



Determining Differences in Anthropometric Characteristics Among Football Players According to Playing Position

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ABSTRACT

The purpose of this study was to examine differences in anthropometric characteristics among football players according to their playing positions. The study employed a cross-sectional comparative design and was conducted on a sample of 50 active football players from FC Sileks, aged 17–30 years. The sample comprised 50 outfield players, who were classified into three positional groups: defenders ($n = 20$), midfielders ($n = 14$), and forwards ($n = 16$). The anthropometric profile was assessed using 18 anthropometric variables representing basic body dimensions, body circumferences, transverse skeletal dimensions, and subcutaneous fat tissue indicators. Data were analysed using descriptive statistics, multivariate analysis of variance (MANOVA), univariate analysis of variance (ANOVA), and post hoc comparisons. Effect sizes were estimated using partial eta squared (η^2_p). The results demonstrated that football players occupying different playing positions differed significantly in their overall anthropometric profiles. The most pronounced differences were observed in body height, body mass, selected transverse skeletal dimensions, body circumferences, and skinfold thickness measurements. These findings suggest that playing position is associated with distinct morphological characteristics, indicating that football players should not be considered a morphologically homogeneous group in anthropometric analyses. From a practical perspective, position-specific anthropometric profiling should be incorporated into the routine assessment of football players to support sports medicine monitoring, talent identification, and individualized training programmes. Furthermore, because these anthropometric assessments are inexpensive, non-invasive, and feasible in field settings, they represent a practical tool for clubs with limited resources seeking to optimize player evaluation according to positional demands.

Research Article

Received 19.5.2026
Accepted 29.6.2026
Published 30.6.2026
Cover date June 2026

KEYWORDS: body anthropometry, body composition, morphological profile, playing position, football.

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Introduction

Modern football places complex physical, physiological, and technical-tactical demands on players, with these requirements varying according to playing position. Consequently, anthropometric characteristics constitute an essential component of football player assessment, as they provide valuable information regarding body size, proportionality, skeletal dimensions, and body composition. Although anthropometric characteristics alone do not

determine competitive performance, they represent an important element of the broader framework for talent identification, player selection, performance monitoring, and the individualization of training programmes ([Reilly et al., 2000](#); [Williams & Reilly, 2000](#)).

Previous research has demonstrated that football players occupying different playing positions exhibit distinct morphological and functional profiles. Defenders and goalkeepers are generally taller and heavier, whereas midfielders are typically required to perform continuous high-intensity movement while covering larger areas of the pitch ([Bloomfield et al., 2007](#); [Stølen et al., 2005](#)). Similarly, ([Gil et al. 2007](#)) and ([Hazir, 2010](#)) reported significant position-related differences in the anthropometric and physiological characteristics of football players. Regional studies further suggest that these positional profiles are not universal but are influenced by factors such as age, competitive level, and the socio-cultural context of sport ([Gontarev et al., 2016](#); [Sylejmani et al., 2019](#)).

In the Macedonian and broader Balkan context, there is still a need for recent, methodologically rigorous evidence on the anthropometric characteristics of football players according to their playing positions. ([Gontarev et al. 2016](#)) provided important normative data on young Macedonian football players, demonstrating that anthropometric characteristics and somatotype vary with age and differ from those observed in the general population. Similarly, ([Sylejmani et al. 2019](#)) reported position-specific differences in the anthropometric and physical characteristics of elite youth football players from Kosovo, with defenders, midfielders, and forwards exhibiting distinct morphological profiles.

Building on the multidimensional model of player evaluation proposed by ([Reilly et al. 2000](#)) and ([Williams and Reilly, 2000](#)), which conceptualises football performance as the interaction of morphological, motor, physiological, and technical-tactical characteristics, the present study employed a cross-sectional, position-based comparative design grounded in classical anthropometry. Specifically, the study aimed to examine differences in anthropometric characteristics among senior football players from FC *Sileks* according to their playing positions. The analysis included defenders, midfielders, and forwards and was based on a set of 18 anthropometric variables representing basic body dimensions, body circumferences, transverse skeletal dimensions, and subcutaneous fat tissue indicators.

