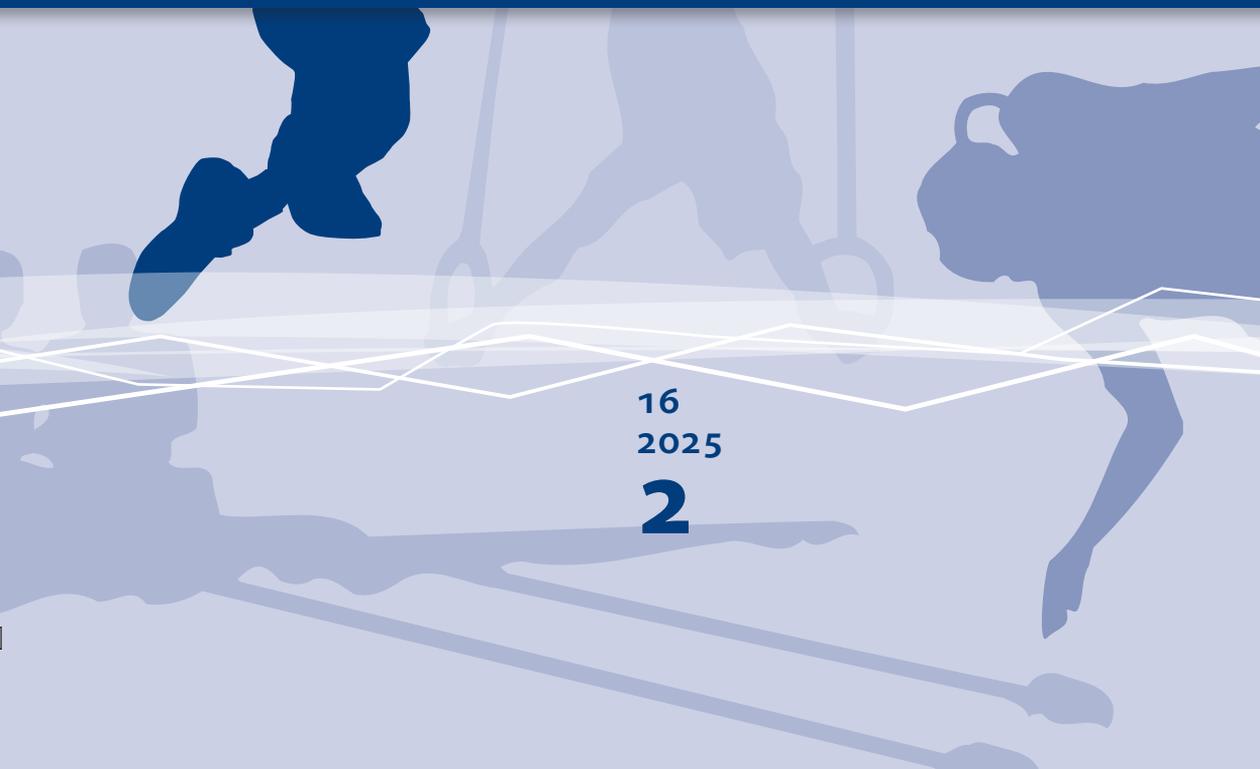


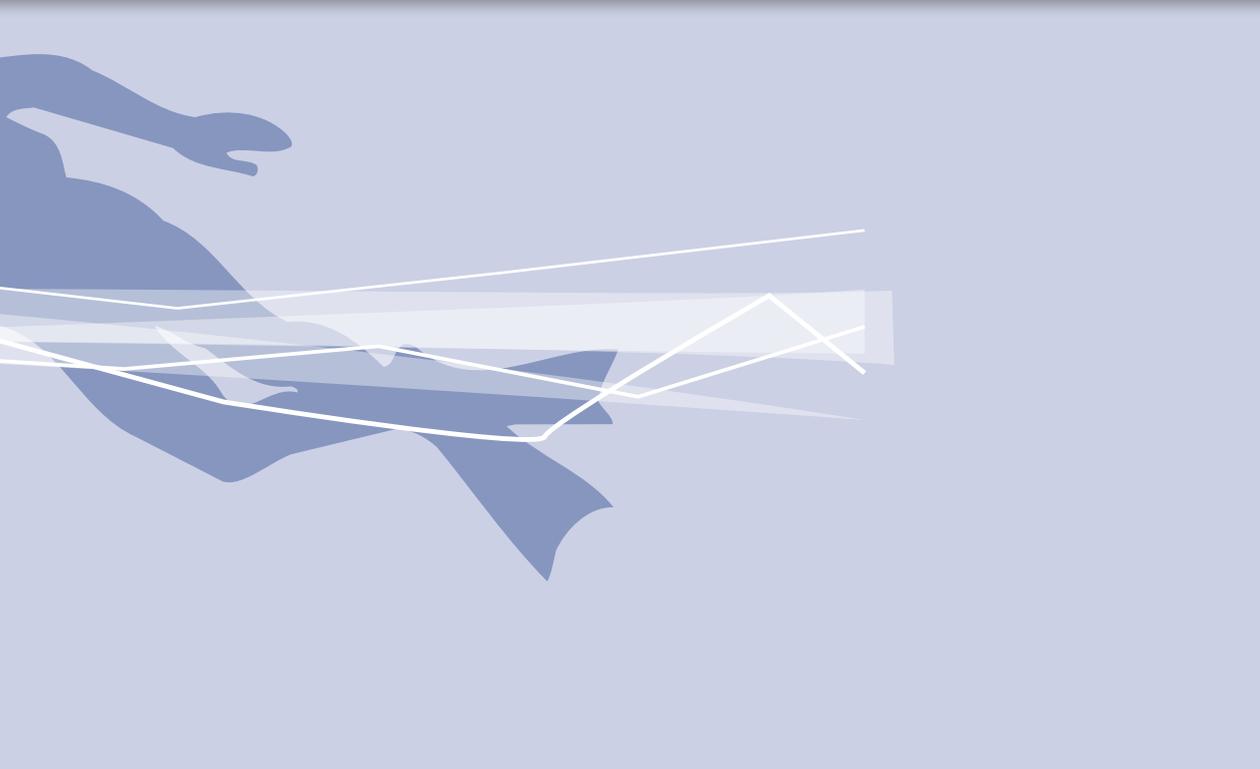


ANNALES KINESIOLOGIAE

UDK / UDC 796.01:612 | Annales Kinesiologiae 16, 2025, 2, pp. 113–218 | ISSN 2335-4240



16
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ANNALES KINESIOLOGIAE

UDK / UDC 796.01:612 | Annales Kinesiologiae 16, 2025, 2, pp 113–218 | ISSN 2335-4240



ISSN 2232-2620

UDK/UDC 796.01:612

Volume 16, Year 2025, Number 2

ISSN (online ed.) 2335-4240

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Publisher / Izdajatelj: Science and Research Centre Koper, Annales ZRS / Znanstveno-raziskovalno središče Koper, Annales ZRS

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E-mail: annaleskin@zrs-kp.si

Home page: <https://ojs.zrs-kp.si/index.php/AK>

Printing / Tisk: Tiskarna Koštomaj d.o.o.

Quantity / Naklada: 150 copies per issue

Online Edition / Spletna izdaja: <https://ojs.zrs-kp.si/index.php/AK>

Financial support / Finančna podpora: *The publishing of this journal is supported by the Foundation for Financing Sport Organisations in the Republic of Slovenia and the Slovenian Research Agency.*



Izdajo revije sofinancirata Fundacija za financiranje športnih organizacij v Republiki Sloveniji in Javna agencija za raziskovalno dejavnost Republike Slovenije.

Journal abbreviation: Ann. Kinesiol.

Annales Kinesiologiae is an international journal published twice a year.

Annual subscriptions (2 issues in English language) are available for 25 eur, and a single issue is available for 15 eur. For students 20% discount applies upon presenting an international valid student ID.

Subscription requests can be send to: annaleskin@zrs-kp.si

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EDITORIAL

The current issue of *Annales Kinesiologiae* (Volume 16, Issue 2, 2025) continues the journal's mission as an international interdisciplinary forum dedicated to the study of human movement, physical activity, exercise, and sport within the broader context of lifestyle and specific environmental influences. The published contributions reflect the core aim of the journal: to deepen kinesiological knowledge and to provide scientifically grounded insights that support the improvement of quality of life through movement-based approaches.

This issue presents original scientific articles, a review paper, and professional reports that collectively address kinesiological phenomena across different levels of performance, stages of the human lifespan, and diverse social and cultural contexts. Particular emphasis is placed on the applicative value of research findings, demonstrating how kinesiological knowledge can be translated into elite sport performance analysis, health promotion, education, coaching practice, and social development.

The issue opens with an original scientific article by İsgüzar et al., which examines the relationship between stoppage time, rally length, and selected performance variables in elite men's volleyball competitions. By analysing rallies from three top-level international leagues with differing regulatory frameworks, the authors provide valuable insights into the temporal structure of the game and its associations with technical efficiency and tactical performance. The findings contribute to a deeper understanding of performance dynamics in elite volleyball and offer practical implications for coaches, analysts, and sport scientists working in high-performance environments.

The review article by Kolar et al. addresses the development of, and challenges associated with, parkour coaches' education in Europe. Through an interdisciplinary perspective that integrates kinesiological, educational, organizational, and sociocultural viewpoints, the authors analyse the ongoing tension between parkour as a self-organized movement culture and its increasing institutionalization within formal sport systems. This contribution expands the understanding of contemporary movement practices and highlights the importance of preserving diversity, creativity, and authenticity while developing structured educational frameworks—an issue of growing relevance within applied kinesiology and sport pedagogy.

The original scientific article, authored by Cvenić, focuses on sex differences in motor performance among preschool children participating in athletic events. By analysing fundamental motor abilities and proposing a standardized

evaluation scale, the study offers practical tools for educators and practitioners working in early childhood physical education. The findings support evidence-based monitoring of motor development and reinforce the importance of early engagement in physical activity as a foundation for lifelong movement competence and healthy lifestyles.

The final original scientific article, authored by David et al., investigates the effects of physical activity on quality of life during menopause. By examining associations between physical activity levels and menopause-related symptoms, the authors provide strong evidence supporting physical activity as an effective, non-pharmacological strategy for improving physical, psychological, and psychosocial well-being. This research aligns closely with the journal's focus on lifestyle-related movement behaviours and their role in enhancing quality of life, particularly among populations facing specific physiological and social challenges.

In addition to scientific articles, this issue includes reports from major international scientific events in the fields of sociology of sport and human movement sciences. Reports from the 21st Conference of the European Association for Sociology of Sport, the World Congress of Sociology of Sport, and the 1st International Congress of Human in Motion provide readers with insights into current global discussions, emerging research trends, and interdisciplinary approaches to understanding sport and physical activity in a rapidly changing world.

Taken together, the contributions in this issue of *Annales Kinesiologiae* highlight the central role of kinesiology in addressing contemporary performance-related, health-related, educational, and social challenges. By linking scientific inquiry with practical application, this issue reaffirms the journal's commitment to promoting research that not only advances theoretical understanding but also delivers tangible benefits for individuals and communities through movement, physical activity, and sport.

Kaja Teraž, PhD,
Editor

Prof. Dr. Rado Pišot,
Editor-in-Chief

UVODNIK

Aktualna številka revije *Annales Kinesiologiae* (letnik 16, številka 2, 2025) nadaljuje poslanstvo revije kot mednarodnega interdisciplinarnega foruma, namenjenega proučevanju človekovega gibanja, gibalne aktivnosti, vadbe in športa v kontekstu življenjskega sloga ter vplivov okolja. Prispevki v tej številki izražajo temeljni cilj revije – poglobljanje kineziološkega znanja in prispevanje k izboljšanju kakovosti življenja s pomočjo gibalno usmerjenih, znanstveno utemeljenih pristopov.

Številka vključuje izvorne znanstvene in pregledne članke ter strokovna poročila, ki obravnavajo kineziološke pojave na različnih ravneh gibalne in športne uspešnosti, v različnih obdobjih življenjskega cikla ter v raznolikih družbenih in kulturnih okoljih s poudarkom na aplikativni vrednosti raziskovalnih ugotovitev. Te kažejo, kako je mogoče kineziološko znanje uporabiti pri analizi uspešnosti vrhunškega športa, promociji zdravja, izobraževanju, trenerski praksi in splošnem družbenem razvoju.

Številko odpira izvorni znanstveni članek İşgüzarja s sodelavci, ki analizira povezanost med časom prekinitev, dolžino izmenjav in izbranimi kazalniki uspešnosti v elitni moški odbojki. Z analizo treh vrhunskih mednarodnih lig z različnimi regulativnimi okviri avtorji ponujajo dragocen vpogled v časovno strukturo igre in morebiten vpliv na tehnično učinkovitost in taktično uspešnost. Prispevek pomembno prispeva k razumevanju časovne strukture igre in ima neposredne praktične implikacije za strokovno delo v vrhunskem športu.

Sledi pregledni znanstveni članek Kolar s sodelavci osvetljuje razvoj in izzive izobraževanja trenerjev parkourja v Evropi ter poudarja pomen usklajevanja institucionalnega razvoja s kulturnimi in ustvarjalnimi temelji te gibalne prakse. Skozi interdisciplinarno perspektivo, ki združuje kineziološke, izobraževalne, organizacijske in sociokulturne vidike, avtorji analizirajo nenehno napetost med parkourjem kot samoorganizirano gibalno kulturo in njegovo vse večjo institucionalizacijo znotraj formalnih športnih sistemov.

Izvorni znanstveni članek Cveniča se osredinja na spolne razlike v gibalni uspešnosti predšolskih otrok. Z analizo osnovnih motoričnih sposobnosti in predlogom standardizirane ocenjevalne lestvice ponuja orodje za spremljanje gibalnega razvoja v zgodnjem otroštvu. Ugotovitve podpirajo na dokazih temelječe spremljanje motoričnega razvoja in poudarjajo pomen zgodnjega vključevanja telesne aktivnosti kot temelja za vseživljenjske gibalne sposobnosti in zdrav življenjski slog.

Znanstveni del zaključí izvorni znanstveni članek David s sodelavkama, ki obravnava vpliv gibalne aktivnosti na kakovost življenja med menopavzo ter potrjuje gibalno aktivnost kot učinkovito nefarmakološko strategijo za izboljšanje telesnega, psihološkega in psihosocialnega blagostanja. Ta raziskava se neposredno navezuje na splošno orientacijo revije *Annales Kinesiologiae* h gibalnim navadam, povezanim z življenjskim slogom, in njihovo vlogo pri izboljšanju kakovosti življenja, zlasti med populacijami, ki se soočajo s posebnimi fiziološkimi in družbenimi izzivi.

Številka je dopolnjena s poročili z vidnih mednarodnih znanstvenih dogodkov s področja sociologije športa in znanosti o gibanju človeka, ki ponujajo vpogled v aktualne razprave na globalni ravni. Poročila iz 21. konference Evropskega združenja za sociologijo športa (EASS), Svetovnega kongresa za sociologijo športa (ISSA) in 1. Mednarodnega kongresa Človek v gibanju (ICHM) bralcem predstavljajo nastajajoče raziskovalne trende in interdisciplinarne pristope k razumevanju športa in telesne aktivnosti v hitro spreminjajočem se svetu.

Prispevki v tej številki revije *Annales Kinesiologiae* potrjujejo osrednjo vlogo kineziologije pri soočanju s sodobnimi izzivi na področjih športa, zdravja, izobraževanja in družbe. S povezovanjem znanstvenega raziskovanja s prakso ponovno potrjuje zavezanost revije k spodbujanju raziskav, ki ne le izboljšujejo teoretično razumevanje, ampak tudi prinašajo oprijemljive koristi za posameznike in skupnosti prek gibanja, telesne aktivnosti in športa.

Dr. Kaja Teraž,
urednica

Prof. dr. Rado Pišot,
glavni urednik



RELATIONSHIP BETWEEN STOPPAGE TIME, RALLY LENGTH, AND SELECTED PERFORMANCE VARIABLES IN ELITE MEN'S VOLLEYBALL COMPETITIONS

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ABSTRACT

Purpose: This study aimed to examine the relationships between stoppage time (ST), rally time (RT), and selected performance variables in elite men's volleyball competitions across three leagues with and without ST restrictions.

Methods: A total of 1616 rallies were analysed, including 450 from the 2022 Men's Volleyball Nations League (VNL), 500 from the 2022 Turkish Efeler League (TL) playoff finals, and 666 from the 2022 Italian Serie A League (IL) playoff finals series. Match videos were analysed using Data Volley software, and technical performance variables, RT, and ST were recorded. Spearman correlation and Kruskal–Wallis H tests were applied to examine relationships and differences among leagues ($p < .05$). Ethical approval was not required because only publicly available match data were analysed.

Results: Significant positive correlations were found between ST and RT in all leagues ($\rho = .28-.33$, $p < .001$). Weak to moderate negative correlations were observed between ST and reception percentage in the IL and VNL ($\rho = -.08$ to $-.13$, $p < .05$), while a weak positive correlation was found in the TL ($\rho = .10$, $p = .029$). Across

all leagues, ST was negatively correlated with first-attack success ($\rho = -.15$ to $-.21$, $p < .001$).

Conclusion: ST was significantly shorter in the VNL compared with the TL and IL. Differences were also observed in reception and attack performance variables across leagues. These findings indicate that temporal characteristics of the game are associated with technical performance in elite men's volleyball.

