

The Importance of Paying Attention to Anthropometrics in the Selection Athletes

Ranu Baskora Aji Putra
 Universitas Negeri Semarang
ranu_baskora@mail.unnes.ac.id

Tandiyo Rahayu
 Universitas Negeri Semarang
tandiyorahayu@mail.unnes.ac.id

Sulaiman
 Universitas Negeri Semarang
sulaiman@mail.unnes.ac.id

Woro Kasmini
 Universitas Negeri Semarang
oktia2016@mail.unnes.ac.id

Abstract---The purpose of this study is to analyze the importance of the ideal anthropometric exercise so that it can support the effectiveness and efficiency of the training process. Systematic review method of 38 articles to identify problems, collect information, and conclusions. The review results that there are certain anthropometric characteristics in the form of height, weight, body size, fat in each volleyball, gymnastics, basketball, football, triathletes and cyclists and swimming. This shows that physiologically the anthropometrics of athletes support their best performance in each of the sports characters involved. The size of body posture is the nature of the athlete. During the process of exercise training does not have much effect on the proportion of body size. Conclusions that anthropometrics are very important in analysis to provide benefits in developing one's potential, especially in the performance

Keywords: *anthropometrics, performance athletes, body posture*

I. INTRODUCTION

An athlete's peak performance is demonstrated through his ability to display a series of harmonious movements, perfect with movement techniques in accordance with the characteristics of his sports branch. The skills and techniques of motion are obtained through gradual and continuous training to create motion awareness. The basis of strong motion, anthropometrics and supporting physical abilities is the foundation for achieving the peak of performance. For example, volleyball athletes with high body postures can display targeted, precise and hard spike movements, gymnastics athletes with their distinctive anthropometrics can display their mastery techniques. Anthropometry is a distinctive characteristic of each individual. The essence of Anthropometry is also a collection of numerical data that shows the size, shape, and strength of humans^[1]. Research on anthropometric results shows that one's the performance and physical activity are

influenced by one of its anthropometrics^[2]. Anthropometric relations with appearance and movement skills include soccer athletes^[3], swimming athletes^{[4][5]}, gymnastics athletes^{[6][7]}, dan basic motion skills.^[8]

Anthropometric characteristics do not have much effect on the appearance of certain branches, for example in archery, chess. when viewed from the side of the movement there are differences in the characteristics of the dominant motion found in each sport, for example for bicycle racing^[9] and running numbers on athletics, its performance is supported predominantly by the lower muscles^{[10][11]}, while branches Weight lifting, golf sports requires upper body contraction^[12]. The maximum appearance of an athlete will appear when there is a synergy between physical abilities, health conditions, mental and strategies and movement techniques. The appearance is the result of the training process and physiological adaptation to the characteristics of each sport being pursued. Sports coaches identify and try to develop athletes' potential optimally with efficient and effective time. One of the concerns of the trainers in an effort to develop potential in a nutshell is using talent scout selection in which anthropometric variables are one of the supporting factors. In accordance with the opinion of scientists that anthropometrics greatly influences the appearance of sprint running at 55%^[13], gymnastics 45%^[14]. Purpose of this article to discuss the importance of paying attention to anthropometrics in athlete training.

II. METHOD

Comprehensive systematic reviews are used to discuss the importance of anthropometrics in the athlete's training process. This method has steps to compile research questions, search and assess literature, extract data, analyze and synthesize, and report the results.^[15]

Instrument questions to explore anthropometric literature in athlete training based on a philosophical foundation on ontology, epistemology and axiology.

