

COMMITTEE FOR THE ASSESSMENT OF DOCTORAL DISSERTATION

TO THE TEACHING AND SCIENTIFIC COUNCIL OF THE UNIVERSITY OF BELGRADE - FACULTY OF SPORT AND PHYSICAL EDUCATION

Subject: Review and assessment report of doctoral dissertation of Mazen Azzi, a doctoral program student.

Based on the decision that was made on the 9th teaching and scientific meeting which took place on May 7th, 2026 on the University of Belgrade - Faculty of sport and physical education, in accordance with the article 40 of the Doctoral academic studies Rulebook - revised version number 02-6p.532/22-4 from November 9th, 2022, and articles 41-43 of the University of Belgrade-Faculty of sport and physical education Statute - revised version (02-6p. 15124-8 from December 19th, 2024), on the proposal of the Doctoral Academic Studies Council (02-6p. 622/26-3 from May 4th, 2026) it was decided to form the committee for the assessment of doctoral dissertation written by Mazen Azzi titled:

“Associations between anthropometric characteristics, motor abilities and technical skill development in Lebanese youth basketball: a cross-positional study“ (“Relacije između antropometrijskih karakteristika, motoričkih sposobnosti i razvoja tehničkih veština u libanskoj omladinskoj košarci: studija preseka”).

Committee was formed from the following members:

1. Dr. Radivoj Mandić, associate professor, University of Belgrade, Faculty of sport and physical education, chair;
2. Dr. Marija Macura, full professor, University of Belgrade, Faculty of sport and physical education, member;
3. Dr. Jelena Obradović, full professor, University of Novo Sad, Faculty of sport and physical education, member.

The doctoral dissertation was completed under the supervision of:

- Dr. Saša Jakovljević, full professor, University of Belgrade - Faculty of Sport and Physical Education, mentor.

After evaluating the doctoral dissertation, biography, and bibliography of the candidate, Committee is handing in to the Teaching and Scientific board the following:

REPORT OF THE ASSESSMENT OF DOCTORAL DISSERTATION

BIOGRAPHY OF THE CANDIDATE

Personal data

Mazen Azzi, was born in 1976 in Lebanon. He dedicated his life to the field of sports and physical education. His passion for athletics began in his teenage years, guiding him toward a career in physical education. He pursued his academic journey at Antonine University in Lebanon, where he earned both his Bachelor's and Master's degrees in Physical Education. Further refining his expertise, he obtained the Level 3 Basketball Coaching Certification from the Lebanese Basketball Federation, equipping him with advanced coaching methodologies. His commitment to athletic performance extended internationally, as he earned a certificate in physical conditioning for teams through Claude Bernard University in France. Since 2000, he has been shaping young athletes as an EPS school teacher fostering both physical and personal growth in his students. In the 2022/23 school year, he enrolled in the doctoral program at the "Faculty of Sport and Physical Education – University of Belgrade".

SCIENTIFIC PRODUCTION AND COMPETENCE OF THE CANDIDATE

Mazen Azzi published three scientific papers:

1. **Azzi, M., & Jakovljevic, S.** (2026). Positional Differences in Anthropometric Characteristics and Technical Skills Among Youth Basketball Players. *International Journal of Kinesiology & Sports Science*, 14(1), 76.
2. **Azzi, M., Fayad, F.** (2022). The effects of Core Training Program on Speed and Agility Performance in Lebanese High School Basketball Female Players. *Al Otrouha Journal*, 1(7), 31-55.
3. **Аззи, М., Фајад, Ф., и Стефановић, Ж.** (2022). Побољшање перформанси вертикалног скока и анаеробне снаге Либанских кошаркаша кроз плиометријски тренинг (Improving vertical jump performance and anaerobic power of Lebanese basketball players through plyometric training). *Годишњак*, 25, 108-121.

BASIC DATA ABOUT DOCTORAL DISSERTATION

The final version of the dissertation is presented on 89 pages, A4 format, using the English alphabet and English language, with 11 tables, 5 figures, and 132 bibliographic units. The dissertation has been presented through the following chapters and subchapters: Introduction; Literature Review; Problem, Purpose, Objectives, Hypotheses of the study; Methods; Results; Discussion and Conclusion; Reference list; Appendices: List of Lebanese basketball clubs and academies, Ethic Committee Approval; Online Accepted Version of the Paper; Statements and Biography.