Keywords: volleyball, RT, ST, performance, competition structure

ODNOS MED ČASOM PREKINITVE, DOLŽINO IZMENJAVE ŽOG IN IZBRANIMI VARIABILNIMI DEJAVNIKI V ELITNIH MOŠKIH ODBOJKARSKIH TEKMOVANJIH

IZVLEČEK

Namen: Namen te je bil proučiti ter primerjati razmerja med časom prekinitve (ST) in spremenljivkami, povezanimi z uspešnostjo, ter časom izmenjave žog (RT) v elitnih moških odbojgarskih tekmovanjih v treh ligah, in sicer z omejitvami časa prekinitve in brez njih.

Metode: Analizirali smo skupno 1616 izmenjav, vključno s 450 izmenjavami iz moške lige VNL (Volleyball National League) 2022, 500 izmenjavami iz finala turške lige Efeler (TL) 2022 in 666 izmenjavami iz finala italijanske lige Serie A (IL) 2022. Tekmovalni videoposnetki, ki jih je med tekmami posnel isti trener, so bili analizirani z uporabo programa Data Volley 4.03.09, iz njih pa so bili izpisani tehnični podatki, dolžine izmenjav in trenutki premora med igro.

Rezultati: Analiza je pokazala pomembno pozitivno korelacijo med ST in trajanjem izmenjav v vseh ligah. Pomembna negativna korelacija je bila opazna med ST ter učinkovitostjo sprejema v ligah IL in VNL, medtem ko je bila v ligi TL ugotovljena pozitivna korelacija. Poleg tega je bila v vseh ligah opazna pomembna negativna korelacija med prvim napadom izmenjave in ST. V vseh ligah je bila ugotovljena tudi pomembna pozitivna korelacija med odstotkom žog v igri in časom prekinitve.

Zaključek: Primerjava ugotovitev iz treh lig je pokazala, da je bil ST v ligi VNL znatno krajši kot v ligah TL in IL. Prepoznane so bile razlike med ligami pri spremenljivkah, povezanih s sprejemi in napadi. Rezultati kažejo, da so časovne značilnosti igre povezane s tehničnimi dosežki v elitnih moških odbojgarskih tekmovanjih.

Ključne besede: odbojka, izmenjava žog, počitek, obremenitev, zmogljivost

INTRODUCTION

Rule changes or different practices in sports are associated with variations in game duration and rest intervals, which may be related to physical and technical performance characteristics. Some sports specify the exact length of rest periods between rallies and play (Sánchez-Moreno, Afonso, Mesquita, & Ureña, 2016). In volleyball, there are no official limits for RT and ST during competitions (Stanković, Perić, Ruiz-Llamas, & Quiroga-Escudero, 2017), although certain pauses, such as time-outs or set breaks, are regulated by the rules (Türkiye Voleybol Federasyonu, TVF, 2023).

As scores become more evenly matched, games tend to be more competitive, with more points played, which may be accompanied by increased fatigue levels (Sánchez et al., 2016). In such situations, players may engage in behaviours such as requesting position checks, medical assistance, floor cleaning, or delaying their transition to the service zone in order to recover before the next rally. Consequently, RT and ST in volleyball may vary considerably during a match (Mroczek, Januszkiewicz, Kawczyński, Borysiuk, & Chmura, 2014).

Since its establishment, the International Volleyball Federation (FIVB) has introduced several rule changes aimed at balancing attack and defence, extending rally length, and enhancing spectator experience (Hileno, González-Franqué, Iricibar, Laporta, & García-de-Alcaraz, 2023).

In 2022, a 15-second timer was implemented in VNL matches to regulate ST between rallies, starting immediately after a rally ends and controlled by the table referee (Federation Internationale de Volleyball, 2022).

According to official volleyball rules, a player must serve within 8 seconds of the referee's whistle (TVF, 2023); however, no regulation exists regarding the transition time from the end of a rally to the service position. Under the new rule, players are required to both assume their service position and execute the serve within 15 seconds after the timer starts.

These rule innovations are expected to be related to ST and RT. Understanding how restrictions on stoppage time are associated with technical performance is important for training planning and competition preparation. Previous research across various sports has examined the relationships between temporal characteristics of competition and performance outcomes (Torres-Luque, Sánchez-Pay, Fernández-García, & Palao, 2014; Granatelli et al., 2014; Ferreira, Volossovitch, & Sampaio, 2014); however, no studies have directly investigated how changes in temporal characteristics in volleyball relate to technical performance during matches.

Due to the specific structure of volleyball, it is hypothesized that changes in game rules are associated with variations in ST and RT, and that these temporal variables are related to technical performance indicators such as serve reception and attack success.

Therefore, the purpose of this study was to examine the relationships among ST, RT, and selected performance variables (serve reception and attack performance) in the 2022 men's VNL, TL, and IL, comparing competitions with and without ST restrictions.

METHODS

Study Sample

A total of 1,671 rallies were included in the study, consisting of 450 rallies from the 2022 Men's VNL, 550 rallies from the TL playoff matches, and 666 rallies from the IL playoff matches. The competitions analysed included the quarterfinals, semifinals, and finals from each league.

Technical Analysis

All matches were analysed using Data Volley 4 software by the same experienced performance analyst. The first serve reception, first attack, and first block actions of both teams in each rally were evaluated according to the technical scoring system presented in Table 1. Reception percentage and first-attack success percentage were calculated based on these evaluations.

To assess the reliability of the technical analysis, 10% of the rallies were randomly selected and reanalysed two weeks later by the same observer. Intra-observer reliability was evaluated using intraclass correlation coefficients (ICC), which showed acceptable agreement ($ICC > 0.85$ for all variables).

Table 1. Technical Scoring

1ST RECEPTION		1ST ATTACK	
Technical Value	Points	Technical Value	Points
Perfect	6	Perfect	6
Positive	5	Positive	5
3-4m close	4	Cover	4
Negative	3	Negative	3
On the net	2	Block	2
Error	1	Error	1
None	0	None	0

Reception Evaluation

Perfect: Areception that arrives exactly to the setter's hands in front of the net.

Positive: Similar to perfect reception but 1 or 2 metres open from the net

Exclamation: A reception 3–4 metres from the net

Negative: A reception more than 4 metres from the net

Over the net: Direct reception in the opponent's side of the court.

Error: A reception that wins points for opposing team

None: No reception (Opposing team serve error)

Attack Evaluation

Perfect: An attack that wins the point

Positive: An effective attack that continues the game in the own court (non-score)

Cover: An attack that touches and turns from the opponent's block

Negative: An ineffective attack that continues the game in the opponent's side of the court (non-score)

Block: An attack blocked by the opposing team

Error: An attack that loses the point

Analysis of RT and ST

Total match time was recorded in seconds from the first serve to the final ball contact. RT was defined as the interval between the serve and the moment the ball contacted the floor to end the rally. The sum of all rally durations represented the total ball-in-play time. ST was defined as the interval between the end of one rally and the subsequent serve. External factors such as time-outs, video challenges, referee interventions, substitutions, floor cleaning, and protests were included in ST. All temporal variables were recorded in seconds and entered into an Excel spreadsheet corresponding to the technical performance data for each rally.

Statistical Analysis

The data were analysed using SPSS version 25.0. The Shapiro–Wilk test was applied to assess the normality of data distribution. As the data were not normally distributed, non-parametric statistical methods were used. Spearman's rank correlation coefficient (ρ) was calculated to examine the relationships between ST, RT, reception percentage, and attack percentage within each league.

Differences between leagues were evaluated using the Kruskal–Wallis H test. When a significant main effect was detected, post-hoc pairwise comparisons were performed to identify differences between leagues. Superscript letters (a, b) in the tables indicate statistically significant differences between leagues, where median values sharing the same letter are not significantly different ($p < .05$).

Interquartile ranges (IQR) were reported as measures of variability. The level of statistical significance was set at $p < .05$. Bonferroni correction was not applied because each league was analysed independently and the study was exploratory in nature.

All competition videos were obtained from publicly available sources, and no personal or identifiable data were collected. Therefore, ethical approval and informed consent were not required for this study.

RESULTS

According to Table 2, in the Italian league, a low positive correlation was observed between ST and RT ($\rho = .282$, $p < .001$), along with weak negative correlations with reception percentage ($\rho = -.078$, $p = .043$) and attack percentage ($\rho = -.153$, $p < .001$).

In the VNL, a moderate positive correlation was found between ST and RT ($\rho = .328$, $p < .001$), whereas weak negative correlations were observed with reception percentage ($\rho = -.128$, $p = .007$) and attack percentage ($\rho = -.214$, $p < .001$).

In the TL, a weak positive correlation was identified between ST and RT ($\rho = .296$, $p < .001$), a weak positive correlation with reception percentage ($\rho = .098$, $p = .029$), and a weak negative correlation with attack percentage ($\rho = -.154$, $p = .001$).

Table 2. Results of the Spearman correlation test between ST, RT, reception percentage, and attack percentage across leagues.

League			RT	1st Reception	1st Attack
IL	ST	ρ	.282*	-.078*	-.153*
		p	.000	.043	.000
		N	666	666	666
VNL	ST	ρ	.328*	-.128*	-.214*
		p	.000	.007	.000
		N	450	450	450
TL	ST	ρ	.296*	.098*	-.154*
		p	.000	.029	.001
		N	500	500	500
ρ – correlation value (Spearman rho) p – level of statistical significance					

According to Table 3, a significant difference was found among the VNL, TL, and IL in ST ($H(2) = 155.1, p < .001$). ST in the VNL (median = 22, IQR = 14) was lower than in the TL (median = 27, IQR = 10) and the IL (median = 29, IQR = 10).

No significant differences were observed among the leagues in RT ($H(2) = 1.41, p = .500$). The IL (median = 4, IQR = 4), VNL (median = 4, IQR = 2), and TL (median = 4, IQR = 0) leagues showed similar rally durations.

According to Table 4, no significant differences were found among the leagues in reception percentage ($H(2) = 6.8, p = .330$) or attack percentage ($H(2) = 7.2, p = .270$). Median reception percentage values were 19.8 (IL), 20.7 (VNL), and 25.2 (TL), while median attack percentage values were 31.7 (IL), 31.6 (VNL), and 27.6 (TL).

Table 3. Results of the Kruskal-Wallis H Test comparing temporal variables across leagues.

	LEAGUE	N	X	MAX	MIN	MEDIAN	H	p
ST (sec)	IL	666	34	163	16	29 ^b	155.1*	<.001
	VNL	450	29	105	15	22 ^a		
	TL	500	35	194	19	27 ^b		
RT (Sec)	IL	666	4.8	30	2	4	1.41	0.5
	VNL	450	4.8	29	2	4		
	TL	500	4.76	22	1	4		

*Values data are presented as median and interquartile range (IQR). Superscript letters (a, b) next to median values indicate the results of post-hoc pairwise comparisons. Groups sharing the same letter do not differ significantly, whereas groups with different letters do (p < .05).

Table 4. Kruskal-Wallis H test results comparing technical variables across leagues.

	League	N	Median	H	p
1st Reception %	IL	666	19.8	6.8	0.33
	VNL	450	20.7		
	TL	500	25.2		
1st Attack %	IL	666	31.7	7.2	0.27
	VNL	450	31.6		
	TL	500	27.6		

Values are presented as median (interquartile range, IQR). Differences among leagues were not statistically significant (p > .05).

DISCUSSION

Volleyball is a demanding anaerobic sport that combines explosive movements—both vertical and horizontal—with short recovery periods (Silva et al., 2019). A volleyball player performs various motor actions on the court, including movements with and without the ball (locomotion), aimed at achieving specific goals and heavily engaging the nervous and muscular systems (Mroczek et al., 2014).

However, contact with the ball is brief, lasting only seconds, such as during passing, serving, or spiking. Most volleyball movements are performed without the ball (Mroczek et al., 2014). When measuring total match time, the portion spent actively with the ball—the working time—is much smaller than the rest periods, which consist of several components (Stanković et al., 2017). Rest and work times vary with the game's characteristics and fluctuate unpredictably across phases of play, reflecting effort intensity (Sánchez-Moreno et al., 2016).

The longest rest periods usually occur between rallies (Stanković et al., 2017). A rally is defined as a sequence of game actions starting with the server's serve and ending when the ball is out of play (TVF, 2023). During a rally, two phases occur: Complex I (side-out), which includes serve, reception, pass, and attack, and Complex II (transition), which involves block, defence, pass, and attack (de Angelis, Bento, Silva, Oliveira, & Franco, 2020). Rally length is regarded as a key performance indicator associated with match success (Hughes & Bartlett, 2002).

The VNL examined in this study is a major international volleyball league in which the winning team qualifies directly for the Olympic Games, the world's premier sporting event (Federation Internationale de Volleyball, 2022). Italy is a leading volleyball nation, ranked first in Europe and third worldwide in men's volleyball, while Turkey is ranked ninth in Europe and fourteenth globally, behind Italy in the international standings (FIVB, 2023; CEV, 2024). When considering club leagues, the most recent FIVB Club World Champion was a team competing in the IL (Volleyball Club World Championship, 2023), reflecting the high competitive standard of the IL at the club level.

Despite differences in league rankings and competition intensity, no significant differences were observed in average rally lengths across the leagues. This challenges the assumption that rally length alone is a reliable performance indicator. Sánchez-Moreno et al. (2016) reported an average rally duration of 4.99 seconds with rest times of 29.02 seconds in elite men's volleyball, while Mroczek et al. (2014) found rally durations ranging from 6 to 12 seconds. In the present study, the average RT was 4.8 seconds in IL, 4.8 seconds in the VNL,

and 4.78 seconds in TL. These findings are consistent with Sánchez-Moreno et al. (2016) but differ from those of Mroczek et al. (2014). The average ST was 34 seconds in IL, 29 seconds in the VNL, and 35 seconds in TL (Table 4). Statistically, no difference was observed between IL and TL, whereas ST in the VNL were significantly shorter (Table 4).

This difference can be attributed to the rule limiting rest time between rallies in VNL competitions. Interestingly, Sánchez-Moreno et al. (2016) analysed tournaments without such restrictions, yet their results were similar to those observed in the VNL with time limits. Therefore, ST in the TL and IL tend to be relatively long. Moreover, Sánchez-Moreno et al. (2016) reported that longer RT are associated with longer ST, and the present findings are consistent with this observation, as a significant positive correlation between RT and ST was identified across all three leagues (Table 3).

This suggests that longer ST are associated with longer subsequent rallies and may contribute to improved preparation for the following rally. Longer ST may enhance the quality of subsequent technical actions and overall player performance. In volleyball, one of the most important skills following the serve is serve reception, which is a key determinant of success. However, the determinants of effective serve reception have received limited attention (Paulo, Zaal, Seifert, Fonseca, & Araújo, 2018). In this study, a negative correlation was found between successful serve reception and ST in the IL and the VNL (Table 3).

This may indicate a decrease in reception success as service intensity increases, despite longer ST allowing additional recovery. Conversely, in the TL, a positive correlation was observed between ST and success in receiving (Table 3). This suggests that the relationship between ST and reception performance may vary with the technical and competitive levels of the league.

Additionally, the lowest median value for good serve reception was observed in the Italian league, whereas the highest was in TL; however, this difference was not statistically significant (Table 4). This pattern may indicate that, despite longer stoppage times in TL, service intensity tends to be lower; however, this interpretation should be interpreted with caution due to the lack of statistical significance. It may also suggest that overall game intensity in the TL differs from that in the VNL and IL.

Several studies in elite men's volleyball indicate that a key predictor of success during the side-out phase is the effectiveness of the first attack within a rally (Peña, Rodríguez-Guerra, Buscà, & Serra, 2013; Zetou, Tsigilis, Moustakidis, & Komninakidou, 2006). In the present study, the median success

rate of the first attack was lower in the TL than in the VNL and IL; however, these differences were not statistically significant (Table 4).

Volleyball involves short bursts of high-intensity actions interspersed with longer low-intensity periods (Angelis et al., 2020). It is characterized by short-duration, high-intensity efforts that primarily rely on the alactic energy system, unlike sports such as soccer, basketball, and swimming, which rely more on aerobic sources (Bara-Filho, Andrade, Nogueira, & Nakamura, 2013). Therefore, effective recovery during matches remains an important factor influencing physical performance.

Despite significant differences in stoppage times among leagues, a significant negative correlation was observed between the success rate of the first attack and ST across all leagues. This indicates that longer rest periods were associated with lower success in the first attack, despite the potential benefit of increased recovery time. When interpreting these findings, it is important to consider that both attackers and defenders typically perform their initial actions under similar resting conditions, which may partially explain this relationship.

A limitation of this study is that technical performance was evaluated by a single trained observer. Although standardized Data Volley procedures were applied consistently across all matches, future studies should include inter- and intra-rater reliability analyses to strengthen the robustness of technical performance assessment.

CONCLUSION

Because stoppage times vary by league and organization, training models should be tailored to the level and rules of the organization in which the competition occurs. In volleyball, increasing the pause between rallies facilitates more effective recovery. However, it does not directly improve the success rate of the first attack, as it also provides the opponent a chance to recover. Therefore, coaches are encouraged to use training methods that enable their athletes to recover more quickly than their opponents. Longer ST result in longer rallies. It becomes possible to finish rallies more quickly with improved recovery.

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ANALYSES OF THE DEVELOPMENT AND CHALLENGES OF PARKOUR COACHES' EDUCATION IN EUROPE

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ABSTRACT

Purpose: Parkour historically developed as an urban community “lifestyle” movement that relied mainly on informal teaching and training methodologies. With formal institutionalization, parkour has transitioned into more formalized structures, including established training academies, coaching certifications, and competitive events. This article presents a structured literature review with the aim of providing an overview of the historical, philosophical/ideological, organizational/institutional, and educational aspects of parkour coach education and knowledge development in Europe. Based on the review, key challenges for future development are also highlighted.

Method: For the purposes of a structured literature review, the search and selection process followed the general principles of the PRISMA 2020 statement as a framework, rather than a formal systematic review protocol. Google Scholar was chosen as the primary search platform. Following the initial screening and analysis, 12 relevant sources were included in the in-depth review. In addition to the literature review, online sources from professional international sports organizations involved in education, training, and certification of parkour coaches were also examined.