Review results

Research on anthropometric specifications in sports is as follows in table 1 below

Table 1. References to Articles on Anthropometry in sports

Author	Sample	Umur (Year)	Origin of sample	Sports
Bester and Coetzee (2010) ^[16]	12	13-18.3	South African	gymnastics
Peeters and Claessens (2013) ^[17]	145	13.2-21.8	World Championship	gymnastics
Massidda et al. (2013) ^[18]	42	13.5-18	Italian	gymnastics
João and Fernandes Filho (2015) ^[18]	25	13-22	South African	gymnastics
Cavedon et al(2015) ^[19]	91	13-22	Italian	basketball
Pyne, D. B. et all(2006) ^[20]	495		Australian	football
Sajber, Dorica et all(2013) ^[4]	15	17	-	Swimming
Brunkhorst, L.Kielstein.(2013) ^[21]	119	17-	-	triathletes and cyclists
De Groot et all(2012) ^[22]	78		Australian	Volley ball

In the research article in table 1 above it is concluded that there are certain anthropometric characteristics in the form of height, weight, body size, fat in each volleyball, gymnastics, basketball, football, triathletes and cyclists and swimming. This shows that physiologically the posture of an athlete supports his best performance in each of the sports characters involved. The size of body posture is the nature of the athlete. During the process of exercise training does not have much effect on the proportion of body size.^[23] Sports activities consist of organized movements in the form of effective movement techniques to produce optimal motion tasks. Race or match rules govern the procedure for participating in accordance with the character of the sport. The coach coaches try to think of ways that athletes can benefit from the training process in accordance with competition and competition regulations, one of which is by using physical, posture (anthropometric athletes) conditions. For example, in a basketball game to get a point, it is necessary to put the ball in the basket with an altitude of 3.05 meters, if the coach chooses a high athlete, he will benefit in terms of the range of the rebound ball. Similarly in volleyball with a net height of 2.43 meters, athletes will benefit from having high posture in terms of smash and blocking movements. Higden's research^[24] explaining the physical factors of gymnasts are unique and clearly identifiable having high physical characteristics and weighing less than 30% of normal, good posture, coordination and more strength.

III. DISCUSSION

In some developing countries, sports training that begins with the process of identifying talent in agriculture is done naturally. The development of an athlete's training process will be awaited until in time he is unable to develop the potential in the sport. This becomes less effective in relation to the much wasted training period. This happens the influence of the surrounding environment is also very influential on the cessation of the training process of team sports athletes^[25]. On the other side there is a way of identifying talents using Imiah selection. This method looks at and identifies based on coaching theory by paying attention to aspects of forming athletes from an early age through measurement.^[26] Although many factors influence how to identify talents other than anthropometrics, physical conditions are also variable in that the psychological aspects of athletes are also important in selecting athletes^[27].

The advantage of coaches paying attention to anthropometrics in scouting a sport is as follows:

1. Facilitate training for mastering movement techniques related to a sport. Posture provides benefits in mastering certain motion techniques in the sport. Scientists examine and conclude anthropometric characteristics (height and body fat percentage) equal to each handball player position^[28], basket ball^[29] in the game so the coach sets the position of the handball player according to his antropometrics. In individual sports, postural control in gymnastics influences the appearance of gymnastic movements^[30]
2. Shorten training time if anthropometrics is in accordance with the characteristics of the sport.

With the advantage of an athlete's posture faster in the training process. An anthropometric comparison study of non-athlete volleyball athletes showed that volleyball athletes were significantly higher than non-athletes^[31], this accelerates volleyball training time. Another study of anthropometric futsal players in the high category is lacking, this supports the agility in moving.^[32]

3. Can plan an exercise program that is appropriate to the characteristics of anthropometrics tailored to the training needs of the sport. With the right and fast information, it will make it easier for the trainer to solve problems and plan improvement programs during the training process.^[33]^[34]

IV. CONCLUSION

In general it is concluded that certain sports require anthropometric advantages to support optimal movement skills and appearance. Posture is a visual description of a person anthropometrics. Research to find out the condition condition of posture related to balance control^[35], overall child psychology^[36], sports^[37];^[38]. This shows that a person's anthropometrics is very important in analysis to provide benefits in developing one's potential, especially in appearance.