Materials and methods

Participant sample

The study employed a cross-sectional comparative design and included a purposive sample of 50 active male football players from FC *Sileks*, a senior team competing in the Macedonian First Football League, the highest level of professional football competition in North Macedonia. Participants were between 17 and 30 years of age and were actively engaged in regular training and competitive match play throughout the study period. A purposive sampling strategy was adopted because the research objective required players with clearly defined positional roles within the same competitive team. This non-probability sampling approach is widely used in studies investigating position-specific anthropometric profiles in football players ([Gil et al., 2007](#); [Slimani & Nikolaidis, 2019](#)). For the comparative analysis, only outfield players were included and classified into three playing-position groups: defenders ($n = 20$), midfielders ($n = 14$), and forwards ($n = 16$), resulting in a total sample of 50 players. Goalkeepers were excluded from the comparative analyses because the limited number of players in this position did not permit meaningful statistical comparison. Before data collection, all participants were informed about the purpose and procedures of the study and provided written informed consent. For participants younger than 18 years of age, additional written informed consent was obtained from a parent or legal guardian. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and received approval from the relevant institutional ethics committee for research involving human participants. Participation was entirely voluntary, and participants were informed of their right to withdraw from the study at any stage without any consequences. All anthropometric measurements were performed following the standardized assessment protocol of the International Biological Program (IBP).

Variables for the Assessment of Anthropometric Characteristics

Anthropometric characteristics were assessed using a set of 18 standardized variables. To ensure clarity and consistency, all abbreviations were derived from the original standardized nomenclature, defined at their first

appearance, and used consistently throughout the text and tables. Basic body dimensions included body height (TV, cm) and body mass (TM, kg). Body circumferences were assessed using thigh circumference (ONK), calf circumference (OPK), upper arm circumference (ONL), forearm circumference (OPL), and flexed upper arm circumference (ONLF). Transverse skeletal dimensions were evaluated by measuring elbow joint diameter (DILZ), knee joint diameter (DIKZ), wrist joint diameter (DIRZ), and ankle joint diameter (DISZ). Subcutaneous fat tissue was assessed using the following skinfold measurements: upper arm skinfold (KDNL), forearm skinfold (KDPL), triceps skinfold (KDTR), subscapular skinfold (KDSS), thigh skinfold (KDNK), calf skinfold (KDPK), and suprailiac skinfold (KDSI).

Measurement Conditions and Procedure

Anthropometric assessments were performed under standardized and controlled conditions during the morning hours (08:00–10:00 a.m.) at the Institute of Physiology, University Clinic in Skopje. All measurements were conducted in rooms with appropriate temperature, lighting, and environmental conditions by experienced sports medicine physicians trained in standardized anthropometric assessment procedures. Body height was measured using a Seca stadiometer (Seca GmbH & Co. KG, Hamburg, Germany), body mass with a Tanita electronic scale (Tanita Corp., Tokyo, Japan), skinfold thickness with a John Bull skinfold caliper (British Indicators Ltd., St Albans, UK), body circumferences with a non-elastic anthropometric measuring tape, and skeletal diameters with a GPM sliding anthropometer (DKSH/Siber Hegner, Zurich, Switzerland). Before each assessment, all anatomical landmarks were identified according to standardized anthropometric procedures. Participants were measured barefoot and wearing light clothing, and all measurements were performed by the same trained examiner to ensure measurement consistency. The use of a single experienced examiner eliminated inter-examiner variability, while anatomical landmarks were re-identified for each participant to minimize the intra-examiner technical error of measurement within internationally accepted limits. All anthropometric assessments were performed in accordance with the standards of the International Biological Program (IBP).

Statistical Analysis

Data were analysed using descriptive and inferential statistical procedures. Descriptive statistics included the calculation of the mean, standard deviation, minimum and maximum values, and measures of variability for each anthropometric variable. The selection and application of the statistical methods followed established methodological recommendations for the behavioural and sport sciences ([Field, 2018](#); [Pallant, 2020](#)). Prior to inferential analyses, the assumptions underlying parametric testing were evaluated. Normality was assessed using the Shapiro–Wilk test, homogeneity of variances using Levene's test, and homogeneity of variance–covariance matrices using Box's M test. Multivariate analysis of variance (MANOVA) was performed to examine overall differences in anthropometric characteristics among defenders, midfielders, and forwards. Following a significant multivariate effect, separate univariate analyses of variance (ANOVA) were conducted for each anthropometric variable to identify the specific variables contributing to the observed group differences. Statistical significance was set at $p < .05$. For variables showing significant group differences, Games–Howell post hoc comparisons were performed because this procedure is appropriate for unequal group sizes and heterogeneous variances. The magnitude of group differences was assessed using partial eta squared (η^2_p), interpreted as small ($\approx .01$), medium ($\approx .06$), and large ($\approx .14$) according to ([Cohen, 1988](#)) guidelines. All statistical analyses were performed using IBM SPSS Statistics (Version 26.0; IBM Corp., Armonk, NY, USA).