Findings: It can be noted that parkour in Europe is still predominantly developed and understood as a “lifestyle” urban activity with the gradual parallel formation of an institutional, formal sports discipline, which is reflected in the intra-organizational and philosophical-ideological conflict between participants and (opinion) leaders of

parkour. These conflicts are also evident at the level of training/education of parkour coaches and instructors.

Conclusions: Recognizing and respecting parkour's roots as a self-organized culture is essential if institutionalization is to enhance rather than diminish the discipline's diversity, creativity, and authenticity.

Keywords: parkour, education, training, coaches, institutionalization, formalization.

ANALIZA RAZVITOSTI IN IZZIVOV IZOBRAŽEVANJA TRENERJEV PARKOURJA V EVROPI

IZVLEČEK

Namen: Parkour se je zgodovinsko razvil kot gibanje urbanega skupnostnega »življenjskega sloga«, ki se je zanašalo predvsem na neformalne metodologije poučevanja in treninga. S formalno institucionalizacijo se je parkour preoblikoval v bolj formalizirane strukture, vključno z uveljavljenimi akademijami za trening, trenerskimi certifikati in tekmovalnimi dogodki. Ta članek strukturirano pregleda literaturo ter predstavlja zgodovinske, filozofsko-ideološke, organizacijsko-institucionalne in izobraževalne vidike izobraževanja trenerjev parkourja in razvoja znanja v Evropi. Na podlagi pregleda so poudarjeni tudi ključni izzivi za prihodnji razvoj.

Metoda: Za strukturiran pregled literature je postopek iskanja in izbora sledil splošnim načelom izjave PRISMA 2020 kot okviru in ne formalnemu protokolu sistematičnega pregleda. Kot primarna iskalna platforma je bil izbran Google Scholar. Po začetnem pregledu in analizi je bilo v poglobljen pregled vključenih 12 ustreznih virov. Ob literaturi so bili pregledani tudi spletni viri profesionalnih mednarodnih športnih organizacij, ki se ukvarjajo z izobraževanjem, usposabljanjem in certificiranjem trenerjev parkourja.

Ugotovitve: Ugotovili smo, da je parkour v Evropi še vedno večinoma razvit in razumljen kot urbana, z življenjskim slogom povezana dejavnost, hkrati pa se postopoma oblikuje kot institucionalna, formalna športna disciplina, kar se izraža v znotraj-organizacijskem in filozofsko-ideološkem konfliktu med udeleženci in (mnenjskimi) vodji parkourja. Tega je mogoče opaziti tudi na ravni usposabljanja/izobraževanja trenerjev parkourja.

Zaključek: Prepoznavanje in spoštovanje zgodovinskih korenin parkourja kot samorganizirane kulture sta bistvena za zagotovitev, da institucionalizacija krepi ter ne zmanjšuje raznolikosti, ustvarjalnosti in pristnosti te discipline.

Ključne besede: parkour, izobraževanje, usposabljanje, trenerji, institucionalizacija, formalizacija.

INTRODUCTION AND HISTORICAL OVERVIEW

Parkour can be defined as the art of moving in the most fluid and efficient way from one place to another through running, jumping, rolling, and leaping over and across any natural or architectural obstacles such as walls, trees, fences, roofs, or staircases (Ortuzar, 2009; Kidder, 2012). The development of parkour in Europe has gone through several distinct stages, driven by cultural, social, and athletic influences. Parkour originated in France, influenced by the military obstacle course training developed by David Belle and his peers (Tani, 2024). The term *parkour* is derived from the French word *parcours*, meaning “route” or “course”. The discipline was initially referred to as *l’Art du déplacement* (*the Art of Movement*) by the Yamakasi group (Rabaglietti, Mulasso, & Arzenton, 2021). During the late 1980s and early 1990s, practitioners—known as traceurs—developed the foundational movements and techniques primarily in urban environments. As parkour gained momentum in France, it spread to other European countries. The establishment of key organizations, videos, and documentaries—most notably *Jump Britain* in 2003—helped to showcase parkour’s potential and attracted attention worldwide. The late 1990s and early 2000s saw the formation of communities and training groups.

With mainstream exposure during the mid-2000s and 2010s, parkour experienced exponential growth in popularity, driven largely by social media platforms, particularly YouTube, as well as mainstream media coverage. Practitioners shared videos showcasing their skills, inspiring a new generation of traceurs. Competitions began to emerge, providing platforms for traceurs to demonstrate their abilities. With formal institutionalization and professionalization in the 2010s, parkour has transitioned into more formalized structures, including established training academies, coaching certifications, and competitive events. In several countries, parkour has been integrated into cultural or athletic programmes, reflecting its acceptance as a legitimate form of movement and expression.

Today, parkour continues to evolve as a recognized discipline, influencing various forms of art, performance, and fitness. European traceurs engage in international collaborations (institutionally), workshops, and events, further enriching the cultural tapestry of parkour, showcasing its adaptability and transnational development. The European and global evolution of parkour illustrates its dynamic character, reflecting broader societal changes and the continued passion of practitioners across Europe (Puddle & Wheaton, 2023).

During its various stages of development, particularly over the past decade, parkour has been integrated into cultural and athletic programmes in a range of

ways across different countries. Several schools and universities have incorporated parkour into physical education curricula, emphasizing (1) physical fitness benefits, (2) creativity, and (3) problem-solving skills. Instruction typically includes basic techniques, safety practices and the development of physical (motor) skills such as (1) balance, (2) coordination, (3) agility, (4) flexibility, and (5) strength (Dvorak, Eves, Bunc & Balas, 2017). Parkour has also become a widespread and well-developed extracurricular activity. Many schools have established parkour clubs allowing students to practice and learn parkour techniques outside of regular classes (Gilchrist & Wheaton, 2011). These clubs often organize training sessions, workshops, and participation in local competitions, fostering a sense of community among students. In this way, parkour has been linked to broader movement education objectives that emphasize physical literacy. Similarly, workshops and classes often include parkour training as part of broader movement education.

With the rise of digital education, online platforms have also emerged that offer parkour training and educational content. These resources enable students to learn at their own pace, providing instructional videos, safety tips, and methodology for incorporating parkour into personal fitness routines. The integration of parkour into educational programmes highlights its versatility and appeal as a physical activity that promotes fitness, creativity, and personal development, making it an attractive option for schools and youth organizations worldwide.

Dvorak et al. (2017) found that parkour training conducted twice a week over a ten-week period among young males (age 16 years old) can significantly increase (1) peak oxygen uptake, (2) oxygen uptake at anaerobic threshold, (3) explosive and (4) static strength, and significantly decrease (5) oxygen uptake at a standardized submaximal running speed, and (6) heart rate at the anaerobic threshold. Overall, all measured parameters showed significant improvements in participants' fitness as a result of parkour-specific training.

Many cities have established community programmes and centres aimed at youth development through parkour (Toscano, 2020). These initiatives promote (1) physical activity, (2) discipline and (3) teamwork while providing safe environments for practice. Community programmes often aim to build confidence and self-expression through the practice of parkour, frequently targeting at-risk youth. Some centres offer formal training in conjunction with life skills seminars. Metropolises such as Paris, London, and Barcelona have acknowledged parkour's cultural relevance by designing urban spaces conducive to its practice. This includes the creation of parkour parks or the integration of parkour-friendly features in public spaces, reflecting recognition of discipline as part of urban culture and urban environment development (Kidder, 2012).

National and international parkour organizations have been established, building competition systems and organizing events to showcase parkour talent, as well as its individual and social development potential. Events such as the Urban Movement Festival or Parkour World Championships attract participants from multiple countries, fostering a sense of community and offering platforms for recognition and growth within the discipline. Parkour has also influenced various artists, dancers, and performers, and in some countries, it has been incorporated into theatre productions, dance performances and urban art projects, blending movement with storytelling and expression, further enhancing its cultural significance.

Processes of institutionalization and formalization of parkour have also led to professional coaching programmes designed to certify trainers to teach parkour safely and effectively. Organizations offer training courses that emphasize (1) safety, (2) pedagogy, and (3) skill progression for coaches working in schools, recreation centres, urban areas, and gyms. Parkour is also promoted by health organizations and fitness communities, which underline (1) functional movement, (2) coordination, and (3) agility as part of holistic approaches to health and fitness. Extensive global media coverage through documentaries, films, and social media platforms has further raised awareness of parkour's positive aspects, promoting it as a legitimate form of physical activity and artistic expression.

The historical development and integration of parkour across diverse social and public environments illustrate its versatility, demonstrating its capacity to adapt to various cultural contexts while promoting the physical and mental well-being of individuals and diverse communities.

The aims of this article are to provide an overview of the (1) historical, (2) philosophical/ideological, (3) organizational/institutional, (4) and educational aspects of the development of parkour coaches' education and knowledge in Europe, and to identify the key challenges for future development.

CHALLENGES OF TRAINING METHODOLOGIES IN PARKOUR TRAINING AND PRACTICE

Created in a deprived suburb of Paris in the late 1980s, parkour—like other so-called lifestyle sports—is often represented by its participants as a non-competitive, rule-free and referee-free practice, thereby marking its difference from institutionalized, achievement-oriented western sport cultures (Wheaton, 2013). However, as parkour has grown in popularity, processes of

organizational institutionalization have emerged, along with the establishment of a number of international and national competition systems and organized efforts intended to recognize this discipline as a sport, including coaching certifications and the transition to nationally accepted accreditation.

Although these competitions receive media attention and significant corporate sponsorship, they have also been dogged by injuries and a noticeable lack of “fluidity of movement”, which is often described as the main objective of parkour. (O’Loughlin, 2012).

Informal teaching and training methodologies, typical of lifestyle sports such as parkour, are also associated with safety concerns and the incidence of injuries due to improper execution of complex body movements in challenging environments (relatively high in the air), resulting in uncontrolled and unlearned landings or falls on hard surfaces.

Based on a review of several studies by different authors investigating the incidence of parkour-related injuries, Rossheim and Stephenson (2017) concluded that the typical parkour injury involves a teenage male who sustains a fracture following a landing impact, most commonly affecting the distal lower extremities. However, case studies also report more severe injuries affecting various parts of the body, including fractures of the collarbone, spine, and wrist, as well as internal injuries such as a lacerated kidney. Using data from the National Electronic Injury Surveillance System (NEISS), Rossheim and Stephenson descriptively analysed parkour-related injuries presenting to emergency departments in the United States from 2009 to 2015. They found that the most common events causing these injuries were landing and striking objects. The most commonly injured body regions were: foot/ankle/toe, arm/elbow, face/head, finger/hand/wrist, back/ribs, leg/knee/shin, and shoulder/clavicle. The most common diagnoses were fractures, sprains/strains, abrasions/contusions, lacerations, pain, and dislocations.

In addition, analysis of the incidence of injuries in disciplines governed by international gymnastics federations reveals that the incidence of injuries in parkour is four times higher than in seven other disciplines. Grosprêtre and El Khattabi (2022) similarly note that, although parkour training appears well self-organized and overall injury rates may be relatively low, several shortcomings remain, notably in training planning, warm-up, stretching, and conditioning. From this perspective, the development of training and coaching methodologies specific to parkour appears essential.

These findings point to the need for more formalized, methodologically, and didactically grounded approaches to the training of parkour coaches, particularly given their frequent involvement in teaching and preparing, primarily or

exclusively, children and young people. Consequently, consideration of the formalization and certification of trainers is especially important, as better and at least partially comprehensive knowledge of trainers can help prevent the social, psychological, and physical risks associated with the participation of children and young people in parkour training and practice.

RESEARCH DESIGN AND METHOD

The structured literature review followed the general principles of the PRISMA 2020 statement (Page et al., 2021), serving as a guiding framework rather than a strict systematic review protocol. Google Scholar was selected as the search database in order to ensure the broadest possible coverage of publications, including both academic and practitioner-oriented sources.

Based on the objectives of the study, the following keywords were used: “parkour” AND (“methodology” OR “didactics” OR “teaching technique”) AND (“training for coaches” OR “coaching”). A temporal restriction was applied, covering the period from 1980 to 2025, corresponding to the emergence and development of parkour. The initial search yielded 571 publications.

To refine the results, an additional filter was applied, narrowing the selection to 200 publications based on relevance and citation count. These publications were imported into Rayyan (Ouzzani, Hammady, Fedorowicz, & Elmagarmid, 2016), a tool for organizing and screening literature reviews. Following the removal of 14 duplicates, 193 publications were included in the initial screening, which was conducted in accordance with predefined inclusion and exclusion criteria (Table 1). Two publications were subsequently excluded because they were not openly accessible, despite meeting all other content criteria (Angel, 2016; Chambers, Aldous, & Bryant, 2020). Based on the inclusion and exclusion criteria, 12 publications were ultimately included in the in-depth review.

In addition to the literature review, online sources from professional international sports organizations involved in education, training, and certification of parkour coaches were also examined. The in-depth analysis was conducted following the general principles of thematic synthesis.

Table 1: Exclusion and inclusion Criteria

Exclusion Criteria	Inclusion Criteria
Not related to parkour	Organizational perspective
Other sports	Methodological approaches
Not applicable to the European context	Institutionalization
Personal experience	Parkour
Practitioners' perspective	European context
Not in English	Coaches' perspective
Without public access	English language
	Public access
EXCLUDED (N=181)	INCLUDED (N=12)

MAIN FINDINGS FROM THE LITERATURE REVIEW

The analysis of the included publications followed the principles of thematic synthesis (Thomas & Harden, 2008). Using this approach, five main thematic areas were identified: (1) informal parkour learning and community, (2) formalization and institutionalization of coach education and training, (3) individualization and adaptation of methods, (4) development of coaching competencies, and (5) the role of the coach in the learning/training process. These areas were used to organize and synthesize the findings, providing a structured overview of key methodological, educational, and organizational aspects related to parkour coach training and knowledge development. The thematic areas are presented and described in greater detail in the following sections. The main findings from the literature review are summarized in Table 2.

Table 2: List of included publications and main findings

No.	Authors/ year	Title	Country	Type of research	Research sample	Main findings
1	Gilchrist & Wheaton, 2011	Lifestyle sport, public policy and youth engagement: Examining the emergence of parkour	England (south)	Qualitative (in-depth qualitative interviews)	The sample consisted from persons involved in the: (1) development of parkour in education, (2) sport policy, and (3) community-based partnerships.	<ul style="list-style-type: none"> – The authors discussed how the perceived ‘success’ of parkour in different contexts is related to the culture and ethos of the activity that is more inclusive, anti-competitive, and less rule bound than most traditional sports; and to its ability to provide managed risk-taking. – More broadly, the paper highlighted and discussed the emergence of lifestyle sports as ‘tools’ for policymakers, and the potential role these non-traditional, non-institutionalized “lifestyle sports” can make in terms of encouraging youth engagement, physical health, and well-being. – The paper therefore contributes to on-going debates about the ability of traditional sports to meet government targets for sport and physical activity participation.
2	O’Loughlin, 2012	A door for creativity – art and competition in parkour	-	Conceptual	-	<ul style="list-style-type: none"> – A sporting definition for parkour would come with risks to its creative future, limiting innovation and artistic development. – Authors draw on the history of vertical skateboarding to see what lessons can be learned there. – Authors also examined how their experiences with the Urban Playground Team and Gravity Style defined their own training regime.

No.	Authors/ year	Title	Country	Type of research	Research sample	Main findings
3	Wallace & Kihiti, 2015	Determining the Social and Psychological Reasons for the Emergence of Parkour and Free Running - An Interpretive Phenomenological Analysis	Turkey	Phenomenological (qualitative study) (IPA procedure - in-depth insight into how a person in a particular context understands a given phenomenon)	8 parkour and free running participants	<ul style="list-style-type: none"> - Parkour and free running are newly emerged high-risk urbanized activities still relatively understudied. - They do not appear to be subject to rules and regulations, with aims and objectives being unclear. - The participants perform dangerous gymnastic movements utilizing awkward obstacles without the use of protective clothing and do not appear to be concerned with the welfare of people in the vicinity. - The participants explained that they were initially motivated by thrill seeking, risk, improved health, and enjoyment. - Regular practice and commitment furnish a participant with a sense of being in the present and a deepened sense of spirituality and enjoyment. - The unique characteristics of parkour and free running (e.g. philosophy, environment, spirituality, perception, and aesthetics) are linked to the characteristics of extreme sport which indicates that parkour and free running are part of a counter culture.
4	Greenberg, 2017	How parkour coaches learn to coach: An exploration of parkour coach learning and development	Kanada, USA	Qualitative study (Interview - basic interpretative qualitative methodology - BIQM)	19 parkour coaches with at least one year of coaching experience	<ul style="list-style-type: none"> - The thesis discusses two less-discussed areas of parkour, each without a consensus among parkour practitioners – parkour regulation and parkour coaching. - When participants were asked how they learned to coach, parkour coaches from this study described the influences of various sources of learning: parkour coaching experience, previous leadership experience, experience as an athlete in parkour and other sports, other parkour coaches, non-parkour coaches, parkour coach education programmes, school, reflection, and the internet.

