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"Importance Of Morphological Division And Characteristics In Sportspersons"

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ABSTRACT

Morphology is a branch of life science dealing with the study of gross structure of an organism or taxon and its component parts.Within the field of biology, morphology is the study of the shapes and arrangement of parts of organisms, in order to determine their function, their development, and how they may have been shaped by evolution.Divisions of morphology, Characteristics of morphology and some studies on Morphological characteristics of sportspersons are provided in this paper. The study of morphology is significant in sports. A lot of studies have been conducted on morphological characteristics of sports persons. Synthesis of such studies have to be made by systematic literature review and meta-analysis. Future studies should specifically focus on throwers at different levels.

Key words: Morphology, sports, throwers, anthropometry, anatomy.

Introduction

Morphology is a branch of biology dealing with the study of the form and structure of organisms and their specific structural features.This includes aspects of the outward appearance (shape, structure, colour, pattern, size), i.e. external morphology (or eidonomy), as well as the form and structure of the internal parts like bones and organs, i.e. internal morphology (or anatomy). Morphology is a branch of life science dealing with the study of gross structure of an organism or taxon and its component parts.

Although it is difficult to pinpoint the emergence of modern morphology as a science, one of the early landmarks was the publication in of De humanicorporis fabrica by Andreas Vesalius, whose careful dissections of human bodies and accurate drawings of his observations revealed many of the inaccuracies in Galen's earlier descriptions of the human body. The field of morphology was developed by Johann Wolfgang von Goethe (1790) and independently by the German anatomist and physiologist Karl Friedrich Burdach (Karl, 1992).

Within the field of biology, morphology is the study of the shapes and arrangement of parts of organisms, in order to determine their function, their development, and how they may have been shaped by evolution. Morphology is particularly important in classifying species, since it can often reveal how closely one species is related to another.

Divisions of morphology

- Comparative morphology is analysis of the patterns of the locus of structures within the body plan of an organism, and forms the basis of taxonomical categorization.
- Functional morphology is the study of the relationship between the structure and function of morphological features.
- Experimental morphology is the study of the effects of external factors upon the morphology of organisms under experimental conditions, such as the effect of genetic mutation.
- Anatomy is a "branch of morphology that deals with the structure of organisms".
- Molecular morphology is a rarely used term, usually referring to the superstructure of polymers such as fiber formation or to larger composite assemblies. The term is commonly not applied to the spatial structure of individual molecules.
- Gross morphology refers to the collective structures of an organism as a whole as a general description of the form and structure of an organism, taking into account all of its structures without specifying an individual structure.

Characteristics of morphology

- Morphology describes structural characteristics.
- Morphology is of two types such as external morphology and internal morphology.
- Internal morphology is referred to as Anatomy.
- Internal morphology is researched in-depth for comparative anatomy.
- External morphology is extensively investigated for classification.

Studies on Morphological characteristics of sportspersons

Very common research in physical culture aim to discover some new facts that would be a realistic basis toconfirm or reject some of the previous laws. Depending on current problem will depend the direction and action of research. In track and field throwing events are manifested motor skills that are usually dominant intheir structure of technical performance, and from which participation depends the result of a particulardiscipline, and as such are often the subject of scientific research. Sometimes it's influence, relations and often differences within a particular discipline within the same or different populations. The results are all themore interesting for science if we take into account a transverse cross-section of the population in order toexamine possible differences of specific motor skills, morphological dimension, specific disciplines, etc. It maybe a cross-section by gender, by result, and so on. This research analyzes the space of specific motorabilities and anthropometric parameters of the population of students of the Faculty of Physical Educationand Sports. Pavlovic, et. al., (2014)determined possible differences in the result success ofball throwing as one of the four throwing events, as well as differences in some anthropometriccharacteristics of students. The survey was conducted on a population of 265 students from severaluniversities. In analyzing the data, by the module T-test theresults obtained statistically significantly explain the differences the result success of shot put in 90% ofcases of the level of significance ($p < 0.001$) and a 40% difference in the morphological status (Body Height,Body Mass, $p < 0.01$, $p < 0.05$).