Results

The results of the multivariate analysis of variance (MANOVA) are presented in Table 1. A statistically significant multivariate effect of playing position on the overall anthropometric profile was observed (Wilks' $\Lambda = .015$, $F = \dots$, $df = 36$, $p < .001$), indicating that defenders, midfielders, and forwards differed significantly when the complete set of anthropometric variables was considered. Following the significant multivariate effect, separate univariate analyses of variance (ANOVA) were conducted for each anthropometric variable. As shown in Table 2, statistically significant differences among the three positional groups were identified in 15 of the 18 variables analysed, indicating that the majority of anthropometric characteristics contributed to the differentiation of players according to their playing positions. Significant differences were observed in the basic anthropometric variables of body height and body mass. Body height differed significantly among the positional groups (TV: $F = 13.53$, $p < .001$),

as did body mass (TM: $F = 13.12, p < .001$). These findings indicate that playing position is associated with significant variation in the fundamental anthropometric characteristics of football players. Significant positional differences were also observed in several transverse skeletal dimensions. Specifically, elbow joint diameter (DILZ: $F = 3.53, p = .037$), knee joint diameter (DIKZ: $F = 7.63, p = .001$), and ankle joint diameter (DISZ: $F = 5.05, p = .010$) differed significantly among3 defenders, midfielders, and forwards (Table 2). Body circumferences also showed significant positional variation. Differences were identified for upper arm circumference (ONL: $F = 5.21, p = .009$), flexed upper arm circumference (ONLF: $F = 9.18, p < .001$), forearm circumference (OPL: $F = 5.69, p = .006$), thigh circumference (ONK: $F = 5.22, p = .009$), and calf circumference (OPK: $F = 3.22, p = .049$). These findings indicate that positional differences extend beyond basic body dimensions to include body circumferences and skeletal breadths. Significant differences were likewise observed in several skinfold measurements, including upper arm skinfold (KDNL: $F = 15.40, p < .001$), forearm skinfold (KDPL: $F = 12.16, p < .001$), subscapular skinfold (KDSS: $F = 11.73, p < .001$), thigh skinfold (KDNK: $F = 7.37, p = .002$), and calf skinfold (KDPK: $F = 4.31, p = .019$). Across the significant variables, effect sizes (partial η^2) ranged from medium to large, with the largest effects observed for the upper arm and forearm skinfolds, body height, body mass, and flexed upper arm circumference. These findings indicate that these variables contributed most strongly to the differentiation of players according to playing position (Table 2). Games–Howell post hoc comparisons revealed that the observed differences were primarily driven by defenders, who differed significantly from midfielders and forwards across most of the significant variables. In contrast, midfielders and forwards differed from one another in relatively few anthropometric characteristics.

Table 1 Multivariate Differences in the Variables for the Assessment of Anthropometric Measures Among the Three Groups of Participants Playing Different Positions

	Value	F	Hypothesis df	Error df	p
Pillai's trace	1.707	10.027	36.000	62.000	.000
Wilks 'lambda	.015	11.91	36.000	60.000	.000
Hotelling's trace	17.464	14.069	36.000	58.000	.000
Roy's largest root	14.054	24.20	18.000	31.000	.000

Table 2. Univariate Differences in the Variables for the Assessment of Anthropometric Measures Among the Three Groups of Participants Playing Different Positions