No.	Authors/ year	Title	Country	Type of research	Research sample	Main findings
5	Säfvenbom & Stjenvang, 2020	Lifestyle sport contexts as self-organized epistemic cultures	Norway	Qualitative study (Interview and observations)	8 participants in interview (30–40 participants observed during activities)	<ul style="list-style-type: none"> – The aim of this study was to understand how a self-organized mixed group of trickers and free-runners facilitate knowledge creation when no instructors guide or control their work. – Authors found out that practitioners' knowledge developed in a continuous and invigorating cycle between the global gymnasium on the internet, where practitioners sought up-to-date knowledge, and the local gymnasium, where they practiced knowledge development as intra- and interdisciplinary embodied interactions. – The object of knowledge that practitioners conveyed as “kinesthetic understanding” was not a fixed a priori product that could be fully achieved, and it seems that practitioners' acceptance of the essential incompleteness of the object of knowledge created a constant desire to glimpse the unattainable.
9	Pagnon et al., 2022	What makes parkour unique?	-	Theoretical biomechanical modelling of techniques	-	<ul style="list-style-type: none"> – Parkour is well in line with modern lifestyle sports that challenge our traditional view of sports as rule-based, set in a dedicated environment, with specialized equipment. – Precision landing is one of the key components of parkour, which involves adapting posture during later phases of the jump in order to make up for potential errors at take-off. – Parkour adepts (traceurs) are landing experts, and must learn specific ways of softening impacts in order to prevent injury. Incidentally, it makes them particularly good at eccentric exercises.

No.	Authors/ year	Title	Country	Type of research	Research sample	Main findings
7	Wintle, 2024	Implementing Meaningful Physical Education through Lifestyle Sports	United Kingdom	Lecture slides	-	<ul style="list-style-type: none"> Author presents a study of parkour in physical education. The results show that parkour develops more competencies, is more fun and enjoyable, and is more challenging than regular physical education classes.
8	Leder & Beaumont, 2021	Lifestyle Sports and Physical Education Teachers' Professional Development in the United Kingdom: A Qualitative Survey Analysis	United Kingdom	Qualitative Survey Analysis	53 UK-based PE teachers	<ul style="list-style-type: none"> The aim of this research was to explore the opportunities and challenges PE teachers in the UK encounter when delivering lifestyle sports, in addition to understanding their current professional development needs to enhance their practice. Findings showed that participants had different concepts of lifestyle sports, while also facing logistical, contextual, and personal factors that influenced their practice. In addition, participants described their preferences for continuing professional development in lifestyle sports and challenges that limit their participation in learning opportunities.
9	Dumont & Thorpe, 2022	The Professionalization of Action Sports	-	Professional book	-	<ul style="list-style-type: none"> This book uncovers the social, political, economic, and organizational dynamics of action sports (also parkour) professionalization. Overall, the book reveals how different action sports (i.e. snowboarding, surfing, kiteboarding, parkour, climbing, skateboarding), and across countries, are at various stages in the professionalization process, with local, national, and international responses and reactions to such trends differing considerably.

No.	Authors/ year	Title	Country	Type of research	Research sample	Main findings
10	Lamm, 2023	Gender equality in parkour in Finland	Finland	Quantitative and qualitative (interview) research methods	4 experienced parkour coaches (interview) 54 parkour practitioners over 15 years of age (online survey)	<ul style="list-style-type: none"> - The purpose of this thesis is to study equality and gender equality in parkour. - The Finnish parkour community is achieving quite good results in gender equality. - Based on the results of the study, females perceive parkour as a more unequal sport than males. - Women's participation could be increased by organizing more low-threshold test days, educating parkour instructors on equality, increasing the visibility and image of women's parkour through marketing, and having more female examples and role models in parkour to encourage more women to take up the sport.
11	Puddle & Wheaton, 2023	The Attempted Globalization of Parkour by the Fédération Internationale de Gymnastique	-	Conceptual	-	<ul style="list-style-type: none"> - Inclusion of parkour into FIG followed two years of unilateral and ultra vives development of competitive events. - Despite the participation of athletes in FIG-organized parkour competitions, the global parkour community has largely opposed parkour under the auspices of the FIG. - The article illuminates the politics, influences, and power struggles between different stakeholders. - Using Ritzer's theory of globalization (imperialistic goals), it is clear that the FIG is attempting to globalize parkour to increase its power and profit, and the IOC is enabling and, to some extent, complicit in this process. - This has implications for the parkour community and other long-standing gymnastics disciplines.

No.	Authors/ year	Title	Country	Type of research	Research sample	Main findings
12	Crosby, Sánchez-García & Jenkins, 2024 & (Sánchez-García, 2024)	Ethnometh- odological and conversa- tion analytic (EMCA) studies of coaching in sport: a coach- ing special issue	Italy (Spain)	Ethnometh- odological study (authors mainly refers to the Raul Sánchez- García's article "Coaching parkour", 2024)	-	<ul style="list-style-type: none"> - "Coaching parkour" shifts the coaching practice to parkour, an informal, non-competitive sporting activity known under different labels such as extreme, alternative, whizz, action, or lifestyle sports. - The author specifically addresses the emotional dimension of coaching parkour: the tension balance between confidence and fear, expressed in the negotiation of expectancies upon athletes' performances on each occasion. - It considers coaching not as a one-way transmission of knowledge from the one who knows (the coach) to the ones who do not (the athletes). - Instead, coaching is praxeologically produced through a complex interactional system made of instructions, performances, expectancies, examples, copying, mimicking, and adjusting the personal execution of movements to the solutions found (or not) by the others and the concerted expectancies among participants (coach and athletes).

DISCUSSION

Based on the analysis of the selected articles, several key content sets or thematic areas and conclusions can be identified. In general, over the past two decades, parkour has increasingly become recognized as a modern lifestyle sport that is rapidly developing across Europe. It represents a contemporary form of movement that differs markedly from other sports and has become an important part of youth and urban culture. As participation has increased and parkour has become progressively integrated into formal sports structures, questions have arisen regarding effective learning methodologies, institutionalization processes, and the role of coaches in knowledge transfer and community development (Pagnon et al., 2022; Angel, 2016).

A thematic synthesis of the 12 selected publications identified five main thematic areas, which are discussed in the following sub-sections. These themes reflect the diverse ways in which parkour is practised and taught, ranging from collaborative peer learning in public spaces to more structured, institutionalized approaches. In addition to the review of scientific and professional literature, online sources from several international sports organizations involved in the institutionalization and formalization of parkour coach education, training, and certification were examined. These sources contributed to the description of the main thematic areas.

Informal parkour learning and community

The parkour concept was originally developed by David Belle based on principles about the art of movement laid down by his father, a Parisian firefighter. As teenagers, Belle and his friends from the “Yamakasi group” practised jumping and climbing over stairs, barriers, walls, and other urban fixtures. In doing so, he developed what they called the “art of movement”, taking advantage of all the constructions and obstacles in ways that for which they were not originally designed. For these early practitioners, parkour functioned primarily as a training method for overcoming obstacles in both urban and natural environments, such as forests (Rabaglietti et al., 2021).

Since the 1990s, parkour has been further popularized through its representation in film (International Gymnastics Federation – FIG, 2025). Its development has followed contemporary trends in the development of youth physical activity, where sports participation has gradually moved away from rigidly structured and highly organized practices towards new forms of personal,

social, and environmental engagement through physical activity (Sterchelea & Camoletto, 2017).

Parkour has traditionally developed in informal environments, where community plays a key role in knowledge transfer. Participants primarily learn through (1) observation, (2) imitation, (3) sharing experiences, and (4) peer feedback. Online resources—such as video tutorials, forums, and social media—also play an important role, serving as significant sources of knowledge, especially for beginners. Learning takes place interactively, often involving experimentation and reflection on personal experiences. (1) Local communities, (2) events, and (3) workshops play a crucial role in disseminating innovation and diversifying approaches, while travel and exchanges between communities further contribute to the development of new techniques and methods (Greenberg, 2017; Säfvenbom & Stjernvang, 2020; Wallace & Kilili, 2015).

Parkour communities are primarily traditionally, and widely understood as informal learning environments, and parkour itself is commonly framed as a non-traditional, non-institutionalized and “lifestyle sport” that can encourage youth engagement in physical activity. As a result, the integration of parkour into institutionalized organizational environments involves negotiation between competing discourses, particularly regarding risks and demands for standardized safety regulations, including the introduction of formal coaching qualifications (Wheaton, 2013). The process of institutionalization and formalization of parkour is also becoming a contested area for normative definitions of the practice itself, giving rise to ideological tensions between competing forms and interpretations of parkour (Ferrero Camoletto, Sterchele & Genova 2015).

Formalization and institutionalization of coach education and training: a critical perspective

As parkour has grown in popularity and recognition, formal training programmes—such as the Academy of Development and Performance Training (hereafter: ADAPT)—have emerged. These programmes establish standards for (1) safety, (2) methodology, and (3) the core values of the discipline (Gilchrist & Wheaton, 2011; Greenberg, 2017). More broadly, the formalization and institutionalization of any sports discipline, including parkour, begin with the establishment of formal international sports organizations, whose main authority and responsibility is to establish (1) the basic rules of competition in sports, (2) a system of competitive age categories and (3) sports-competitive disciplines, (4) a competition system, and (5) levels of recognized competitions,

as well as a (6) system of education of coaches and (7) judges. Within the field of parkour, at least five international sports organizations have developed, each intervening in distinct ways to define the field of parkour as a more or less institutionalized sport discipline with formal rules, competition structures, and coach education, training, and licensing.

The World Freerunning Parkour Federation (hereinafter WFPF), established in 2009, positions itself as the world's foremost platform for parkour, bringing the philosophy and sport of parkour to mainstream audiences everywhere. They claim that like anything alive and exciting, parkour is also evolving and that every athlete who posts a parkour video, whether their first or their hundredth, contributes to that process. By bringing together diverse individuals and communities from all kinds of places and backgrounds, each with their own unique mentality, the WFPF's goal is that the voices of the movement will continue to shape that evolution in a positive direction. While operating less as an institutionalized and formal (traditional) sports organization and more as a platform of ideas that supports the development of parkour, it has developed the WFPF Parkour Academy. This coaching Academy as they claim offers the most comprehensive curriculum in the industry, with a progressive eight-step parkour curriculum and lesson plans that take students from basic skills all the way to competitive level parkour. As of 2025, WFPF reports certification of over 3,000 instructors worldwide. They claim that WFPF Certification Programme, the only parkour certification developed in partnership with a major insurance underwriter, is the gold standard for the safe and practical instruction of parkour (World Freerunning Parkour Federation – WFPF, 2025).

The International Parkour Federation (hereinafter IPF), founded in 2014, describes itself as the world governing body for parkour. Its stated objectives are to (1) assist in the formation of National Parkour Governing Bodies (NGB's), (2) mentor young parkour athletes around the world, and (3) support initiatives that exemplify the parkour philosophy, "Be Strong to Be Useful." In recent years, the IPF has been particularly active in the conflict-torn countries of the MENA region (Middle East and North Africa), and together with local athletes in Baghdad helped to open Iraq's first parkour school, which now provides a safe place to train for more than 350 young athletes. The IPF steadfastly supports gender and racial equality and human diversity in all its global initiatives. The Federation claims to be the only competent world-governing body for the sport of parkour and is also recognized by national Olympic committees in many countries. In the field of coaching training and certification, the IPF, in partnership with International Professional Training Certification (IPTC), runs a series of parkour international certifications and seminars. The

IPF also organizes and sponsors championships around the world, using its own gameplay and judging criteria, from regional and national parkour cups to qualifiers for world championships (IPF website, 2025). Sanctioned by the IPF in collaboration with the WFPF, the World Parkour Championship (since 2018) showcases the spectacular discipline of parkour, which redefines the “art of movement”. The IPF has more than 50 affiliated (Parkour) National Governing Bodies across five continents (World Parkour Championship – WPC, 2025).

Following introductory workshops at the 2016 Youth Olympic Games in Lillehammer, the Executive Committee of the International Gymnastics Federation (hereinafter FIG) gave the green light in February 2017 for the development of a new sport discipline (parkour) in the FIG sport disciplines portfolio. The development of parkour under the auspices of the FIG paved the way for the launch of the first series of World Cups within the framework of the FISE (World Festival of Action Sports) in 2018. Following the establishment of the FIG Parkour Commission in 2024, the first Parkour Technical Committee, responsible for overseeing parkour, was set up. The FIG organized the first official World Cup competition in September 2021 in Sofia (Bulgaria) and so far, eight editions of the World Cup have been organized, as well as two World Senior Championships and one Junior World Championship. Under the auspices of the FIG, parkour has also been represented at two World Games. According to the FIG Members Survey Report (2025), parkour is organized as a sports discipline in 21 (out of 50) National Gymnastics Federations (NGFs) in Europe, but in 24 of them it is not or the NGFs are not aware of the existence of parkour in their country. The FIG database currently contains 291 licensed parkour athletes from around the world. Of all licensed parkour athletes, 102 or 35% (average age 22.5 years; 81 or 71.4% men and 21 or 21.6% women) are from 20 European countries (most of them are from the Czech Republic – 12, Switzerland – 11 and Slovakia – 10). In 2002, the FIG established the FIG Coaching Education Academy, which in 2011 was divided into two successive systems, namely the Age Group Programme and the FIG Coaching Academy. The FIG Coaching Education System is intended for the education, training, and certification of coaches in all sports disciplines included in the FIG portfolio, including parkour (FIG, 2025).

The inclusion of parkour as the eighth FIG gymnastics discipline in 2017 was the catalyst for the creation of the International Parkour Earth Federation (Puddle & Wheaton, 2023), the international governing body for the interconnected disciplines of parkour, freerunning, and l’Art du Déplacement, collectively known as parkour. At its core, Parkour Earth is a federation of national representative parkour organizations (community organizations & national

parkour federations), run by a community for a community. In addition to these organizations from around the world, Parkour Earth also works with countries without formal representation to support them in building genuine national community-led organizations, highlighting the organizational specificity of this sport, whose membership structure, expected from international sports governance, may not suit every parkour community, as there are a variety of other options for joining and supporting (Parkour Earth, 2025).

Established in 2005, Parkour Generations is a multi-award-winning global organization that provides training, education, performance, facility design, and consulting for the movement discipline of parkour or freerunning. Parkour Generations focuses primarily on parkour education and training and offers a variety of training programmes (e.g. for schools, fitness, and other programmes) and supports the ADAPT methodology and educational programmes as the foundation for training, certification, and licensing of parkour coaches and professionals (Parkour Generations, 2025).

Based on the newly established institutional and formal organizational forms of the international organization of parkour, many countries have established specialized separate National Parkour Federations or include parkour as a sport discipline within the portfolio of National Gymnastics Federations to connect local communities and collaborate with public institutions. The process of institutionalization has progressed at varying rates in individual countries; for example, in Finland, the national federation was established relatively early on. In France and elsewhere, local groups initially developed independently and later joined together to form national organizations (Lammi, 2023). The organizational institutionalization and formalization of competitive systems in parkour also brings greater control and direction of (1) methodological and didactic approaches to training, (2) structural knowledge, and (3) introduces a transparent and professional way of imparting knowledge to aspiring parkour coaches, which in turn brings greater safety in the implementation of parkour and the framing of its operation in safer and more controlled sports environments.

The literature also highlights some critical aspects of the formalization of parkour. With the institutionalization and organizational formalization of parkour and its inclusion in gymnastics federations and sports policies, debates have emerged regarding the preservation of parkour's original values, such as informality, autonomy, and creativity (Dumont & Thorpe, 2022; Puddle & Wheaton, 2023). While formalization brings greater safety, recognition, and opportunities for collaboration with public institutions, there is a risk that excessive standardization could limit creativity and the original values of parkour. Coaches emphasize the importance of maintaining flexibility and openness

to innovation, even within formal programmes and guidelines (Gilchrist & Wheaton, 2011; O'Loughlin, 2012; Puddle & Wheaton, 2023; Wintle, 2024).

Individualization and adaptation of methods

Parkour learning is highly individualized. Coaches and communities frequently adapt their methods to the physical and psychological characteristics of each participant (e.g. fear of injury, motor skills). Progressions and regressions of exercises are well established, enabling participants to gradually overcome obstacles and fear and to progress safely (Greenberg, 2017; Wallace & Kili, 2015). In contrast to traditional athletes, self-organized lifestyle sport practitioners (parkour athletes) typically have no podiums to reach or formal grades to attain (Säfvenbom & Stjernvag, 2020).

Because parkour is so new, and many parkour athletes are not trained by coaches, many traceurs (parkour adepts) learn how to execute various parkour techniques through online tutorials or by training informally with peers (Kidder, 2012). Learning most frequently occurs through mutual exchange and through personal trial and error. When training in groups, participants usually do not seek the presence of a formal coach or instructor. They usually have no authorized instructor available but appear to treat this apparent deficiency as an opportunity to facilitate autonomous learning processes. Instead of instructors, the internet has become a useful resource to learn new techniques and see how others train (Gilchrist & Wheaton, 2011). However, learning by watching videos is impersonal, which means that athletes who rely on these videos as their primary source of learning cannot receive immediate encouragement and feedback from a coach. According to Greenberg (2017), interest in formal coaching and access to parkour coaches only increased with the introduction of competitive systems and rules, although these options are mainly sought by parkour newcomers and those who are not yet experienced in parkour.

Nevertheless, several parkour organizations worldwide have developed coach education programmes designed to teach their participants how to coach parkour in a safe and effective manner (e.g. Parkour Generations ADAPT, 2025). Most parkour coach education, development, certification, and apprenticeship programmes, referred to as parkour coach education programmes, are independently regulated and each organization is likely to train its coaches according to its own standards and philosophy (Greenberg, 2017).

Development of coaching competencies

As noted earlier, parkour coaches continue to acquire most of their knowledge through (1) personal experience, (2) reflection, (3) collaboration with other coaches, and (4) exchange within the community. Formal education and certifications—such as ADAPT, IPF/IPTC, and the FIG Coaching Education Academy—typically function as supplements rather than the foundation for coaching work (Greenberg, 2017). Given the existence of multiple international federations, each claiming to be representative of global parkour and following different philosophies of parkour development, as well as developing different programmes, knowledge, levels, processes, and durations of parkour trainer and instructor education, two contrasting models are presented here; (1) the ADAPT programme, supported primarily by international parkour organizations that conceptualize parkour as a community-based sports movement, and (2) the FIG coaching educational programme, which frames parkour primarily as a competitive sport discipline.