The diagnosis of morphological characteristics is an integral part of the entire training process in sports. Gardašević, et. al., (2020) determined the influence of morphological characteristics on the ball's speed of movement after the shoot from a spot and movement in handball. The sample included 36 female handball players aged 14.33 years. The predictor set consisted of 10 morphological variables. In comparison, the three variables constituted the criterion variables by which the ball's speed of movement was determined after different ways of shooting. Using regression analysis, it was found that the predictor set of variables explains about 70% of the variance for all three criterion variables. Individually, a statistically significant and positive influence on the speed of movement of the ball after the shot was recorded at the height and weight of the body, while a negative effect was observed for the variables; arm length, leg length and skin fold on the abdomen. Based on the results obtained, it can be concluded that morphological characteristics significantly influence the speed of movement of the ball after a shot in the handball, which can significantly contribute to the selection of handball players, as well as in establishing the tactics of handball, especially in situations where one shot decides the match. Also, the obtained results indicate the necessity of considering the age characteristics of the female respondents, that is, the need to adjust the training process to the period of intensive growth and development.

Vučetić, et. al., (2005) presented the anthropometric and morphological characteristics of 46 national level track-and-field athletes. 20 morphological body measures were taken on a sample of 15 sprinters, 13 endurance sprinters, 9 middle-distance runnersand 9 long-distance runners. Body fat percentage, body mass index and body constitution type were also calculated. Canonical discriminative analysis showed significant difference between the athletes of various running events, for the measures of body volume and body fat, and no significant difference in the variables of longitudinal and transversal dimensions of the skeleton. ANOVA and Student t-test for independent samples showed statistically significantly higher thigh and lower leg circumference in sprinters, as well as greater upper arm skinfold in middle-distance runners. The mesomorphic component is a dominant characteristic of body constitution of the runners in all events, whereas the ectomorphic component is the least marked.

Igor (2014) examined the relation of morphological characteristics with the jumping and throwing events results, with elementary school students as athletes. The sample included 200 primary school students in the region of Prokuplje, male, aged 13 and 14 years, who, in addition to regular physical education classes, were included in the sports clubs training activities. The variables sample included 13 anthropometric measures as a set of predictors and four specific-motor tests of jumping (high jump and long jump) and throwing events (shot put and javelin), as well as a set of criteria. Determining the relations and influence between the morphological characteristics and the specific motor skills was obtained by applying the canonical-correlation and regression analysis. The research of canonical correlation analysis results showed that there are statistically significant interlinks between canonical factors of morphological dimension Can. 0.81% ($p = .000$) and the results of examinee's specific-motor skills in a long running jump, running high jump, shot put and javelin. Regression analysis results show that the morphological dimensions have an important prediction of the results of examinee's specific-motor skills.

There is growing interest in identifying morphological, motor, maturation characteristics,as well as their changes, of children and adolescents in systematized training in varioussports. Knowledge of these characteristics is important for coaches and researchers becausethey provide parameters for assessing youth development during training. For track and field,studies on the category under 16 are scarce. Freitas, et. al., (2020) describedthe profile and to design a percentile table of morphological, motor, maturation and eventspecificvariables of under 16 athletes. 105 young athletes were evaluated on two consecutivedays. On the first day, an anamnesis of athletes and coaches was performed. Anthropometricand anaerobic measurements were analyzed in shot put, long jump, 800 m run. On the secondday, flexibility, vertical impulse, upper limb strength, speed and maximal aerobic speed wereevaluated. The biological maturation was evaluated by the percentage of the predicted adult height. A table with percentiles was prepared with the data of all athletes. Another table withthe results of the whole group plus mean and standard deviation was prepared. A last tablewas prepared containing data divided by group of sports events. The morphological variablespresented differences between the groups as to body mass, BMI and sum of skinfolds.