	Defenders		Midfielders		Forwards		F	p
	Mean	SD	Mean	SD	Mean	SD		
TV	182.95	4.87	173.93	4.93	175.88	6.39	13.53	.000
TM	79.65	5.16	71.43	6.40	70.19	6.72	13.12	.000
DIRZ	54.30	3.47	53.43	1.74	55.59	2.53	2.32	.109
DILZ	82.80	5.17	78.71	2.20	79.13	6.50	3.53	.037
DIKZ	104.70	4.90	102.14	2.74	99.13	4.46	7.63	.001
DISZ	71.20	3.37	74.14	2.38	71.00	3.10	5.05	.010
ONL	299.50	14.59	287.14	19.78	283.13	13.65	5.21	.009
ONLF	338.50	10.77	317.14	21.99	318.75	17.27	9.18	.000
OPL	271.00	7.88	261.43	12.62	260.00	11.83	5.69	.006
ONK	581.00	27.03	563.57	28.38	551.88	26.45	5.22	.009
OPK	380.00	12.77	382.14	23.67	366.25	21.41	3.22	.049
KDNL	5.08	1.35	3.54	0.46	3.66	0.39	15.40	.000
KDTR	7.33	2.79	5.93	1.21	6.19	0.96	2.56	.088
KDPL	6.11	1.53	4.59	0.42	4.56	0.73	12.16	.000
KDSS	11.35	2.95	8.60	1.36	8.11	1.47	11.73	.000
KDNK	11.74	3.76	8.06	1.66	9.13	2.50	7.37	.002
KDPK	8.04	2.46	6.56	1.72	6.31	1.12	4.31	.019
KDSI	8.65	3.21	7.44	1.62	7.00	2.64	1.86	.167

Note. p = level of statistical significance (significant at $p < .05$). η^2p = partial eta squared (effect size); for the significant variables the values were TV = .37, TM = .36, DILZ = .13, DIKZ = .25, DISZ = .18, ONL = .18, ONLF = .28, OPL = .20, ONK = .18, OPK = .12, KDNL = .40, KDPL = .34, KDSS = .33, KDNK = .24 and KDPK = .16, indicating predominantly large effects. Group sizes: defenders $n = 20$, midfielders $n = 14$, forwards $n = 16$. Games–Howell post hoc comparisons indicated that the differences were driven mainly by the defenders, while midfielders and forwards rarely differed from one another.

Discussion

The primary aim of this study was to examine whether football players occupying different playing positions differ in their anthropometric characteristics. The findings demonstrated that playing position is an important determinant of morphological variation, indicating that defenders, midfielders, and forwards should not be considered a morphologically homogeneous group. These results support the contemporary multidimensional model of football performance, which proposes that positional specialization and competitive success arise from the interaction of morphological, motor, physiological, technical-tactical, and psychological characteristics ([Reilly et al., 2000](#); [Williams & Reilly, 2000](#)). In particular, ([Reilly et al. 2000](#)) emphasized that football players should be evaluated through multiple interrelated dimensions rather than isolated anthropometric or physiological indicators. The present findings are consistent with this perspective, demonstrating that a comprehensive anthropometric assessment provides valuable information for distinguishing players according to their positional roles. Differences in the basic anthropometric characteristics confirm the importance of body height and body mass as key morphological determinants in football. These findings are consistent with the functional demands associated with different playing positions. Defenders typically require greater stature and body mass to perform effectively in aerial duels, physical contests, and positional play, whereas midfielders are generally characterized by a lighter physique that facilitates continuous movement, frequent transitions, and coverage of larger areas of the pitch ([Bloomfield et al., 2007](#); [Rodríguez Rodríguez et al., 2019](#)). These findings are in agreement with ([Stølen et al. 2005](#)), who emphasized that football imposes complex physiological and mechanical demands, with the intensity and nature of match activities varying according to playing position. Similarly, ([Gil et al. 2007](#)) reported significant positional differences in the anthropometric and physiological profiles of young football players, highlighting the importance of position-specific evaluation. More recent international evidence further supports these observations. Studies involving professional and elite youth football players from different countries consistently report that defenders, together with goalkeepers, tend to be taller and heavier than players in other positions, whereas midfielders generally exhibit comparatively lighter and leaner anthropometric profiles. The present findings, in which defenders demonstrated the largest values for the basic anthropometric characteristics, are therefore consistent with this contemporary body of evidence ([Rodríguez Rodríguez et al., 2019](#); [Bongiovanni et al., 2023](#); [Sun et al., 2025](#)). An important contribution of the present study is that the observed morphological differentiation extended beyond body height and body mass to include transverse skeletal dimensions. This finding is noteworthy because previous research has primarily focused on body mass, body mass index, body fat percentage, or general body composition, whereas skeletal breadths and joint diameters have received considerably less attention as independent components of the anthropometric profile. The present results therefore suggest that positional specialization in football is associated not only with modifiable aspects of body composition but also with relatively stable constitutional characteristics. In this respect, the findings complement previous studies by ([Hazar, 2010](#)) and ([Lago-Peñas et al. 2011](#)), which demonstrated positional differences in anthropometric and physical characteristics across competitive levels, by providing a more comprehensive evaluation based on a broader range of anthropometric variables. The findings related to body circumferences further support the existence of position-specific morphological profiles. Limb circumferences reflect the combined contribution of skeletal size, muscle mass, and subcutaneous fat tissue, making them valuable indicators for athlete profiling and performance monitoring. Consistent with the findings of ([Sutton et al. 2009](#)), who reported position-related differences in body composition among English Premier League football players, the present study demonstrates that positional variation can also be identified using classical anthropometric measurements rather than relying exclusively on laboratory-based body composition assessment techniques. This has important practical implications, particularly for football clubs and sport organizations with limited access to advanced laboratory equipment, where field-based anthropometric assessments provide an accessible, cost-effective, and reliable approach for routine player monitoring. The findings related to skinfold measurements indicate that subcutaneous