INTRODUCTION

The candidate starts the **introduction** by pointing basketball as one of the most popular team sports worldwide among both adults and youth, and that participation among adolescents has increased considerably in recent decades (Sodaitis, 2020). Due to the growing number of young players, identifying talented athletes has become increasingly important (Masanovic, 2018). Modern basketball performance assessment focuses not only on player selection and position assignment, but also on evaluating physical, technical, and tactical abilities (Masanovic, 2018). However, the candidate indicates that research has often focused more on

developmental pathways toward elite performance than on talent identification itself (Falk et al., 2004). The candidate further states that basketball is a dynamic sport characterized by multidirectional movements and repeated high-intensity actions such as sprinting, jumping, shuffling, and rapid changes of direction (Trninic & Dizdar, 2000; Crisafulli et al., 2002). Consequently, physical abilities such as speed, agility, strength, and explosive power are considered essential for successful performance (Cronin et al., 2003). Agility is particularly important because players constantly react to unpredictable game situations on a relatively small court (Jakovljević et al., 2011). Basketball players possess superior anthropometric and physical characteristics, such as body height, arm span, speed, agility, jumping ability, and explosive power, which are important for talent identification, predicting future performance, and enhancing basketball-specific skills including dribbling, passing, and defensive movement (Hoare, 2000; Le Gall et al., 2010; Vila et al., 2012; Karalejić et al., 2011). The candidate brings attention to the fact that there is still limited evidence regarding relationship of anthropometric and physical characteristics with technical skills such as shooting, dribbling, and passing among youth players aged 16–18 years (Sodaitis, 2020), and that this gap is particularly evident in Lebanese basketball, despite the sport's popularity and international success in Lebanon (Nassif & Amara, 2018).

The literature review is presented in chapter 2. It is divided into 10 subchapters. Candidate reviews the scientific literature related to basketball performance, emphasizing the importance of anthropometric characteristics, physical abilities, motor learning, and technical skills in talent identification and player development. The candidate first explains **motor learning theory and the Integrative model of sports performance**, highlighting that basketball performance depends on the interaction of physical, technical, tactical, and psychological factors, while skill acquisition progresses through cognitive, associative, and autonomous stages supported by deliberate practice and representative learning environments (Magill & Anderson, 2010; Davids et al., 2008; Ericsson et al., 1993). The literature then discusses **body composition** and anthropometric characteristics, explaining that skeletal muscle mass, body fat distribution, body height, arm span, and body mass significantly influence movement efficiency, strength, speed, agility, and basketball-specific performance (Janssen et al., 2004; Nikolaidis & Vassilios Karydis, 2011; Lago-Peñas et al., 2011; Ziv & Lidor, 2009). Furthermore, anthropometric profiling is presented as an important tool for talent identification and individualized training design in basketball (Han et al., 2023; Hoare, 2000). The chapter also reviews major **physical abilities** required in basketball, including muscular strength, endurance, speed, agility, flexibility, and explosive power, all of which are essential for sprinting, jumping, rapid changes of direction, and maintaining performance during competition (Scanlan et al., 2012; McGill et al., 2012; Sheppard & Young, 2006; Young et al., 2015). **Technical skill development** is discussed through the acquisition of fundamental basketball skills such as dribbling, passing, shooting, rebounding, and defensive movement, emphasizing the role of structured practice, feedback, and cognitive processes such as decision-making and anticipation in skill execution (Gómez et al., 2013; Krause & Nelson, 2019; Vickers, 2007). In addition, the chapter examines **gender and positional differences** in basketball, showing that male and female players, as well as guards, forwards, and centers, differ in anthropometric profiles, physical capacities, and technical demands, which requires individualized and position-specific training approaches (Nikolaidis et al., 2014; Sattler et al., 2015). Finally, the literature review highlights the **importance of talent identification and long-term athlete development models**, emphasizing that successful basketball performance is determined by the interaction of anthropometric, physical, technical, and cognitive factors (Vaeyens et al., 2008; Vila et al., 2012; Han et al., 2023).

The problem, purpose, objectives and hypotheses of the study are stated in chapter 3. A need for research that investigates the relationships between body composition, physical

performance, and basketball technical abilities among young athletes represents **the problem of the research**. Although previous studies have demonstrated the importance of anthropometric and physical characteristics in basketball performance, limited research has examined their influence on basketball-specific technical skills such as shooting, dribbling, and passing in youth players, particularly in the Lebanese context (Hoare, 2000; Vila et al., 2012).

The **purpose** of this study is to examine the influence of anthropometric characteristics and physical abilities on basketball-specific technical skills among Lebanese youth basketball players. The study also aims to identify differences according to gender and playing position and determine which variables best predict technical basketball performance, providing practical insights for coaches to design individualized training programs that optimize both physical attributes and skill development to improve game performance.