REFERENCES

- [1] dan H. H. Roberta Zulvi Surya., Siti Wardah, "Penggunaan Data Antropometri dalam Evaluasi Ergonomi Pada Tempat Duduk Penumpang Speed Boat Rute Tembilahan - Kuala Enok Kab . Indragiri Hilir Riau," *Malikussaleh Ind. Eng. J. Vol.2 No.1 4-8 ISSN 2302 934X*, vol. 2, no. Fakultas Teknik dan Ilmu Komputer, Universitas Islam Indragiri, Tembilahan, Riau, pp. 4–8, 2013.
- [2] C. K. Mulyadi, Fransisca, K. M. Pramudya, Kevin, M. Lenardi, and S. Sukmaniah, "Hubungan Antropometri, Aktivitas Fisik, dan Pengetahuan Gizi dengan Asupan Energi dan Komposisi Makronutrien pada Remaja," *E J. Kedokt. Indones.*, 2013.
- [3] Fakhrollah, "Analisis Antropometrik Atlet Sepakbola Universitas Serambi Mekkah Banda Aceh," *PENJASKESREK*, vol. 4, no. 2, 2017.
- [4] D. Sajber, M. Peric, M. Spasic, N. Zenic, and D. Sekulic, "Sport-specific and anthropometric predictors of synchronised swimming performance," *Int. J. Perform. Anal. Sport*, 2013.
- [5] M. Leone, G. Lariviere, and A. S. Comtois, "Discriminant analysis of anthropometric and biomotor variables among elite adolescent female athletes in four sports," *J. Sports Sci.*, 2002.
- [6] B. Mkaouer, S. Hammoudi-Nassib, S. Amara, and H. Chaabène, "Evaluating the physical and basic gymnastics skills assessment for talent identification in men's artistic gymnastics proposed by the International Gymnastics Federation.," *Biol. Sport*, vol. 35, no. 4, pp. 383–392, 2018.
- [7] B. Vandorpe *et al.*, "The value of a non-sport-specific motor test battery in predicting performance in young female gymnasts," *J. Sports Sci.*, 2012.
- [8] D. P. Cliff, A. D. Okely, L. M. Smith, and K. McKeen, "Relationships between Fundamental Movement Skills and Objectively Measured Physical Activity in Preschool Children," *Pediatr. Exerc. Sci.*, 2009.
- [9] B. Carter-Thuillier *et al.*, "Anthropometric Characteristics of Female and Male Athletes Bear A Different Effect on Fitness," *Asian J. Sports Med.*, 2019.
- [10] S. S. Wang, S. L. Whitney, R. G. Burdett, and J. E. Janosky, "Lower Extremity Muscular Flexibility in Long Distance Runners," *J. Orthop. Sport. Phys. Ther.*, 2013.
- [11] L. J. Huston and E. M. Wojtys, "Neuromuscular performance characteristics in elite female athletes," *Am. J. Sports Med.*, 1996.
- [12] P. A. Hume, J. Keogh, and D. Reid, "The role of biomechanics in maximising distance and accuracy of golf shots," *Sports Medicine*. 2005.
- [13] F. Brocherie, O. Girard, F. Forchino, H. Al Haddad, G. A. Dos Santos, and G. P. Millet, "Relationships between anthropometric measures and athletic performance, with special reference to repeated-sprint ability, in the Qatar national soccer team," *J. Sports Sci.*, 2014.
- [14] A. L. Claessens, J. Lefevre, G. Beunen, and R. M. Malina, "The contribution of anthropometric characteristics to performance scores in elite female gymnasts," *J Sport. Med Phys Fit.*, vol. 39, no. 4, pp. 355–360, 1999.
- [15] K. Richardson Dr. *et al.*, "A systematic review," *Annals of Internal Medicine*. 2013.
- [16] S. Bacciotti, A. Baxter-Jones, A. Gaya, and J. Maia, "The Physique of Elite Female Artistic Gymnasts: A Systematic Review," *J. Hum. Kinet.*, vol. 58, no. 1, pp. 247–259, 2017.
- [17] M. Boraczyński, T. Boraczyński, R. Podstawski, J. Laskin, D. Choszcz, and A. Lipiński, "Relationships between anthropometric features, body composition, and anaerobic alactic power in elite post-pubertal and mature male taekwondo athletes," *Hum. Mov.*, vol. 18, no. 4, pp. 30–