ADAPT is an international parkour coaching certification programme that provides standardized training in safety, training methodology, and ethical values. Its primary objective is to professionalize parkour coaching in order to improve the quality and safety of training sessions and to facilitate greater institutional recognition of parkour. The programme combines theoretical and practical training with competency assessment. Coaches progress through four hierarchical levels, upgrading their theoretical knowledge, technical proficiency, and practical competencies at each stage (ADAPT Education Pathway, 2025).

The FIG Academy Programme was established in 2002 for coaches from all FIG member federations across its disciplines (Gymnastics for All, Men's Artistic, Women's Artistic, Rhythmic, Trampoline, Aerobic, Acrobatic, and Parkour). Its underlying philosophy is grounded in a comprehensive worldwide review and analysis of the sport science literature related to the growth and development characteristics of a child as it progresses from birth to adulthood and how that knowledge has implications for training. This athlete-centred philosophy informs decisions regarding curriculum content of a coach education programme to assure the safe and systematic training of gymnasts in all disciplines (including parkour) towards high performance. The Academy Programme therefore aims to provide a standardized competency-based coach education system for the development of gymnastics worldwide, built on principles of sport science, health, current training best practice, and current ethical and safeguarding standards. In 2011, the FIG Coaching Education programme was divided into two successive pathways—the Age Group Programme and the

FIG Coaching Academy—each consisting of four progressive levels. Coaches advance by demonstrating increasing levels of competence and may ultimately obtain the FIG Academy Brevet, the highest certification level (FIG, 2025).

The IPF also provides coaching certification programmes and educational resources for coaches at different levels, contributing to the creation of a global standards framework for training and safety quality for the discipline. Across Europe, additional initiatives, projects, and activities have also emerged in the field of education and training of coaches and the organization of competitions at both the pan-European networking and national levels. Mentorship, participation in events (e.g. Coach Europe), and the exchange of best practices at the European level are important for the development of coaching competencies and the dissemination of innovation (Gilchrist & Wheaton, 2011).

Coach Europe is a European event and platform dedicated to knowledge exchange, networking, and the professional development of parkour coaches. It brings together trainers from various countries through workshops, lectures, practical training sessions, and conferences, organized by European parkour organizations such as Parkour Outreach CIC (UK), national associations (e.g. the Finnish Parkour Association and Motion Academy Spain), and in partnership with international federations such as the IPF and WFPPF.

In addition, local groups and training centres are often involved in hosting events and contribute to the dissemination of best practices and the professionalization of parkour at the European level (Gilchrist & Wheaton, 2011; Lammi, 2023; Leeder & Beaumont, 2021; Wintle, 2024). In some countries, formal training programmes have already been developed, incorporating practical and theoretical education, reflective practice, and competency assessment. These programmes underscore the importance of safety, lesson planning, communication, and adapting the learning environment. According to the literature, formal parkour coaching programmes have been developed primarily in the following countries: In France, the birthplace of parkour, the formalization of coaching programmes is the most advanced, with integration into gymnastics federations and specialized certification schemes. Moreover, the French Parkour Federation (Fédération de Parkour) offers certification for coaches in France and beyond, focusing on the integration of parkour into physical education and youth programmes. They emphasize the importance of teaching parkour with safety and ethics in mind. Finland is developing training programmes that include both practical and theoretical education, as well as reflective practice. In the United Kingdom, organizations such as Coach Europe offer systematic education and networking through coaching programmes and workshops. Parkour UK also offers a coaching certification pathway that includes theoretical and practical

assessments. The organization emphasizes safety, inclusion, and effective coaching strategies, providing resources for coaches to develop their skills. In other European countries, such as the Netherlands and Germany, formal and semi-formal programmes are also being developed, often in collaboration with gymnastics federations or youth sports organizations; however, these programmes are still in the growth and standardization phases (Gilchrist & Wheaton, 2011; Lammi, 2023; Leeder & Beaumont, 2021; Wintle, 2024).

Collectively, with their educational and training programmes as well as their efforts to bring safety and professionalism to parkour training and development, these initiatives contribute to the professional development of parkour coaches, ensuring a standardized approach to teaching while promoting safety and inclusion within the community. Aspiring coaches are encouraged to seek accredited programmes that best align with their teaching goals and community needs.

Based on a comprehensive review of the knowledge development and qualification models of parkour coaches in Europe, recommendations for the design of parkour coach training programmes are given in Table 3. Each content area is accompanied by a concise explanation outlining the content that should be conveyed to participants in the education process. The proposed competency model should offer future parkour coaches a comprehensive insight into parkour both as a lifestyle physical activity and a sports discipline, while also enabling the acquisition of all fundamental knowledge in the field of didactic-methodological principles and approaches to learning specific movements in parkour, as well as other segments of sports training and the preparation of parkour athletes or traceurs.

Table 3: Recommended content for designing training programmes and a competency model for parkour coaches.

Content area	Description and specific content
<p>Historical development of parkour</p>	<ul style="list-style-type: none"> – The content related to the historical development of parkour should explain the origin of parkour and its development to the present day through the prism of various sociological, cultural, anthropological, and economic perspectives. – The content must also provide an insight into the anticipated future development in light of people’s increasingly digital lifestyles, individualization, and their dependence on the instant gratification of informational, economic, and social needs. – Through learning about the content, future coaches must develop competencies related to understanding the past influences of different environments on the development of parkour, as well as the ability to recognize the interests, desires, and motivations of future traceurs for engaging in this activity.
<p>Institutionalization and formalization of parkour</p>	<ul style="list-style-type: none"> – In this content set, future coaches must learn the reasons for the process of institutionalizing parkour and its formation as a sports discipline with its own international competition system and competitions. – Through this content, future coaches must develop the competencies of knowing various organizational forms of global parkour organization and its placement in the global sports-organizational environment, as well as the fundamental orientations of individual global and continental organizations in the field of parkour. – This chapter should also equip future coaches with a fundamental knowledge of various competition systems and specific technical-competition rules.
<p>The role of the coach in parkour training and leadership styles</p>	<ul style="list-style-type: none"> – In this content area, it is important to emphasize the role of the coach in the process of practising parkour and, above all, distinguishing it according to the philosophical orientation of the practice (as a sports discipline or as a „lifestyle“ activity). – The role of the trainer must be specified both from the perspective of developing his or her organizational and pedagogical development competencies when working with different age categories and different interest orientations of trainees in the training process. – In accordance with the different roles of the coach in the parkour training process, leadership styles that best suit the level of training should also be defined. – Through this chapter, future coaches must develop the competencies to understand the comprehensive influence of the coach on the development of the fundamental abilities and personalities of the trainees, as well as on the sporting result.

Content area	Description and specific content
<p>Basics of sport training in parkour</p>	<ul style="list-style-type: none"> – This section should present the definition and fundamental principles of sports training in general (e.g. periodization, holistic approach, processes) and their application to parkour practice and sports training. – The chapter must comprehensively present the structural characteristics of parkour as a physical activity as well as a sports discipline and, most importantly, define the areas of training that form a comprehensive parkour training model. – Furthermore, the content should also define the fundamental characteristics of training cycling and sports exercise programming. – Through this chapter, future coaches must develop competencies for a comprehensive understanding of the process and principles of sports training and exercise.
<p>Special equipment and organizational aspects of preparing the learning environment and/or training.</p>	<ul style="list-style-type: none"> – This content set must be intended for the presentation, technical description, and description of the usability of special training and competition equipment for carrying out activities, training and competitions in parkour. – A special place in this section should be given to the emphasis on safety and the safe use of equipment during the training process. It should also note the risks, dangers, and safety measures for practising parkour in urban areas and on natural obstacles (e.g. walls, buildings, ruins, trees, etc.). – Various organizational aspects of training should also be presented, related to the arrangement and placement of equipment, the number and placement of support personnel and methods of protecting trainees, basic spatial requirements for training, etc. – Through this content set, future trainers must develop comprehensive competencies in safely organizing parkour training using various special training aids and equipment, as well as for training in urban and natural environments. – They should also become familiar with the possibilities and use of modern digital technologies in the training process.
<p>Motor development and physical preparation</p>	<ul style="list-style-type: none"> – This chapter should comprehensively present the motor development of children, adolescents, and adults, as well as the fundamental structure of human motor and functional abilities, methods of their measurement, and development. – The content must also include an understanding and distinction between general and special physical preparation and its impact on the incidence of injuries, fatigue, and the development of sports performance or parkour practice ability. – By studying these contents, future coaches must develop comprehensive competencies for preparing a plan for general and special physical training at the level of daily, weekly, and long-term training, as well as developing test batteries for determining the condition and progress of trainees from the perspective of physical, motor, and functional development.

Content area	Description and specific content
<p>Technical preparation and skill learning process in parkour</p>	<ul style="list-style-type: none"> – The content related to technical preparation must comprehensively present the pedagogical-didactic principles of learning movements, the principles of motor learning, the basic learning methods, and the technical characteristics of movements in parkour. – Technical characteristics should be presented through the fundamental biomechanical (kinematic and dynamic) characteristics of individual groups of movements (vaulting, jumping, climbing manoeuvres, etc.) with special emphasis on the biomechanical principles of movements in the unsupported phase (e.g. somersaults) and during landings, which are characterized by the highest incidence of injuries in parkour. – By learning this content, future coaches must develop comprehensive competencies in understanding the psychological processes associated with learning motor skills, as well as in planning, leading, and controlling the processes of learning parkour skills.
<p>Psychical preparation of parkour athletes</p>	<ul style="list-style-type: none"> – Content related to the psychical preparation of trainees should largely concentrate on content related to managing fear when performing skills, motivation, and psychological preparation for competition or performing demanding feats (e.g. visualization). – By learning this content, future coaches must develop competencies to understand the occurrence of fear and ways to cope with it, the principles and models of motivation, and different approaches to the psychological preparation of athletes to perform various feats (e.g. climbing tall buildings or crossing demanding courses) or to perform a competitive performance as successfully as possible.

The role of the coach in the learning/training process

Coaches can be understood as highly trained professionals in the field of high-performance sports who possess specific tertiary education and specialist qualifications, making them domain-specific experts with both training and experience in various facets of the sport (Lyle & Muir, 2020). Ericsson (2018) wrote that an expert is highly skilled and knowledgeable in a particular field or someone who is widely recognized as a reliable source of knowledge, techniques, or skills, whose judgments are recognized as having authority and status in public or by their peers. Experts must have long-term and intensive experience of practice and education in a specific field. He goes on to emphasize that expertise refers to the qualities, skills, and knowledge that distinguish experts from novices and less experienced people.

According to Matveev's (1977) classification of sports, which is based on the structural complexity of movements in sports, parkour can be classified among individual conventional poly-structural sports disciplines, which are characterized by anaerobic energy processes and dominant motor abilities, such as relative strength, coordination, flexibility, and balance. Polistructural sports are also characterized by open or semi-open movement structures that are performed in variable external conditions. The conventional character of parkour means that all movements (elements) must be performed within a specific movement model (prescribed by experts – convention), which could also be called the ideal movement model (hereafter IMM). Martens (2012) defined sport-specific movements as technical skills that are “specific procedures for moving the body to perform the task to be accomplished.” The IMM of the technical skill is defined by a biomechanical model of movement and is predetermined in the evaluation rules (e.g. Parkour FIG Code of Points) prescribed by the international (or national) sport organizations that issued the rules, set the competition system, and licensed and/or organized competitions (Kolar, Biloslavo, Pišot, Veličković, & Tušak, 2025).

Despite the complexity, uncertainty, and increasing demands for excellence in sports training—which necessitate an interdisciplinary approach involving highly trained experts from diverse fields (e.g. physiology, biomechanics, medicine, nutrition, psychology) (Wilson & Kiely, 2023)—the coach remains the central figure in managing the process. Nash and Collins (2006) describe coaches as (1) managers of the coaching process, (2) technical advisors, (3) tacticians, and (4) educators. Coaches are responsible for the following: (1) managing the organizational process, which includes planning, organizing, implementing (pedagogical processes), controlling, and evaluating both the results and the

training process; (2) coordinating all involved experts and athletes, ensuring alignment and collaboration; and (3) delegating tasks and activities effectively to optimize the training process. These three core managerial responsibilities represent the substantive content of a coach's work. However, the fundamental method by which coaches carry out these tasks is decision-making (Abraham, Collins, & Martindale, 2006; Kolar & Tušak, 2022; Wilson & Kiely, 2023).

In the parkour training process, the primary responsibility of coaches is to create a safe, supportive, and adaptable environment that enables participants to experiment, progress, and develop independence. Coaches must recognize individual needs, provide support in overcoming fear, and encourage reflection on personal progress. In formal settings, coaches often collaborate with public institutions, schools, and sports federations, which requires additional competencies in organization, leadership, and communication (Corsby, Sánchez-García, & Jenkins, 2024; Greenberg, 2017; Lammi, 2023; Wallace & Kilili, 2015).

Because parkour exists as both a competitive sport and a lifestyle activity, trainers, instructors, educators, and coaches must lead athletes by employing flexible coaching leadership styles. The selected style and approach to the teaching and leading of participants in a process should be adapted in response to the motivation, goals, and capabilities of participants. Chelladurai and Arnott (1985) describe three different leadership styles for coaching, namely autocratic, participative, and delegative, and suggest that the best decision style in any circumstances relies on the configuration of the attributes of the problem. Coaches with a dominant autocratic style make decisions entirely independently. Those with a prevalent democratic leadership style engage in the entire decision-making process collaboratively with the athlete. In contrast, coaches with a laissez-faire/delegative leadership style make judgments independently but seek the athlete's consent and agreement before finalizing decisions. Kaya (2014) emphasized that the situational leadership style is the most common style for coaches and outlined four subdomains of this style: telling, selling, participating, and delegating. He argues that before a leadership style is implemented, the level of an athlete's acceptance and readiness should be assessed to determine the coach's best-fit leadership style. Elderon (2020) emphasized that a good coach adapts their style to the situation, often favouring the participative approach in contexts that require learning, decision-making, and problem-solving. Similarly, Sherman, Fuller and Speed (2002) recommend flexible use of decision-making and coaching styles and adapting them to match those styles to which the athlete is receptive. Marshall (2006) supports the argument that successful coaching of high-level athletes involves a much more consensual

process than the do-as-I-say approach, while Kolar, Kovač, & Piletič (2006) argue that the relationship between (1) the athlete's biological and sports development phase and (2) the coach's leadership style changes from more autocratic in the period of youth to more participative in the period of growing up and maturing.

Studies of the leadership styles of sports coaches also have another important message. They indicate that a more participative leadership style allows athletes greater autonomy in expressing their opinions and concerns, thereby ensuring coaches obtain more relevant feedback about the impact of training on the development of athletes' careers (Moen, Høigaard & Peters, 2014; Elderon, 2020) and is associated with positive outcomes (Lyle & Muir, 2020). Voight (2002) argues that based on the feedback the coaches receive, coaches can implement the strategies or personal skill development of the athletes effectively.

CONCLUSIONS

Over the past two decades, parkour has evolved from a grassroots movement into a recognized lifestyle sport across Europe, characterized by a dynamic interplay between informal community-driven learning and increasing formalization. Its unique character lies in its origins as a self-organized epistemic culture, where knowledge, values, and practices are shaped internally by practitioners rather than imposed by external institutions. This community-based approach has fostered creativity, adaptability, and strong peer-to-peer knowledge exchange.

As parkour integrates into formal sports structures, with the emergence of standardized training programmes and national federations, new opportunities for safety, recognition, and institutional collaboration have arisen. This process has largely changed the basic philosophy of parkour from a lifestyle physical activity to a competitive sports discipline. The latent struggle between the two philosophies of parkour has led to fragmented governance structures and competing representations of the different philosophical views on the development, existence, and evolution of parkour, as well as raising the issue of representativeness in a comprehensive global sports organization. Despite the emergence of a large number of international sports organizations with different ideological and philosophical orientations toward parkour, they have all used the process of institutionalization to develop various (in terms of content, duration, levels, approaches, etc.) education, training, and certification programmes and thus the formal regulation of coaches and instructors who ensure the transfer of

knowledge to trainees in the processes of training and learning parkour skills. Regardless of the fundamental orientations of the programme organizers, institutionalization and formalization of the development of teaching staff competencies will bring higher knowledge standards, greater safety in learning and performing parkour, and the development of parkour training methods and methodologies tailored to the goals, needs, and abilities of the trainees. However, this process also presents challenges: excessive standardization risks undermining the creativity, autonomy, and core values that define parkour. Coaches and community leaders emphasize the importance of maintaining flexibility, supporting individual learning needs, and preserving the innovative spirit of the discipline, even within formalized frameworks.

In summary, the future development of parkour depends on achieving a balance between the benefits of formalization and the preservation of its original, community-centered ethos. Recognizing and respecting parkour's roots as a self-organized culture is essential if institutionalization is to enhance rather than diminish the discipline's diversity, creativity, and authenticity.