The following **objectives** of the study are stated:

1. Determining the body composition parameters in Lebanese young basketball players and analysing how these parameters influence performance in: shooting, dribbling, and passing.
2. Determining the physical abilities: agility, power, and speed in Lebanese young basketball players and examining the contribution of these abilities to the development and execution of the aforementioned technical basketball skills
3. Assessing the quality of basketball skills of young Lebanese basketball players including shooting accuracy, passing effectiveness, dribbling control, and how these are influenced by both morphology and fitness.
4. Investigate the relationships between anthropometric characteristics, physical fitness levels, and technical skill performance by conducting statistical and multivariate analyses to explore how these elements interact to influence overall performance.
5. Investigate how these relationships differ across various categorical variables like gender and playing position, focusing on how these variables impact the balance between physical attributes and skill acquisition.
6. Offer practical insights into how coaches can design tailored training programs that account for the individual anthropometric and fitness profiles of players, aiming to enhance technical skills and overall game performance in youth basketball.

The following one general and eight supporting **hypotheses** are stated:

GH: Anthropometric characteristics and physical abilities are independent factors that statistically significantly affect the key basketball-specific skills: shooting, dribbling, and passing in Lebanese young basketball players according to gender and playing position.

H1: Anthropometric Characteristics (BH, BW, BMI, PBFM, PSMM, and PFI) significantly affect shooting performance in Lebanese young basketball players.

H2: Anthropometric Characteristics (BH, BW, BMI, PBFM, PSMM, and PFI) significantly affect dribbling performance in Lebanese young basketball players.

H3: Anthropometric Characteristics (BH, BW, BMI, PBFM, PSMM, and PFI) significantly affect passing performance in Lebanese young basketball players.

H4: Physical abilities (agility, power, and speed) significantly affect shooting performance in Lebanese young basketball players.

H5: Physical abilities (agility, power, and speed) significantly affect dribbling performance in Lebanese young basketball players.

H6: Physical abilities (agility, power, and speed) significantly affect passing performance in Lebanese young basketball players.

H7: Gender is a categorical variable that significantly impacts the relationship between Physical abilities, Anthropometric Characteristics, and key basketball-specific skills in Lebanese young basketball players.

H8: Playing Position is a categorical variable that significantly impacts the relationship between Physical abilities, Anthropometric Characteristics, and key basketball-specific skills in Lebanese young basketball players.

The research design, participant selection process, testing protocols, measurement instruments, data collection procedures, and statistical analyses applied in the study are presented in **method** chapter. The sample consisted of 260 Lebanese youth basketball players aged 16–18 years, including both males and females who actively participated in organized basketball training and competition. Participants represented different playing positions, including guards, forwards, and centers, allowing the study to compare positional differences in anthropometric profiles, physical abilities, and technical skills. Anthropometric measurements included body height (BH), body mass (BM), body mass index (BMI), Percentage of body fat (PBFM), Percentage of skeletal muscle mass (PSMM), Protein Fat Index (PFI). Body composition was assessed using bioelectrical impedance analysis (BIA), a widely used and non-invasive method for evaluating body composition in athletic populations. Physical abilities were evaluated through standardized field tests relevant to basketball performance. Speed was assessed using short sprint tests over 10 m and 20 m distances, while agility was evaluated using the T-drill agility test. Lower-body explosive power was measured through the vertical jump test using an adjustable Vertec vertical jump tester and the jump-and-reach method. Basketball-specific technical skills were assessed using standardized shooting, dribbling, and passing tests designed to evaluate technical efficiency, coordination, ball control, and accuracy. The testing procedures were conducted indoors under standardized environmental conditions, and all participants completed a structured warm-up before testing. Statistical analyses were performed using appropriate statistical software. Descriptive statistics, including means and standard deviations, were calculated for all variables. Comparative analyses such as t-tests, ANOVA, and MANOVA were used to examine differences according to gender and playing position. Pearson correlation analysis was applied to investigate relationships between anthropometric characteristics, physical abilities, and basketball-specific technical skills. In addition, multiple regression analyses were conducted to identify which anthropometric and physical variables significantly predicted technical basketball performance.

The **results** were organized through descriptive statistics, comparative analyses, correlation analyses, and regression models to examine the relationships between anthropometric characteristics, physical abilities, and basketball-specific technical skills. Descriptive statistics presented the mean values and standard deviations for all investigated variables, while comparative analyses revealed that male players demonstrated superior physical performance in sprint speed, agility, explosive power, and jumping ability, whereas differences in technical skills between males and females were smaller. Positional analyses showed that guards achieved greater agility, speed, and dribbling efficiency, forwards displayed balanced physical and technical characteristics, and centers demonstrated larger body dimensions and greater strength-related capacities, confirming the existence of position-specific performance profiles in basketball. Correlation and regression analyses indicated that motor abilities, particularly agility, sprint speed, and explosive power, were stronger predictors of basketball-specific technical performance than anthropometric characteristics. Dribbling performance showed the strongest association with agility and speed, while body fat percentage demonstrated a moderate negative influence on shooting and dribbling efficiency.