- 40, 2017.
- [18] S. Bacciotti, A. Baxter-Jones, A. Gaya, and J. Maia, "The Physique of Elite Female Artistic Gymnasts: A Systematic Review," *J. Hum. Kinet.*, vol. 58, no. 1, pp. 247–259, 2017.
- [19] V. Cavedon, C. Zancanaro, and C. Milanese, "Physique and performance of young wheelchair basketball players in relation with classification," *PLoS One*, 2015.
- [20] D. B. Pyne, A. S. Gardner, K. Sheehan, and W. G. Hopkins, "Positional differences in fitness and anthropometric characteristics in Australian football," *J. Sci. Med. Sport*, 2006.
- [21] L. Brunkhorst and H. Kielstein, "Comparison of anthropometric characteristics between professional triathletes and cyclists," *Biol. Sport*, 2013.
- [22] R. De Groot, P. Malliaras, S. Munteanu, C. Payne, D. Morrissey, and N. Maffulli, "Foot posture and patellar tendon pain among adult volleyball players," *Clin. J. Sport Med.*, 2012.
- [23] R. Damsgaard, J. Bencke, G. Matthiesen, J. H. Petersen, and J. Müller, "Body proportions, body composition and pubertal development of children in competitive sports," *Scand. J. Med. Sci. Sport.*, 2001.
- [24] D. Highden, "Talent identification and development in Women's Artistic Gymnastics in Australia Sports Profile: Women's Artistic Gymnastics," 2019.
- [25] O. Molinero, A. Salguero, E. F. Álvarez, and S. Márquez, "Reasons for dropout in youth soccer: a comparison with other team sports," *Mot. Eur. J. Hum. Mov.*, 2009.
- [26] M. Boostani, M. Boostani, and A. Rezaei, "Talent identification in sport," *J. Combat Sport. Martial Arts*, 2013.
- [27] A. Abbott and D. Collins, "Eliminating the dichotomy between theory and practice in talent identification and development: Considering the role of psychology," *J. Sports Sci.*, 2004.
- [28] A. Chaouachi, M. Brughelli, G. Levin, N. B. B. Boudhina, J. Cronin, and K. Chamari, "Anthropometric, physiological and performance characteristics of elite team-handball players," *J. Sports Sci.*, 2009.
- [29] E. J. Drinkwater, D. B. Pyne, and M. J. McKenna, "Design and interpretation of anthropometric and fitness testing of basketball players," *Sports Medicine*. 2008.
- [30] A. Kochanowicz, K. Kochanowicz, B. Niespodziński, J. Mieszkowski, and P. Sawicki, "Effects of systematic gymnastic training on postural control in young and adult men," *Sci. Gymnast. J.*, 2017.
- [31] M. Grabara, "Comparison of posture among adolescent male volleyball players and non-athletes," *Biol. Sport*, 2015.
- [32] O. Galy *et al.*, "Anthropometric and physiological characteristics of Melanesian futsal players: A first approach to talent identification in Oceania," *Biol. Sport*, 2015.
- [33] N. Lankton and J. Luft, "Uncertainty and Industry Structure Effects on Managerial Intuition About Information Technology Real Options," *J. Manag. Inf. Syst.*, 2008.
- [34] P. B. Laursen and D. G. Jenkins, "The scientific basis for high-intensity interval training: Optimising training programmes and maximising performance in highly trained endurance athletes," *Sports Medicine*. 2002.
- [35] O. Ludwig, "Interrelationship between postural balance and body posture in children and adolescents," *J. Phys. Ther. Sci.*, 2017.
- [36] R. Hepach, A. Vaish, and M. Tomasello, "The fulfillment of others' needs elevates children's body posture," *Dev. Psychol.*, 2017.
- [37] C. Lunde and K. H. Gattario, "Performance or appearance? Young female sport participants' body negotiations," *Body Image*, 2017.
- [38] K. Barczyk-Pawelec, Z. Bankosz, and M. Derlich, "Body postures and asymmetries in frontal and transverse planes in the trunk area in table tennis players," *Biol. Sport*, 2012.