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SEX DIFFERENCES AND PERFORMANCE EVALUATION IN PRESCHOOL ATHLETIC EVENTS: A STUDY FROM THE OLYMPIC FESTIVAL OF KINDERGARTENS IN CROATIA

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ABSTRACT

*This study examined sex differences in motor performance among preschool children and proposed a preliminary, norm-referenced evaluation scale for selected athletic disciplines within the Olympic Festival of Kindergartens. The sample consisted of 120 children (60 boys and 60 girls), approximately six years of age, representing the best-performing participants from county-level competitions conducted between 2007 and 2017. Motor performance was assessed in ball throwing, standing long jump, and the 50-m sprint. Sex differences were analysed using the independent samples *t*-test with effect sizes reported as Cohen's *d*. Boys achieved significantly better results in ball throwing ($t(118) = 6.51, p < 0.001, d = 1.19$) and the 50-m sprint ($t(118) = -2.07, p = 0.041, d = -0.38$), indicating large and small-to-moderate effects, respectively. No significant sex difference was observed in the standing long jump ($t(118) = 0.64, p = 0.521, d = 0.12$). Comparisons with national datasets revealed similar performance patterns, confirming earlier findings of sex-related differences in explosive strength and speed during early childhood. The proposed five-level evaluation scale, derived from competitive performance distributions, provides a practical assessment framework for use in organized preschool sport settings. Given the selective nature of the sample and the absence of formal psychometric validation, the scale should be considered preliminary and applicable primarily to physically active preschool children participating in competitive events.*

Keywords: *preschool children, motor performance, athletic events, sex differences, evaluation scale*

RAZLIKE MED SPOLOMA IN OCENJEVANJE USPEŠNOSTI NA ŠPORTNIH DOGODKIH PREDŠOLSKIH OTROK: ŠTUDIJA Z OLIMPIJSKEGA FESTIVALA VRTCEV NA HRVAŠKEM

IZVLEČEK

Študija je proučevala razlike med spoloma v motoričnih sposobnostih predšolskih otrok in v njej je predlagana preliminarna, normativno utemeljena ocenjevalna lestvica za tri atletske discipline, vključene v olimpijski festival vrtcev. Vzorec je obsegal 120 otrok (60 fantov in 60 deklic), ki so bili stari približno šest let ter, izbrani na podlagi najboljših dosežkov na ravni okrožnih tekmovanj med letoma 2007 in 2017. Motorični dosežki so bili ocenjeni v metanju žoge, skoku v daljino z mesta in teku na 50 metrov. Razlike med spoloma so bile analizirane z neodvisnim t -testom, pri čemer so bili izračunani tudi učinki velikosti (Cohenov d). Fantje so dosegli statistično pomembno boljše rezultate v metanju žoge ($t(118) = 6,51$; $p < 0,001$; $d = 1,19$) in teku na 50 metrov ($t(118) = -2,07$; $p = 0,041$; $d = -0,38$), kar kaže na velik oziroma majhen do zmeren učinek. Pri skoku v daljino z mesta ni bilo ugotovljenih statistično pomembnih razlik med spoloma ($t(118) = 0,64$; $p = 0,521$; $d = 0,12$). Primerjava z nacionalnimi podatki je pokazala podobne vzorce, pri čemer fantje že v zgodnjem otroštvu izkazujejo boljše rezultate v nalogah, povezanih z eksplozivno močjo in hitrostjo. Predlagana petstopenjska ocenjevalna lestvica, oblikovana na podlagi tekmovalnih dosežkov, je praktično orodje za uporabo v organiziranih predšolskih športnih okoljih. Glede na selektivno naravo vzorca ter odsotnost formalnega preverjanja zanesljivosti in veljavnosti je treba lestvico obravnavati kot preliminarno in primerno predvsem za telesno aktivne predšolske otroke, vključene v tekmovalne športne programe.

Ključne besede: predšolski otroci, motorične sposobnosti, športni dogodki, razlike med spoloma, ocenjevalna lestvica

INTRODUCTION

Physical activity plays a crucial role in the healthy development of children, particularly during the preschool years, when fundamental motor skills and coordination are formed. Early exposure to sport and movement-based play fosters not only physical fitness but also cognitive, emotional, and social growth. Recognizing the importance of sport as a holistic educational tool, the Croatian Olympic Committee launched the Olympic Festival of Kindergartens in 2002 through its Office for Local Sport. This national event aims to promote physical activity among preschool children while transmitting key Olympic values such as friendship, respect for diversity, non-violence, and fair play.

Held annually in May, the Festival gathers over 15,000 children from across Croatia. Under the slogan “I will be an Olympian too”, it serves as both a celebration of sport and a pedagogical initiative. By engaging in various athletic and recreational activities, children develop motor and functional abilities essential for proper growth, health, and harmonious development. Through preparation and participation, children enhance physical competencies such as strength, speed, and coordination, while also developing social interaction skills, teamwork, and respect—values that extend beyond the sports field into everyday life.

Physical activity (PA) is beneficial for maintaining and enhancing health (Hawladar et al., 2023) and plays a key role in children’s growth and development (Bingham et al., 2016; Piercy et al., 2018). Although promoting a healthy lifestyle is particularly crucial during early childhood (Tran et al., 2025), children are becoming increasingly less physically active (Husu et al., 2024; Phipps et al., 2024). Despite its importance for child development, unstructured outdoor play is declining (Holt et al., 2016). For preschool-aged children, free outdoor play represents the most natural way to engage in PA and remains critical for healthy development (Caroli et al., 2011). Recent Croatian research further emphasizes that reduced movement and increased sedentary behaviour in early childhood can negatively affect the formation of lifelong healthy habits (Petrić, 2022, 2025), while long-term physical inactivity poses significant risks to both physical and mental health (Pišot, 2022).

Longitudinal studies of morphological and motor development indicate that the period between five and seven years of age is characterized by intensified development of motor abilities in both sexes. The most pronounced changes occur in repetitive strength, coordination, precision, and balance, particularly around the age of six. Sex differences have been reported, with girls showing advantages in balance and flexibility, and boys demonstrating superior

performance in explosive strength and precision tasks (De Privitellio, Marić, & Mijan, 2006; De Privitellio, Babić, & Caput-Jogunica, 2007). Neuromotor explanations are supported by findings indicating earlier maturation of coordination and movement regulation in girls, whereas boys tend to exhibit earlier advantages in strength-related motor tasks (De Privitellio et al., 2006; Lopes, Rodrigues, Maia, & Malina, 2011). International research similarly reports sex-related differences in preschool motor performance, especially in tasks involving strength and speed, while coordination-based skills show smaller differences (Lopes et al., 2011; Tomkinson et al., 2017).

Within the framework of the Croatian Olympic Committee, preschool athletic competitions include football for boys and girls, 50-m running, standing long jump, ball throwing, and the 4 × 25 m relay. Running and elementary games that involve fundamental movements such as walking, climbing, crawling, and jumping positively influence cardiovascular development and enhance key motor abilities, including speed, strength, coordination, and endurance. It should be emphasized that the present study is based on results achieved by top-performing preschool children participating in county-level competitions within the Olympic Festival of Kindergartens. Accordingly, the proposed evaluation scale reflects competitive finalist performance and is not intended to represent normative motor development of the general preschool population.

The main goal of this research is to examine motor performance in 50-m running, standing long jump, and ball throwing among preschool children aged five and six. The partial goals are to analyse sex differences in these disciplines and to propose a preliminary, norm-referenced evaluation scale based on competitive performance outcomes.

METHODS

Preschool boys and girls from kindergartens in Osijek-Baranja County participated in this study. Participants were approximately six years old; however, exact birth dates and indicators of biological maturation were not available. The children competed in three athletic disciplines—standing long jump, 50-m sprint, and ball throwing—within the Olympic Festival of Kindergartens over a ten-year period (2007–2017).

The sample consisted of 60 boys and 60 girls, representing the ten best results from each sex across six different county-level competitions. It should be emphasized that the sample included exclusively top-performing preschool children who qualified for county-level finals. Consequently, the sample

represents a highly selected subgroup of physically active children who were already involved in structured physical activity and competitive preparation, rather than the general preschool population.

Basic descriptive statistics (mean, standard deviation, minimum, maximum, skewness, and kurtosis) were calculated for all variables. Sex differences in performance were examined using the independent samples t-test. In addition to t-values, exact p-values, degrees of freedom, and effect sizes (Cohen's *d*) were reported to ensure transparent and precise statistical interpretation. Effect sizes were interpreted according to Cohen's criteria (small ≈ 0.2 , moderate ≈ 0.5 , large ≥ 0.8).

Although data were collected across multiple years, the study was not designed as a longitudinal analysis tracking the same individuals over time. Instead, repeated cross-sectional competition results were used to derive stable performance benchmarks for applied evaluation purposes.

Individual results in each discipline were further analysed using frequency tables and distribution-based categorization. Performance scores were divided into five levels, graded from poor (1) to excellent (5), forming a norm-referenced evaluation scale based on competitive performance outcomes. This scale was intended as a practical classification tool for use in preschool sport settings rather than as a fully standardized psychometric instrument.

All statistical analyses were performed using STATISTICA for Windows, version 14.1.0.8.

RESULTS

The basic descriptive statistics for boys and girls in the three disciplines are presented in Table 1. Boys achieved higher mean values than girls in ball throwing (19.78 m vs 13.08 m), standing long jump (1.41 m vs 1.39 m), and 50-m sprint (9.88 s vs 10.09 s). The largest difference was observed in ball throwing, reflecting greater upper body strength and coordination among boys.

Sex differences in performance were examined using an independent samples t-test. A statistically significant difference was found in the 50-m sprint, with boys achieving faster times than girls, $t(118) = -2.07$, $p = 0.041$, Cohen's $d = -0.38$, indicating a small-to-moderate effect size. A large and statistically significant sex difference was observed in ball throwing, where boys achieved substantially higher results than girls, $t(118) = 6.51$, $p < 0.001$, Cohen's $d = 1.19$, reflecting a large effect size. In contrast, no statistically significant sex difference was found in the standing long jump, $t(118) = 0.64$, $p = 0.521$,

Table 1. Descriptive Statistics and t-values for Boys and Girls

Discipline	Sex	N	Mean	SD	Min	Max	Skew	Kurt	K-S-D	t(df)	p	Cohen's d
50-m sprint (s)	F	60	10.09	0.53	8.57	11.08	-0.75	0.33	0.10			
	M	60	9.88	0.58	8.36	11.00	-0.07	-0.25	0.07	-2.07 (118)	0.0406	-0.38
Ball throw (m)	F	60	13.08	4.00	8.35	23.60	1.02	0.02	0.20			
	M	60	19.78	6.89	9.00	39.33	1.02	0.37	0.16	6.51 (118)	<0.001*	1.19
Standing long jump (m)	F	60	1.39	0.17	1.05	1.98	1.11	2.14	0.11			
	M	60	1.41	0.17	1.20	1.96	1.08	0.45	0.15	0.64 (118)	0.5206	0.12

Legend: N = number of participants; SD = standard deviation; Min = minimum; Max = maximum; Skew = skewness; Kurt = kurtosis; K-S-D = Kolmogorov-Smirnov test statistic; t = t-test value; df = degrees of freedom; p = significance level; d = Cohen's d (effect size).

Table 2. Evaluation Marks for Preschool Children

Ball Throw Boys (m)	Ball Throw Girls (m)	Long Jump Boys (cm)	Long Jump Girls (cm)	50-m Sprint Boys (s)	50-m Sprint Girls (s)	Mark
≤12.79	≤10.25	≤129	≤116	≥10.68	≥10.77	1
12.80–20.37	10.26–14.06	130–148	117–139	10.67–10.02	10.76–10.14	2
20.38–27.95	14.07–17.88	149–167	140–163	10.01–9.36	10.13–9.52	3
27.96–35.53	17.89–21.69	168–186	164–186	9.35–8.70	9.51–8.89	4
>35.53	>21.70	>186	>186	<8.69	<8.88	5

Cohen's $d = 0.12$, suggesting a trivial effect size and comparable performance between boys and girls in this discipline. According to Cohen's criteria, the observed sex differences ranged from trivial (standing long jump), through small-to-moderate (50-m sprint), to large (ball throwing), indicating that sex-related performance differences were discipline-specific.

Table 2 presents a preliminary, norm-referenced evaluation scale based on competitive performance results obtained within the Olympic Festival of Kindergartens. The scale categorizes performance into five levels (from poor to excellent) and is intended primarily as a practical assessment tool rather than a fully standardized psychometric instrument. It is evident that boys achieved higher marks more frequently than girls in ball throwing and sprinting, reflecting their greater upper body strength and speed at this age.

The cut-off points for the five performance categories were determined using a distribution-based approach derived from the observed range of competition results. Performance intervals were constructed to ensure practical applicability and balanced classification rather than strict psychometric optimization. The scale is therefore norm-referenced to competitive performance and should be regarded as a preliminary classification tool rather than a validated assessment instrument.

DISCUSSION

The results of this study demonstrate clear sex differences in motor performance among preschool children, with boys outperforming girls in ball throwing and the 50-m sprint, while standing long jump performance remained largely comparable. The lower performance of girls in ball throwing may be attributed to the greater neuromotor complexity of the task, which requires coordinated involvement of the entire kinetic chain. At this age, girls may rely more on neuromotor control than on strength-based mechanisms, resulting in lower throwing efficiency. In contrast, standing long jump, which primarily depends on bilateral explosive leg action and involves less complex coordination, produced more balanced results between the sexes.

When county-level results are compared with performance indicators from the final competition of the 6th National Olympic Festival of Kindergartens (Cvenić, 2009), similar performance patterns emerge. In the 50-m sprint, boys' top ten times ranged between 8.51 and 9.08 seconds, while the best-performing girl achieved 8.47 seconds, outperforming all boys in that year's national final. In ball throwing, boys reached distances of 24.28–28.34 m, whereas girls achieved 13.34–17.27 m, further illustrating pronounced sex-related differences in

explosive upper-body performance. Standing long jump results again showed substantial overlap between sexes, with boys jumping 1.48–1.68 m and girls 1.49–1.57 m. These findings highlight both consistent sex-related trends and considerable inter-individual variability among high-performing preschool children.

Further comparison with the national dataset of 512 girls and 548 boys reported by Babić, Caput-Jogunica, Jelovčić, and De Privitellio (2008) supports the observed tendencies. In their large-scale sample, boys outperformed girls in ball throwing (16.48 m vs 10.44 m), standing long jump (1.42 m vs 1.33 m), and the 50-m sprint (9.80 s vs 10.14 s). The greatest difference was again observed in ball throwing, whereas differences in standing long jump were relatively small. Together with the present findings, these results confirm that sex differences in explosive strength and speed tend to emerge early in childhood, while coordination-based tasks show more uniform development between the sexes.

Differences in evaluation approaches also influence how performance distributions are interpreted. Babić et al. (2008) proposed a detailed ten-point classification system, later grouped into five marks, allowing fine discrimination of small performance differences. In contrast, the evaluation scale developed in the present study assigns broader performance ranges to each category, prioritizing practical usability over detailed differentiation. Despite these methodological differences, both approaches identify comparable developmental patterns, with boys more frequently occupying higher performance categories in ball throwing and sprinting, and overlapping distributions in standing long jump.

Although data were collected over a ten-year period, the present analysis was not designed as a longitudinal study following the same individuals over time. Instead, the aim was to derive stable performance benchmarks from repeated competitive events. Therefore, descriptive statistics, group comparisons, and effect size estimates were considered methodologically appropriate for the applied purpose of the study.

Taken together, comparisons across local, national, and historical datasets suggest that early engagement in physical activity—both structured and unstructured—supports motor development, while sex-based performance differences remain evident across competitive contexts. The proposed evaluation scale represents a practical and accessible tool for kindergarten educators and sports practitioners, enabling identification of motor strengths and areas requiring additional support within organized preschool sport settings. Given the absence of formal reliability and validity testing, the scale should be regarded as a preliminary, norm-referenced evaluative framework, intended for applied use in competitive preschool contexts rather than as a population-based developmental standard. In addition to biological factors, pedagogical and environmental

influences—such as encouragement, activity preferences, opportunities for movement practice, and instructional approaches in early childhood education—may also contribute to observed sex differences and should be considered alongside biological explanations.

LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

An important limitation of this study is the selective nature of the sample. The analysed results are based on the top-performing preschool children from county-level competitions and therefore do not represent the general preschool population. Consequently, the proposed evaluation scale should be interpreted as applicable primarily to physically active children participating in organized sport events, rather than as a normative reference for all preschool children.

Another limitation relates to age-related factors. Although participants were approximately six years old, exact age ranges, relative age effects, and indicators of biological maturation were not controlled for. Given the rapid developmental changes characteristic of early childhood, these factors may have influenced individual performance outcomes.

Furthermore, although the evaluation scale is based on a large set of competition results, no formal psychometric testing was conducted. Reliability and validity indicators were not assessed, and the scale should therefore be considered preliminary. Future research should examine test–retest reliability, construct validity, and applicability of the scale in non-competitive preschool settings.

Future studies should also aim to include broader and more heterogeneous samples, incorporate longitudinal designs, and explore the combined influence of biological, pedagogical, and environmental factors on motor development in early childhood.

CONCLUSIONS

This study highlights clear sex differences in motor performance among preschool children participating in athletic disciplines at the Olympic Festival of Kindergartens. Boys demonstrated superior results in ball throwing and sprinting, while performance in standing long jump was largely comparable between sexes. These findings are consistent with established developmental patterns, indicating that boys' advantage in explosive and upper-body strength emerges

early in childhood, whereas coordination-based abilities tend to develop more uniformly across the sexes.

Early engagement in structured physical activity, together with playful and inclusive programmes such as the Olympic Festival of Kindergartens, plays a crucial role in fostering motor competence, intrinsic motivation, and positive attitudes toward lifelong physical activity. By combining educational, health, and developmental objectives, such initiatives contribute substantially to the holistic growth and well-being of preschool children.

The proposed evaluation scale provides a practical and accessible tool for kindergarten educators and sports professionals to monitor children's progress in basic athletic skills. Systematic assessment and constructive feedback can help identify children who may benefit from additional support, encourage parental involvement in physical development, and promote the early adoption of healthy movement habits. The findings should therefore be interpreted primarily within the context of organized preschool sport, while future research is encouraged to validate the proposed evaluation scale in broader and more diverse preschool populations.