The **discussion** confirmed that basketball-specific technical performance is more strongly associated with motor abilities than with anthropometric characteristics, emphasizing the importance of speed, agility, coordination, and explosive power in successful basketball performance. Although body dimensions such as height and body mass contributed to

performance, their predictive value was generally lower than that of motor abilities, suggesting that movement efficiency and neuromuscular performance play a more important role in technical skill execution during adolescence. The chapter also highlighted the influence of gender and positional specialization on player development, showing that guards relied more on agility and ball-handling abilities, while centers benefited more from body size and strength.

The candidate reported **conclusions** stating that hypotheses H5 and H7 were supported; H1, H2, H4, H6, and H8 were partially supported; and H3 was not supported. It is emphasized the importance of individualized and position-specific training programs that combine technical skill development with strength and conditioning. Furthermore, talent identification programs should consider motor abilities, technical efficiency, gender, developmental stage, and positional requirements when evaluating young basketball players.

References were presented in the volume of 132 bibliographic units, all written in English. The reference list suggests that the literature used is actual and referent to write this dissertation. Bibliographic units are correctly mentioned in the text and in the bibliography.

Appendices (82 - 89) contains the data required by the Regulations of Doctoral studies of the Faculty of Sports and Physical Education and the Instruction on Formation repository of doctoral dissertations: (1) Lebanese basketball clubs and academies; (2) The Approval of the Ethics Committee for implementation of the research; (3) Title page of the published work; (4) Copyright statement form; (5) Statement on the identity of printed and electronic versions of doctoral thesis; (6) Statement of Use; (7) Biography.

Material presented in this dissertation is partly based on the results that were published in international scientific journal:

1. **Azzi, M., & Jakovljevic, S. (2026).** Positional Differences in Anthropometric Characteristics and Technical Skills Among Youth Basketball Players. *International Journal of Kinesiology & Sports Science*, 14(1), 76.

On March 27, 2026, the authenticity of Mazen Azzi doctoral dissertation was completed by University Library Svetozar Marković. The summary report states 1% similarity index. This additionally confirms the authenticity of Mazen Azzi doctoral dissertation.

CONCLUSION

This doctoral dissertation provides both theoretical and practical insight into the assessment of anthropometric characteristics, physical abilities, and technical skills in young basketball players, considering that their timely evaluation, interaction, and application in the individualization of the training process represent some of the most important components of youth talent profiling. This doctoral dissertation also contributes to the existing body of knowledge by providing one of the first comprehensive analyses of the relationships between anthropometric characteristics, motor abilities, and technical basketball skills among Lebanese youth basketball players. The obtained findings may serve as a valuable reference for coaches, sport scientists, and practitioners involved in youth basketball development and talent identification programs. In addition, the study emphasizes the necessity of integrating physical conditioning with technical skill training in order to achieve optimal player development during adolescence. Future research should include longitudinal designs and broader performance indicators in order to further clarify the developmental pathways of young basketball players across different competitive levels and cultural environments.

COMMITTEE'S PROPOSAL TO TEACHING-SCIENTIFIC COMMITTEE

Candidate Mazen Azzi has fulfilled all legal requirements for acquiring the right to defend his doctoral dissertation. His scientific background and professional work in the field of physical education and sport are clearly defining him as an adequate candidate. Regarding his future work he plans to continue to influence the next generation of athletes and professionals in the field of sports and physical education through his unwavering dedication to education, coaching, and scientific research.

The committee has a uniform opinion that the present doctoral dissertation is original and independent scientific work of the author, as well as that it has significant value for sport sciences i.e., talent identification in basketball. With this dissertation Mazen Azzi presented himself as a devoted educator and coach who has both, a good theoretical background and practical experience from the court, as well as practical knowledge necessary for successful independent scientific work.

Based on the qualitative and quantitative analysis of the candidate's professional, scientific and practical work, the committee has a uniform opinion that Mazen Azzi has fulfilled all legal and scientific requirements for the defence of the doctoral dissertation, therefore, we are suggesting Teaching-Scientific Council to accept the Committee positive assessment report of doctoral dissertation named "Associations between anthropometric characteristics, motor abilities and technical skill development in Lebanese youth basketball: a cross-positional study" ("Relacije između antropometrijskih karakteristika, motoričkih sposobnosti i razvoja tehničkih veština u libanskoj omladinskoj košarci: studija preseka") and, in accordance with legal rights, to direct it further to Social-Humanistic Scientific Council of University of Belgrade for assessment and acceptance.

In Belgrade, 04.06.2026.

Committee members:

Dr. Radivoj Mandić, associate professor, University of Belgrade – Faculty of Sport and Physical Education, chair

Dr. Marija Macura, full professor, University of Belgrade – Faculty of Sport and Physical Education, member

Dr. Jelena Obradović, full professor, University of Novi Sad - Faculty of Sport and Physical Education, member