Significantdifferences were observed only for the motor variable MAS. No significant differenceswere observed only for long jump. When divided by groups, it was evident that throwers aredifferent from the other athletes in some morphologic variables and in specific sports events.

Grasgruber(2020) identified the morphological profile and determining the physical qualities of the javelin throwers in Algeria menand women. For this purpose, we assumed that the Algerian throwers possess physical qualities that allow them to throw the javelinfarthest and have an acceptable template to achieve good performances in javelin throwing.And to verify these hypotheses, the study based on a descriptive method took place with a sample composed of 07 throwers and 07 throwers finalist of the Algerian OPEN championship for the year 2014; these two groups were subjected to physical tests andanthropometric measurements for this purpose. The results obtained show that our throwers have considerable physical qualities tobe among the best throwers, they also have a morphological profile of mesomorphic type, but they throw not far, which invalidates ourhypotheses. We conclude that Algerian launchers have acceptable physical qualities and a morphological profile of the mesomorphictype, and despite the presence of all the favorable conditions to achieve African and world performances, they still do not launch far. Onthis basis, we recommend that the actors of this discipline conduct a global expertise on the training contents, the recycling of trainers, the specific equipment and the infrastructure.

Ahmedov, et. al., (2021) determined the significance of morphological space for success in judo,through the analysis of previous results of various scientific papers. The research included 739 respondents ofboth sexes, aged 13 to 24 years. The analysis of the obtained results revealed that there are statisticallysignificant differences in morphological characteristics between the sexes at all ages, and that these differencesare mainly in height, weight, circumference, and limb length, which are all greater in men, as well assubcutaneous tissue and body fat percentage, which are bother greater in females. Subcutaneous adipose tissuehas been found to be complicating factor during judo performance. The obtained results generally indicated thatmorphology did not have a crucial impact on judo performance, which was shown for almost all ages, especiallyfor the ages of 13 to 16 years. The judoist somatotype mainly showed that judoists belong most often to themesomorphic somatotype, then to the endomorphic and a combination of the mesomorphic and endomorphic,while the ectomorphic type is rarely present among judoists. In regard to differences in morphology betweenhigh and lower-ranked judoists of both sexes, there are negligible differences.

Technical, tactical and physiological demands of water polo players that once were standard are no longer current. The advancement in the total approach to this discipline, from players', coaches' and also from the scientific standpoint, have led to the establishing of new physiological principles that are now actual in this team sport. The relationship of morphological characteristics and specific motor abilities represents one of the important traits of a player profile in elite water polo. Idrizović, Calleja-Gonzáles&Kontić, (2014) examined and define the relationships among the anthropometrical characteristics (body height, arm span, leg length, body mass and BMI) and three sport-specific fitness tests, 20-meters-sprint-swimming, maximal

dynamometric force in eggbeater kick and throwing velocity. The sample of participants embraced 22 (23.04 ± 2.72 years) top-quality water polo players, members of the national team and one water polo club, who participated in the Adriatic League competition. Throwing velocity shows a significant correlation only with maximal dynamometric force in eggbeater kick (r=.455, p=.033). Maximal dynamometric force in eggbeater kick, except with throwing velocity shows significant correlation with body mass (r=.745, p=.000), body height (r=.568, p=.006), BMI (r=.521, p=.013) and with arm span (r=.488, p=.021). Regarding to swimming speed, significant correlations were not found. One of the major finding of the present research was that swimming speed has no statistically significant linear correlation with any of applied morphological and specific motor parameters. A second major result was that throwing velocities significantly correlate only with maximal dynamometric force in eggbeater kick. On the other side, no statistically significant correlation has been found between a throwing velocity and the applied anthropometric parameters that almost completely determined a result in the test for the estimation of a maximal dynamometric force in eggbeater kick.

Conclusion

The study of morphology is significant in sports. A lot of studies have been conducted on morphological characteristics of sports persons. Synthesis of such studies have to be made by systematic literature review and meta-analysis. Future studies should specifically focus on throwers at different levels.

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