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ANALYSING THE BENEFIT AND EFFECT OF PHYSICAL ACTIVITY DURING MENOPAUSE

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ABSTRACT

Purpose: *The increasing prevalence of menopause-related discomforts, coupled with the potential for non-pharmacological interventions, underscores the need to explore lifestyle modifications such as physical activity (PA). This study aimed to evaluate the effects of pre-existing PA on the quality of life (QoL) in menopausal women.*

Method: *Conducted between September 2022 and January 2023, the cross-sectional study utilized IBM SPSS Statistics (version 23) and included 138 women. Standardized QoL questionnaires (MENQOL and SF-36) and the Global Physical Activity Questionnaire (GPAQ) to assess their PA levels and QoL outcomes.*

Result: *Among participants, 64% engaged in moderate-intensity PA, averaging 90 minutes per week in recreational activities, while spending 75 minutes per day sedentary. A significant inverse relationship was observed between total PA and menopause-related symptoms, with strong negative correlations in the Psychosocial ($r = -0.398, p < 0.001$) and Vasomotor ($r = -0.284, p < 0.001$) domains of MENQOL. Women who met the 150 minutes/week recommendation for moderate-to-vigorous physical activity (MVPA) reported significantly better psychological QoL ($p = 0.025$) as measured by SF-36. Furthermore, positive associations were noted between work-related PA and general health outcomes, suggesting that PA benefits extend across various health dimensions.*

Conclusions: *These findings highlight the role of PA in improving menopausal QoL and emphasize the importance of incorporating personalized PA recommendations into menopausal care. Further research using objective PA measurements and a larger, more diverse cohort is recommended to confirm these results and provide deeper insights.*

Keywords: *women, menopause, menopausal symptoms, physical activity, MENQOL, SF-36*

ANALIZA KORISTI IN UČINKOV TELESNE DEJAVNOSTI MED MENOPAVZO

IZVLEČEK

Namen: *Vedno večja razširjenost neprijetnih simptomov, povezanih z menopavzo, skupaj z možnostjo nefarmakoloških posegov poudarja potrebo po raziskovanju sprememb življenjskega sloga, kot je telesna dejavnost. Namen te študije je bil oceniti učinke redne telesne dejavnosti na kakovost življenja žensk v menopavzi.*

Metode: *Presečna študija je bila izvedena med septembrom 2022 in januarjem 2023 s pomočjo programa IBM SPSS Statistics (različica 23) in je vključevala 138 žensk. Standardizirani vprašalniki o kakovosti življenja (MENQOL in SF-36) ter svetovni vprašalnik o telesni dejavnosti (GPAQ) so bili uporabljeni za oceno njihove telesne dejavnosti in kakovosti življenja.*

Rezultati: *64 % udeleženk je bilo zmerno telesno dejavnih: v povprečju so 90 minut na teden izvajale rekreativne telesne dejavnosti, medtem ko so 75 minut na dan preživele sede. Opazili smo pomembno obratno sorazmerje med skupno telesno dejavnostjo in z menopavzo povezanimi simptomi z močnimi negativnimi korelacijami na psihosocialnem ($r = -0,398, p < 0,001$) in vazomotoričnem ($r = -0,284, p < 0,001$) področju MENQOL. Ženske, ki so izpolnile priporočilo 150 minut/teden zmerne do intenzivne telesne dejavnosti (MVPA), so poročale o znatno boljši psihološki kakovosti življenja ($p = 0,025$), merjeni s SF-36. Poleg tega so bile ugotovljene pozitivne povezave med telesno dejavnostjo, povezano z delom, in splošnimi zdravstvenimi rezultati, kar kaže, da imajo koristi telesne dejavnosti različne zdravstvene dimenzije.*

Sklepne ugotovitve: *Ti izsledki poudarjajo vlogo telesne dejavnosti pri izboljšanju kakovosti življenja v menopavzi in poudarjajo pomen vključevanja prilagojenih priporočil za telesno dejavnost v tem obdobju. Za potrditev rezultatov in pridobitev globljih spoznanj priporočamo nadaljnje raziskave z objektivnimi meritvami telesne dejavnosti in večjo, bolj raznoliko kohorto.*

Ključne besede: *ženske, menopavza, simptomi menopavze, telesna dejavnost, MENQOL, SF-36*

INTRODUCTION

Menopause marks a significant transition in a woman's life, characterized by the natural cessation of reproductive function. This stage, typically occurring in the mid-40s to 50s, involves a decline in ovarian function and hormonal changes, primarily a decrease in estrogen and an increase in follicle-stimulating hormone (FSH) (El Hajj et al., 2020). These hormonal shifts result in various physical and psychological symptoms that can adversely affect women's quality of life (QOL) during this period. Symptoms include hot flashes, night sweats, mood fluctuations, sleep disturbances, and an increased risk of metabolic and cardiovascular diseases, osteoporosis, and weight gain. The onset and intensity of these symptoms vary across individuals, with lifestyle, genetics, and socioeconomic factors playing significant roles (Kuck & Hogervorst, 2024; Mishra & Kuh, 2006; Nelson, 2008; Utian, 2005).

Menopause is a natural phase of ageing, and managing its symptoms is key to overall health. Physical activity (PA) plays a vital role in reducing menopause-related discomforts, including weight gain, anxiety, depression, and sleep disturbances. Studies show that regular exercise lessens symptom severity and improves quality of life (QOL), while also enhancing mental and physical health, lowering the risk of chronic conditions like cardiovascular disease and diabetes, and improving sleep quality (Dąbrowska-Galas, Dąbrowska, Ptaszkowski, & Plinta, 2019).

Although hormone replacement therapy (HRT) is a popular treatment option for alleviating menopausal symptoms, concerns about its potential adverse effects have led many women to explore alternative therapies (Kim, Cho, Ahn, Yim, & Park, 2014). PA stands out as a non-pharmacological intervention that can effectively improve both physical and mental well-being during menopause. Despite the known benefits of PA, many women remain unaware of its potential in managing menopausal symptoms. This highlights the need for healthcare professionals to actively promote PA and other healthy lifestyle habits as part of comprehensive menopausal care.

The purpose of this study is to evaluate the impact of PA, along with medical, sociodemographic, and lifestyle factors, on the quality of life of menopausal women. By examining the relationship between PA and menopausal symptoms, this research aims to provide insights into the role of PA as an essential component of personalized care during menopause.

METHODS

Study design

This research was a non-randomized, cross-sectional study conducted between September 2022 and January 2023. Participants were recruited online from diverse locations, including Nigeria and Hungary. The inclusion of participants from Nigeria and Hungary was intentional, designed to capture perspectives from distinct socioeconomic and cultural environments and thereby enrich understanding of the relationship between physical activity and menopausal quality of life. Nigeria represents a developing West African setting, where cultural beliefs, healthcare access, and lifestyle behaviours differ markedly from those in Hungary, a Central European country characterized by more established healthcare systems and differing activity norms. The ‘others’ category included respondents from Canada, Costa Rica, Côte d’Ivoire, Ghana, Malawi, Pakistan, Rwanda, Saudi Arabia, Senegal, Singapore, Switzerland, and the United Kingdom, who participated through shared online recruitment links. Although these additional participants were few, their inclusion enhanced the heterogeneity and external validity of the sample.

The results were analysed collectively rather than by country to preserve statistical power and ensure consistency in interpretation. This approach reflects the exploratory nature of the study while recognizing that contextual differences may influence the observed relationships between physical activity and menopausal well-being.

Participants and sampling

A total of 180 women were invited to participate in the study using a convenience sampling technique. The inclusion criteria were women aged 45 years or older, who had experienced natural cessation of menstruation for at least 12 months (i.e. menopausal), and who did not have any physical limitations that would interfere with the assessment of daily physical activity (PA). Women who had undergone induced menopause due to hysterectomy, radiation therapy, or other medical procedures were excluded from the study, as well as those who were pregnant, breastfeeding, or had mental or cognitive impairments. After applying these criteria, 132 women were included in the final analysis. These women were further divided into two subgroups based on

the time since menopause: those who had experienced menopause 5 years or less ago were categorized as perimenopausal, while those who had experienced menopause more than 5 years ago were classified as postmenopausal. The classification of menopausal status into ≤ 5 years (perimenopausal) and >5 years (postmenopausal) was informed by previous research (El Hajj et al., 2020; Mishra & Kuh, 2006), which identifies the first five years following menopause as a critical period characterized by heightened symptom intensity and significant physiological adaptation.

Data collection

The sociodemographic section collected information on education level (grouped into primary, secondary, university, postgraduate diploma, and doctorate/PhD), marital status (categorized as single, married, divorced, or widowed), and parity (number of children). Smoking status was determined by the number of packs smoked daily, while alcohol consumption was categorized as never, monthly, weekly, daily, or other. Employment status was assessed with the question, "What do you do for a living?" Although participants answered an open-ended question ("What do you do for a living?"), responses were subsequently coded as 'employed' or 'unemployed' to ensure uniformity in statistical analysis. The questionnaire also included questions on childbirth, pregnancy, medication, menstrual cycle, chronic diseases, height, weight (to calculate BMI), contraceptive use, menopausal hormone therapy, age, and country of birth.

The Menopause-Specific Quality of Life Questionnaire (MENQOL) questionnaire was used to assess menopause-related symptoms. Developed by Hilditch et al. (1996), the scale was designed to reflect women's experiences of menopause. The Hungarian adaptation and validation of this scale was completed by Lewis, Hilditch, & Wong (2005). The MENQOL consists of 29 items across four domains: Vasomotor (items 1-3), Psychosocial (items 4-10), Physical (items 11-26), and Sexual (items 27-29). Participants indicated the presence of each symptom using a "yes" or "no" option and ranked the severity on a scale from 0 (not at all bothered) to 6 (extremely bothered).

The Global Physical Activity Questionnaire (GPAQ) was developed by the World Health Organization (WHO) in 2002 as part of the Stepwise Approach to Chronic Disease Risk Factor Surveillance (WHO, 2002). In their 2004 Global Strategy on Diet, Physical Activity, and Health, the WHO recommended its use for national physical activity surveillance (WHO, 2004). Bull, Maslin, and

Armstrong (2009) assessed the GPAQ's validity and reliability across nine countries. In this study, the English version of the GPAQ was used due to its appropriateness for the Nigerian context. The GPAQ was validated for use in Hungary by Ács et al. (2020) and has been adapted to various populations worldwide. The questionnaire consists of 16 questions evaluating physical activity across three domains: work, transportation, and leisure, as well as time spent sedentary. For this study, specific GPAQ items focused on daily physical activity: "How many days a week do you engage in moderate-to-vigorous level physical exercise?" and "How many hours a week do you typically spend engaging in moderate-to-strenuous physical activity?" Walking frequency was used as a measure of mild physical activity.

The 36-Item Short Form Survey (SF-36), developed by the Boston Health Research Institute, is widely used to assess general health status. The Hungarian validation of the SF-36 was carried out by Czimbalmos, Nagy, Varga, and Husztik (1999), providing a reference for the standard values in the local population. In this study, the original English version of the SF-36 was used to ensure compatibility with the Nigerian context. The SF-36 consists of eight dimensions, covering physical functioning, bodily pain, role limitations due to physical and emotional problems, social functioning, mental health, vitality, and general health perceptions. The scores for each dimension range from 0 (poorest health) to 100 (best health). (Brazier et al., 1992)

Statistical analysis

Data were analysed using IBM SPSS Statistics (version 23) and Microsoft Excel. Descriptive statistics, including frequencies, percentages, means, and standard deviations, summarized participant demographics and questionnaire responses. Spearman's rank correlation was used to examine the association between physical activity and menopausal symptoms, while the Chi-square test was applied to compare differences between groups. A significance level of $p < 0.05$ was considered for all analyses.

Ethical considerations

This study adhered to the principles outlined in the Declaration of Helsinki. All participants provided informed consent electronically before taking part in the study. Ethical approval for the study was obtained from the University of

Pécs Faculty of Health Sciences, Institute of Physiotherapy and Sport Sciences Ethics Committee.

RESULTS

Sociodemographic and health characteristics

The main sociodemographic and health characteristics of the participants are summarized in Table 1. A total of 138 women (57.1 ± 6.2 years) participated in the study. The majority of the participants (44.2%) were between 51 and 56 years of age. Educational achievement was varied, with 33.33% holding a university degree and 25.36% a postgraduate diploma. Employment was prevalent, with 75.36% of the participants employed at the time of the study.

Regarding menopausal status, 56.52% were perimenopausal, while 43.48% were postmenopausal. In terms of perceived health, 29.71% rated their health as good, while 30.43% described it as neither good nor bad. A smaller percentage (7.25%) reported excellent health. Almost all participants (99.28%) had never used menopausal hormone therapy, and none had ever used oral contraceptive pills.

The majority of the participants were from Nigeria (70.29%), with a smaller proportion from Hungary (20.29%). In terms of childbirth history, 73.19% had delivered via natural birth. The mean time since menopause was 6.01 ± 5.14 years, and the participants reported an average sleep quality score of 84.49 ± 20.08 . Overall, the sample represented a diverse group of middle-aged women with varying health and lifestyle characteristics.

Table 1. Sociodemographic and Health Characteristics of the Participants

Variable	Level	N	%
Age by group	45-50	14	10.14
	51-56	61	44.2
	57-62	43	31.16
	63-68	13	9.42
	69-74	3	2.17
	75-80	4	2.9
Educational level	Primary school	27	19.57
	Secondary school	23	16.67
	University	46	33.33
	Postgraduate diploma	35	25.36
	Doctorate (PhD/DBA)	7	5.07
Employment	Yes	104	75.36
	No	34	24.64
Menopausal status	Perimenopausal	78	56.52
	Postmenopausal	60	43.48
Perceived health status	Poor	7	5.07
	Fair	38	27.54
	Neither good nor bad	42	30.43
	Good	41	29.71
	Excellent	10	7.25
Marital status	Single	12	8.7
	Married	89	64.49
	Divorced	18	13.04
	Widow	19	13.77
Smoking	Yes	27	19.57
	No	111	80.43

Use of menopausal hormone therapy	Current users	0	0
	Past users	1	0.72
	Never used	137	99.28
Use of oral contraceptive pills	Used	0	0
	Never used	138	100
Home country	Nigeria	97	70.29
	Hungary	28	20.29
	Others	13	9.42
Child delivery	Natural birth	101	73.19
	Cesarean section	7	5.07
	Others	30	21.74
		Mean	SD
Time since menopause (years)		6.01	5.14
Age (years)		57.1	6.2
Self-evaluation of sleep quality		84.49	20.08

N = number of participants; SD = standard deviation; % = percentage.

Mean scores of MENQOL domains: Psychosocial, Physical, Vasomotor and Sexual domain

Table 2 presents the mean scores of the MENQOL domains, including Vasomotor, Psychosocial, Physical, and Sexual domains for pre/perimenopause and post-menopause groups. The table also includes the standard deviation (SD) and p value for the comparison of mean scores between the two groups. The results indicate that there were significant differences in the mean scores of the Vasomotor domain between pre/perimenopause and post-menopause groups ($p = 0.008$). Similarly, significant differences were found in the Psychosocial ($p = 0.0002$), Physical ($p < 0.001$), and Sexual ($p < 0.001$) domains. In most cases, pre/perimenopausal women reported slightly higher mean scores than postmenopausal women, indicating that they were more likely to experience symptoms in these areas.

Table 2. Mean scores of MENQOL domains: Psychosocial, Physical, Vasomotor and Sexual domain

MENQOL domains	Menopause Group	N	Mean	SD	P value
Vasomotor domain	Pre/peri- menopause	78	3.55	1.17	0.008
	Post- menopause	60	3.54	1.37	
Psychosocial domain	Pre/peri- menopause	78	3.59	1.24	0.0002
	Post- menopause	60	3.54	1.35	
Physical domain	Pre/peri- menopause	78	3.63	1.19	p<0.001
	Post- menopause	60	3.49	1.36	
Sexual domain	Pre/peri- menopause	78	3.54	1.05	p<0.001
	Post- menopause	60	3.35	1.3	

N = number of participants; SD = standard deviation;
MENQOL = Menopause-Specific Quality of Life. *p < 0.05

Physical activity level

Table 3 shows the descriptive statistics participants' engagement in physical activity. The participants engage in different types of physical activities, including work-related, transport-related, recreational, and sitting activities. Participants engaged in an average of 118.4±398.6 min/week of vigorous PA at work and 116.9±177.6 min/week of moderate PA at work. However, the mean values (0.0) indicate that vigorous PA at work is not common in this group.

For transportation-related activity, participants averaged 115.1±96.6 min/week, with a MET expenditure of 460.6±386.5. Recreational vigorous PA was low, averaging only 32.0±150.7 min/week, while moderate recreational activity was preferred, with participants averaging 90.3±107.5 min/week.

Participants spent an average of 75.3±45.8 min/day sitting, indicating a considerable amount of sedentary time. The total physical activity per week, combining all types and intensities, was around 472.8±931.0 min/week, with a corresponding total MET value of 2492.7±5921.1.

Table 3. Descriptive statistics showing participants' engagement in physical activity

Measure	Mean	SD	Median	IQR Lower	IQR Upper
PA by domains Work – vigorous PA					
min/week	118.41	398.579	0.00	0.00	0.00
MET	947.25	3188.629	0.00	0.00	0.00
Work – moderate PA					
min/week	116.88	177.617	30.00	0.00	152.50
MET	467.54	710.469	120.00	0.00	610.00
Transport					
min/week	115.14	96.613	90.00	50.00	200.00
MET	460.55	386.454	360.00	200.00	800.00
Recreation – vigorous PA					
min/week	32.03	150.691	0.00	0.00	0.00
MET	256.23	1205.531	0.00	0.00	0.00
Recreation – moderate PA					
min/week	90.29	107.508	60.00	0.00	180.00
MET	361.16	430.032	240.00	0.00	720.00
Sitting					
min/day	75.29	45.845	60.00	40.00	90.00
Total PA min/week	472.75	931.009	180.00	50.00	532.50
Total MET	2492.72	5921.115	720.00	200.00	2130.00

SD = standard deviation; PA = Physical Activity; IQR Lower = lower quartile; IQR Upper = Upper quartile; MET = Metabolic Equivalent of Task.