fat tissue represents an important component of position-specific morphological differentiation in football. Lower levels of subcutaneous fat are generally associated with greater movement efficiency, improved running economy, and a more favourable body composition for repeated high-intensity activities ([Slimani & Nikolaidis, 2019](#); [Strauss et al., 2021](#)). Nevertheless, these indicators should not be interpreted in isolation, as the optimal anthropometric profile varies according to playing position, style of play, competitive level, and training experience. These findings are consistent with the systematic review by ([Slimani and Nikolaidis, 2019](#)), which demonstrated that the anthropometric, physiological, and physical characteristics of football players vary according to age, competitive level, and playing position. Accordingly, the present results further support the growing body of evidence indicating that body composition represents an important, yet position-dependent, component of football performance. Notably, defenders in the present study also exhibited the highest skinfold values. This pattern most likely reflects their larger overall body size rather than inferior physical condition and is consistent with recent studies reporting that players occupying physically demanding positions tend to display greater body dimensions, circumferences, and skinfold values ([Strauss et al., 2021](#); [Weber et al., 2024](#)). The present study makes several important contributions to the existing literature. First, it confirms the existence of position-specific morphological differences within a well-defined sample of senior football players competing in the Macedonian First Football League. Second, unlike many previous investigations that focused primarily on body height, body mass, or body composition, the present analysis examined a broader anthropometric profile encompassing body dimensions, body circumferences, transverse skeletal dimensions, and skinfold measurements. Third, the findings demonstrate the practical value of classical anthropometric assessment for position-specific player profiling. These observations support the recommendations of ([Reilly et al. 2000](#)) and ([Williams and Reilly, 2000](#)), who advocated a multidimensional approach to football player evaluation integrating anthropometric, motor, physiological, technical-tactical, and psychological characteristics. The findings of the present study have important practical implications for position-specific player assessment and monitoring. Taken together, the observed differences in anthropometric characteristics provide a useful framework for supporting evidence-based decision-making in football. Specifically, the pronounced differences in body height and body mass may facilitate position-specific talent identification and player recruitment, whereas variations in transverse skeletal dimensions and body circumferences provide additional information on skeletal robustness and segmental development that may guide strength and conditioning programmes. Furthermore, differences in skinfold measurements offer a practical, inexpensive, and field-based method for monitoring body composition and seasonal changes in players' physical condition. Consequently, coaches, strength and conditioning specialists, and sports medicine practitioners may use these anthropometric indicators to complement routine player assessment, monitor morphological adaptations throughout the competitive season, and support the individualization of training programmes. Nevertheless, anthropometric characteristics should not be considered in isolation when evaluating football players. Their greatest practical value lies in their integration with assessments of physical performance, technical-tactical proficiency, competitive behaviour, and psychological characteristics. The present study has several limitations that should be acknowledged. First, the cross-sectional design does not permit causal inference; therefore, it cannot be determined whether the observed positional differences reflect natural selection, position-specific training adaptations, or a combination of both. Second, the sample consisted of players from a single professional club, which limits the generalizability of the findings to other clubs, leagues, and competitive levels. Third, goalkeepers were excluded from the comparative analyses because of the limited sample size, despite previous evidence suggesting that they possess distinct anthropometric characteristics ([Slimani & Nikolaidis, 2019](#); [Strauss et al., 2021](#); [Sun et al., 2025](#)). Finally, the study focused exclusively on anthropometric characteristics and did not incorporate simultaneous assessments of motor, physiological, or technical-tactical performance, which would provide a more comprehensive understanding of positional specialization in football. Future research should include larger and more representative samples comprising players from different clubs, age categories, and competitive levels. Longitudinal studies are particularly warranted, as they would enable the monitoring of morphological changes across multiple seasons and clarify whether positional differences remain stable or evolve in response to long-term training adaptations. In addition, future investigations should integrate anthropometric assessments with measures of strength, speed, agility, endurance, and football-specific performance. Such a multidimensional approach would provide a more comprehensive understanding of the relationship between anthropometric characteristics and the functional demands associated with different playing positions. In conclusion, the present study demonstrates that anthropometric characteristics play a significant role in the morphological differentiation of football players according to their playing positions. The findings emphasize the

