S., Midgley, A. W., Garrett, A., Parkin, G., & Lovell, R. (2017). Relative Age, Maturation and Physical Biases on Position Allocation in Elite-Youth Soccer. *International Journal of Sports Medicine*, 38(3), 201–209. <https://doi.org/10.1055/s-0042-119029>
- Vaeyens, R., Lenoir, M., Williams, A. M., & Philippaerts, R. M. (2008). Talent identification and development programmes in sport: current models and future directions. *Sports Medicine (Auckland, N.Z.)*, 38(9), 703–714. <https://doi.org/10.2165/00007256-200838090-00001>
- Valente-Dos-Santos, J., Coelho-e-Silva, M.,

- Duarte, J., Pereira, J. R., Rebelo-Gonçalves, R., Figueiredo, A., Mazzuco, M., Sherar, L., Elferink-Gemser, M., & Malina, R. (2014). Allometric Multilevel Modelling of Agility and Dribbling Speed by Skeletal Age and Playing Position in Youth Soccer Players. *International Journal of Sports Medicine*, *35*. <https://doi.org/10.1055/s-0033-1358469>
- Valente-dos-Santos, J., Coelho-e-Silva, M. J., Martins, R. A., Figueiredo, A. J., Cyrino, E. S., Sherar, L. B., Vaeyens, R., Huijgen, B. C. H., Elferink-Gemser, M. T., & Malina, R. M. (2012). Modelling developmental changes in repeated-sprint ability by chronological and skeletal ages in young soccer players. *International Journal of Sports Medicine*, *33*(10), 773–780. <https://doi.org/10.1055/s-0032-1308996>
- Valente-Dos-Santos, J., Coelho-E-Silva, M. J., Severino, V., Duarte, J., Martins, R. S., Figueiredo, A. J., Seabra, A. T., Philippaerts, R. M., Cumming, S. P., Elferink-Gemser, M., & Malina, R. M. (2012). Longitudinal study of repeated sprint performance in youth soccer players of contrasting skeletal maturity status. *Journal of Sports Science & Medicine*, *11*(3), 371–379.
- Valente-dos-Santos, J., Coelho-e-Silva, M. J., Simões, F., Figueiredo, A. J., Leite, N., Elferink-Gemser, M. T., Malina, R. M., & Sherar, L. (2012). Modeling developmental changes in functional capacities and soccer-specific skills in male players aged 11-17 years. *Pediatric Exercise Science*, *24*(4), 603–621. <https://doi.org/10.1123/pes.24.4.603>
- Valente-Dos-Santos, J., Coelho-e-Silva, M., Vaz, V., Figueiredo, A., Capranica, L., Sherar, L., Elferink-Gemser, M., & Malina, R. (2014). Maturity-associated variation in change of direction and dribbling speed in early pubertal years and 5-year developmental changes in young soccer players. *The Journal of Sports Medicine and Physical Fitness*, *54*, 307–316.
- Williams, C. A., Oliver, J. L., & Faulkner, J. (2011). Seasonal monitoring of sprint and jump performance in a soccer youth academy. *International Journal of Sports Physiology and Performance*, *6*(2), 264–275. <https://doi.org/10.1123/ijsp.6.2.264>
- Wrigley, R. D., Drust, B., Stratton, G., Atkinson, G., & Gregson, W. (2014). Long-term soccer-specific training enhances the rate of physical development of academy soccer players independent of maturation status. *International Journal of Sports Medicine*, *35*(13), 1090–1094. <https://doi.org/10.1055/s-0034-1375616>
- Zuber, C., Zibung, M., & Conzelmann, A. (2016). Holistic Patterns as an Instrument for Predicting the Performance of Promising Young Soccer Players - A 3-Years Longitudinal Study. *Frontiers in Psychology*, *7*, 1088. <https://doi.org/10.3389/fpsyg.2016.01088>