importance of evaluating football players in relation to their positional roles rather than considering them a homogeneous group. Furthermore, the results support the integration of anthropometric profiling into comprehensive player assessment. However, its greatest value lies in combining anthropometric evaluation with assessments of motor performance, physiological capacity, technical-tactical proficiency, and psychological characteristics, thereby providing a multidimensional framework for football player evaluation and development. Future research should include larger and more representative samples comprising players from different clubs, age categories, and competitive levels. Longitudinal studies are particularly warranted, as they would enable the monitoring of morphological changes across multiple seasons and clarify whether positional differences remain stable or evolve in response to long-term training adaptations. In addition, future investigations should integrate anthropometric assessments with measures of strength, speed, agility, endurance, and football-specific performance. Such a multidimensional approach would provide a more comprehensive understanding of the relationship between anthropometric characteristics and the functional demands associated with different playing positions. Overall, the findings of the present study demonstrate that anthropometric characteristics play a significant role in the positional differentiation of football players. The results emphasize the importance of evaluating players according to their positional roles rather than considering them a homogeneous group. Furthermore, the findings support the integration of anthropometric profiling into a comprehensive player assessment framework. However, its greatest value is achieved when anthropometric assessment is combined with evaluations of motor performance, physiological capacity, technical-tactical proficiency, and psychological characteristics.

Conclusion

The findings of the present study demonstrate that football players occupying different playing positions differ significantly in their anthropometric characteristics. These results confirm that playing position is an important determinant of morphological differentiation, particularly with respect to body height, body mass, transverse skeletal dimensions, body circumferences, and skinfold measurements. The observed differences indicate that defenders, midfielders, and forwards should not be regarded as a morphologically homogeneous group, as each playing position is associated with a distinct anthropometric profile. The study therefore contributes to a better understanding of position-specific morphological characteristics in football and highlights the importance of incorporating anthropometric profiling into player assessment. From a practical perspective, the findings may support sports medicine monitoring, talent identification, position-specific player profiling, and the individualization of training programmes. Nevertheless, anthropometric characteristics should not be used as the sole criterion for player evaluation but rather as one component of a multidimensional assessment that also incorporates motor performance, physiological capacity, technical-tactical proficiency, and psychological characteristics. The present study demonstrates that classical anthropometric assessment represents a practical and valuable tool for position-specific player profiling in modern football. Because the findings are based on a single club and therefore have limited generalizability, future research should focus on collecting comparable anthropometric data from players representing different clubs, leagues, and countries. The integration of such datasets through multi-centre collaborations and, ultimately, meta-analytic approaches would provide stronger evidence regarding the consistency of position-specific morphological profiles across different competitive and cultural contexts.

Declarations

Conflict of Interest Statement

The authors declare no conflict of interest.

Funding Statement

This research received no external funding.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethical Statement

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and relevant institutional ethical standards. The research was carried out as part of the author's PhD thesis entitled *"Transformational Morpho-Functional and Motor Effects of a Specially Programmed Functional Training Regimen in Football Players Performing at Different Playing Positions"* at the Faculty of Physical Education, Sport and Health, Ss. Cyril and Methodius University in Skopje. The doctoral research project was approved by the Faculty Council under archival/reference number 0201-644/7.1 (13 July 2018). All participants provided written informed consent prior to participation, while written parental or legal guardian consent was additionally obtained for participants under 18 years of age. Participation was voluntary, and participants were free to withdraw from the study at any stage without consequences.

Author Contributions (CRediT Taxonomy)

Conceptualization: Z.T.; Methodology: Z.T. and B.D.; Software: Z.T.; Validation: B.D.; Formal analysis: Z.T.; Investigation: Z.T.; Resources: B.D. and L.P.; Data curation: Z.T.; Writing – original draft preparation: Z.T.; Writing – review and editing: Z.T., B.D., and L.P.; Visualization: Z.T.; Supervision: B.D. All authors have read and agreed to the published version of the manuscript.

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