Relationship between GPAQ questionnaire and the SF-36 questionnaire

Table 4 presents the correlation coefficients and significance levels between different types of physical activity and various health-related outcomes, including physical functioning, emotional problems, energy, well-being, social functioning, pain, and general health.

Moderate positive correlations were observed between moderate work activity and various health-related outcomes, including physical health ($r = 0.234$, $p = 0.006$), emotional problems ($r = 0.202$, $p = 0.018$), well-being ($r = 0.308$, $p = 0.000$), pain ($r = 0.228$, $p = 0.007$), and general health ($r = 0.222$, $p = 0.009$). Additionally, active transportation was positively correlated with energy ($r = 0.249$, $p = 0.003$).

Recreational vigorous activity showed a positive correlation with social functioning ($r = 0.193$, $p = 0.023$). In contrast, recreational moderate activity demonstrated a negative correlation with social functioning ($r = -0.302$, $p = 0.000$) and pain ($r = -0.180$, $p = 0.034$). For daily average sitting time, negative correlations were found with emotional problems ($r = -0.175$, $p = 0.041$) and energy ($r = -0.218$, $p = 0.010$).

Finally, total physical activity was positively correlated with physical health ($r = 0.227$, $p = 0.007$), well-being ($r = 0.260$, $p = 0.002$), and general health ($r = 0.292$, $p = 0.001$).

Relationship between of physical activity and menopausal status

Table 5 shows the correlation coefficients representing the relationship between different types of physical activity, as measured by the GPAQ, and the various domains of menopause-related quality of life (MENQOL), including the Vasomotor, Psychosocial, Physical, and Sexual domains. Significant correlations were found between MENQOL domains and different physical activity types measured by GPAQ. For vigorous work, weak negative correlations were observed with the Vasomotor domain ($r = -0.218$, $p = 0.010$), Psychosocial domain ($r = -0.191$, $p = 0.025$), Physical domain ($r = -0.176$, $p = 0.039$), and Sexual domain ($r = -0.183$, $p = 0.032$).

Similarly, recreational vigorous activity showed moderate negative correlations with the Vasomotor domain ($R = -0.276$, $p = 0.001$), Psychosocial domain ($R = -0.241$, $p = 0.004$), Physical Domain ($R = -0.244$, $p = 0.004$), and Sexual domain ($R = -0.182$, $p = 0.032$).

Table 4. Correlation analysis showing the relationship between physical activity and quality of life

SF - 36									
GPAQ		Physical Functioning	Physical Health	Emotional Problems	Energy	Well-Being	Social Functioning	Pain	General Health
Vigorous Work	r (p)	-0.065 (0.449)	-0.078 (0.363)	-0.008 (0.922)	-0.143 (0.094)	-0.078 (0.36)	-0.127 (0.136)	-0.147 (0.085)	0.066 (0.439)
Moderate Work	r (p)	0.149 (0.08)	.234** (0.006)	.202* (0.018)	0.112 (0.191)	.308** (0)	0.127 (0.136)	.228** (0.007)	.222** (0.009)
Active Transportation	r (p)	0.041 (0.635)	0.139 (0.103)	-0.07 (0.415)	.249** (0.003)	0.118 (0.169)	-0.038 (0.656)	0.127 (0.139)	0.163 (0.056)
Recreational Vigorous	r (p)	0.007 (0.937)	0.027 (0.758)	-0.159 (0.062)	0.047 (0.584)	-0.001 (0.991)	.193* (0.023)	0.098 (0.253)	0.134 (0.117)
Recreational Moderate	r (p)	0.004 (0.967)	0.024 (0.783)	0.09 (0.295)	-0.013 (0.881)	0.093 (0.277)	-.302** (0)	-.180* (0.034)	0.112 (0.19)
Daily Sitting	r (p)	0.153 (0.073)	0.011 (0.894)	-.175* (0.041)	-0.018 (0.837)	-.218* (0.01)	-0.012 (0.886)	-0.118 (0.166)	-0.111 (0.193)
Total Physical Activity	r (p)	0.142 (0.097)	.227** (0.007)	0.006 (0.948)	0.133 (0.119)	.260** (0.002)	-0.077 (0.369)	0.05 (0.559)	.292** (0.001)

SF-36 = 36-Item Short Form Health Survey; GPAQ = Global Physical Activity Questionnaire. *p < 0.05, ** = p < 0.01

In terms of total physical activity, stronger negative correlations were identified across all MENQOL domains, including the Vasomotor domain ($R = -0.284$, $p = 0.001$), Psychosocial domain ($R = -0.398$, $p = 0.000$), Physical domain ($R = -0.288$, $p = 0.001$), and Sexual domain ($R = -0.311$, $p = 0.000$).

Table 5. Correlation analysis showing the relationship between menopause and physical activity

MENQOL					
GPAQ		Vasomotor domain	Psychosocial domain	Physical domain	Sexual domain
Vigorous Work Activity	r (p)	-.218* (0.01)	-.191* (0.025)	-.176* (0.039)	-.183* (0.032)
Recreational Vigorous Activity	r (p)	-.276** (0.001)	-.241** (0.004)	-.244** (0.004)	-.182* (0.032)
Total Physical Activity	r (p)	-.284** (0.001)	-.398** (0)	-.288** (0.001)	-.311** (0)

MENQOL = Menopause-Specific Quality of Life Questionnaire; GPAQ = Global Physical Activity Questionnaire. * $p < 0.05$, ** = $p < 0.01$

Relationship between menopause, physical activities, sociodemographic factors, and quality of life

Table 6 presents the results of a correlation analysis that aimed to investigate the relationships between menopause, physical activity, sociodemographic factors, and quality of life. The analysis was based on a sample of 138 participants. Several significant correlations were observed. Total Physical Activity (Total PA) was significantly associated with various quality of life domains. Specifically, Physical Health showed a correlation with Total PA ($R = 0.227$, $p = 0.007$). Well-being was also significantly correlated with Total PA ($R = 0.260$, $p = 0.002$), along with General Health ($R = 0.292$, $p = 0.001$).

Negative correlations were found between Total PA and certain menopause-related domains, including Vasomotor domain ($R = -0.284$, $p = 0.001$) and Psychosocial domain ($R = -0.398$, $p = 0.000$). Additionally, Physical domain

Table 6. Correlation analysis showing the essential relationship between menopause, physical activity, and quality of life

		MENQOL + SF-36 + Sociodemographic									
GPAQ		Physical Health	Well-Being	General Health	Vaso-motor Domain	Psycho-social domain	Physical Domain	Sexual Domain	Edu-cation	Age	Years since meno-pause
Total PA	r (p)	0.227 (0.007)	0.260 (0.002)	0.292 (0.001)	-0.284 (0.001)	-0.398 (0.000)	-0.288 (0.001)	-0.311 (0.000)	-0.238 (0.005)	0.34 (0.000)	-0.197 (0.020)

MENQOL = Menopause-Specific Quality of Life Questionnaire; SF-36 = 36-Item Short Form Health Survey; GPAQ = Global Physical Activity Questionnaire. *p < 0.05

($R = -0.288$, $p = 0.001$) and Sexual domain ($R = -0.311$, $p = 0.000$) were negatively correlated with Total PA.

Among sociodemographic factors, Age was positively correlated with Total PA ($R = 0.340$, $p = 0.000$), while Years Since Menopause showed a negative correlation with Total PA ($R = -0.197$, $p = 0.020$). Education also showed a significant negative correlation with Total PA ($R = -0.238$, $p = 0.005$).

DISCUSSION

The findings of this study support the hypothesis that physical activity (PA) has a positive influence on the quality of life (QOL) in menopausal women. Consistent with previous research, our results demonstrate that women who engage in regular physical activity report better outcomes across various domains of menopausal symptoms, including vasomotor, psychosocial, physical, and sexual aspects.

One of the most significant findings of this study is the negative correlation between total physical activity and menopausal symptoms across all MENQOL domains, indicating that higher levels of physical activity are associated with fewer menopausal symptoms. Specifically, total physical activity was strongly negatively correlated with the Psychosocial domain ($r = -0.398$, $p < 0.001$), suggesting that regular physical exercise may play a vital role in mitigating psychological symptoms such as mood swings, anxiety, and depression, which are common during menopause. These findings are consistent with Sternfeld and Dugan's conclusions, which emphasize the role of exercise in improving both psychological and physical well-being during the menopausal transition. Furthermore, reviews underscore the significant psychosocial burden of vasomotor symptoms, reinforcing the importance of physical activity in holistic menopausal care (Sternfeld & Dugan, 2011; Utian, 2005).

The positive correlations between physical activity and general health outcomes, as measured by the SF-36, further reinforce the argument for incorporating physical activity into menopausal healthcare. Total physical activity was positively correlated with overall well-being ($r = 0.260$, $p = 0.002$), general health ($r = 0.292$, $p = 0.001$), and physical health ($r = 0.227$, $p = 0.007$), suggesting that active lifestyles contribute to improved health perceptions and fewer limitations in daily activities.

Interestingly, the study also found a significant relationship between recreational vigorous physical activity and social functioning, as well as energy levels, highlighting the importance of including structured recreational

activities in post-menopausal care programmes. These findings are in line with previous studies, such as those by Liu, Chen, Mielke, McCarthy, & Bailey, (2022) which confirm the effectiveness of structured exercise in improving social engagement and reducing fatigue among menopausal women.

In contrast, sedentary behaviour, particularly prolonged sitting, has been shown to negatively impact emotional well-being and energy levels, exacerbating menopausal symptoms. Studies have associated sedentary lifestyles with increased risks of depression, fatigue, and poor sleep quality among menopausal women (Hallal et al., 2012; Segar, Eccles, & Richardson, 2008). These findings emphasize the need for targeted interventions to reduce sedentary time and promote active lifestyles. One promising approach is structured interventions such as yoga, which has demonstrated specific benefits for menopausal women. A randomized controlled trial revealed that yoga not only improves menopausal symptoms but also enhances sleep quality across various menopause statuses, reinforcing its value as an effective non-pharmacological option for managing these symptoms (Fara, Pujiastuti, & Hadisaputro, 2019).

It is also worth noting the sociodemographic factors associated with physical activity levels in this study. For instance, education was negatively correlated with total physical activity, indicating that more educated women may be less physically active. This may be due to the nature of their employment or lifestyle factors, suggesting that future interventions should consider tailored approaches to encourage physical activity across different educational backgrounds. Furthermore, age showed a positive correlation with total physical activity ($r = 0.340$, $p < 0.001$), suggesting that older women in our sample are more likely to engage in physical activity, potentially due to greater awareness of its benefits. This is highlighted in a study by Matthews et al. (2009) who noted the positive impact of socio-economic factors on menopausal health.

The low reported use of hormone replacement therapy (HRT) and contraceptives in our sample highlights a growing trend towards non-pharmacological interventions to manage menopause-related symptoms. This cautious approach is reflective of findings from the Women's Health Initiative (Rossouw et al., 2002), which raised concerns about the long-term risks associated with HRT. In light of these concerns, promoting physical activity as a safe and effective alternative is particularly important.

The diverse background of participants in this study, predominantly from Nigeria and Hungary, adds valuable insight into how sociocultural and geographic factors influence the impact of physical activity on menopause-related symptoms. Research indicates that cultural norms, access to healthcare, lifestyle habits, and climate can significantly shape how menopausal symptoms

are experienced and managed across populations. For instance, women in warmer climates like Nigeria may face heightened vasomotor symptoms, such as hot flashes, due to environmental heat stress. In contrast, Hungarian women, benefiting from greater access to healthcare resources, often have opportunities for more structured interventions, including physical activity counselling. Broader cross-cultural analyses, such as the DAMES study, further underscore the role of cultural and socioeconomic factors in shaping menopausal experiences, highlighting universal challenges in symptom management across different regions (Avis & Crawford, 2008; Greendale, Lee, & Arriola, 1999; Jones, Jurgenson, Katzenellenbogen, & Thompson, 2012; Nelson, 2008; Obermeyer, Reher, & Saliba, 2007).

This cultural diversity underscores the importance of personalized care approaches that account for regional differences in menopausal symptomatology and access to resources. Additionally, it reinforces the need for cross-cultural validation of tools like the MENQOL and GPAQ, which were used in this study. The fact that these tools have been validated in both Hungarian and Nigerian contexts strengthens (Ács et al., 2020; Lewis et al., 2005) the reliability of the findings but also highlights the importance of ensuring that interventions are culturally appropriate.

Including women from various countries highlights the universal benefits of physical activity for menopausal women while stressing the need to consider cultural and socioeconomic contexts in healthcare recommendations. For example, promoting exercise may require different strategies in places with limited access to gyms or safe outdoor spaces. Future research should explore these cultural differences to better support diverse populations of menopausal women.

CONCLUSIONS

In conclusion, this study underscores the critical role of physical activity in enhancing the quality of life among menopausal women. It emphasizes the need to integrate structured exercise programmes into healthcare strategies for this population, particularly those that focus on reducing sedentary behaviour and encouraging regular recreational activity.

Future research should continue to examine these associations through longitudinal designs capable of capturing the long-term impacts of physical activity on menopausal health outcomes. Moreover, expanding the participant base to include larger and more balanced samples from both Nigeria and Hungary

would enable meaningful cross-cultural comparisons. Such comparative investigations could elucidate how sociocultural norms, healthcare accessibility, and environmental conditions shape the relationship between physical activity and menopausal well-being. Insights from these multi-country approaches may ultimately guide the development of culturally responsive and context-specific health promotion strategies for women experiencing menopause worldwide.

ACKNOWLEDGEMENTS

I would like to extend my sincere gratitude to all the women who participated in this study by completing the questionnaire. I also wish to acknowledge the University of Pécs for their invaluable support throughout my academic journey.

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REPORTS AND REVIEWS
POROČILA IN OCENE



REPORT ON THE 21ST CONFERENCE OF THE EUROPEAN ASSOCIATION FOR SOCIOLOGY OF SPORT “SPORT AND THE WORLD IN CRISIS: CHALLENGES AND SOLUTIONS”

Warsaw, Poland, 25–27 June 2025

This was the second time the European Association of Sociology of sport (EASS) conference was held in Poland, following the 2004 conference in Rzeszów. Its return after more than twenty years was particularly meaningful, given the country’s importance to the organization’s founding. The main conference theme, “*Sport and the World in Crisis: Challenges and Solutions,*” highlights how sport intersects with global politics, ethics, and issues of (in) equality. EASS conferences offer a key platform for sport sociologists to present and debate research on the social roles and significance of sport, physical activity, and exercise in society.

This year’s keynote speakers addressed a rich and diverse set of themes, each shedding light on the complex challenges and lived realities confronting sports in the contemporary moment. Topics ranged from the datafication and automation of sport, and the implications of artificial intelligence (Prof. Brad



Millington), to examinations of sports clubs as vital spaces for community organization, political mobilization, and belonging (Prof. Dorota Woroniecka-Krzyzanowska). Looking ahead, reflections on the future of sport amid digital transformation, climate change, geopolitical instability, and demographic change (Prof. Holger Preuss) underscored the extent to which sport is deeply entangled with the most pressing social, political, and economic issues of our time.

Parallel Sessions and Poster Presentations: The wide range (over 150) of oral and poster presentations was very rich. At this conference, Ana Cikač, MSc, and I presented the paper “*Perfectionism and Injuries in Women’s Team Sports: Preliminary Findings*,” reporting selected results from the project “*Machine Learning to Reduce Injury Gaps in Women’s Team Sports*,” co-funded by the Slovenian Research and Innovation Agency. With multiple parallel sessions, choosing was challenging, but the talks offered fresh perspectives rather than ready-made answers.

The 2025 Young Researcher Award was awarded to Marit Hiemstra (PhD Candidate) for “*Knowing More Than Rationally in Guided Running*,” which examines how safety and enjoyment are experienced in partnerships between runners with sight loss and their guides, and how standardized training can limit embodied trust and relational ways of knowing.

Social Programme: A city walking tour offered our first introduction to Warsaw, with the guide’s vivid account of its layered history leaving a lasting impression. Chopin’s music, embedded in the city through sound benches, added a unique sensory dimension. The conference dinner, with its beautiful view over the square, was equally enjoyable, and we are already looking forward to the next, 22nd conference in Jyväskylä, Finland, from 15–18 June 2026.

Saša Pišot

POROČILO Z 21. KONFERENCE EVROPSKEGA ZDRUŽENJA ZA SOCIOLOGIJO ŠPORTA *ŠPORT IN SVET V KRIZI: IZZIVI IN REŠITVE*

Varšava, Poljska, 25.–27. junij 2025

To je bila druga konferenca Evropskega združenja za sociologijo športa (EASS), ki je potekala na Poljskem, po prvotni konferenci leta 2004 v Rzeszówu. Vrnitev tja po več kot dvajsetih letih je bila še posebej pomembna, saj ima Poljska ključno vlogo pri ustanovitvi združenja EASS. Glavna tema konference *Šport in svet v krizi: izzivi in rešitve* poudarja, da je šport povezan z globalno politiko, etiko in vprašanji (ne)enakosti. Konference EASS so zato pomembna platforma za športne sociologe, ki lahko tam predstavijo teme, ki osvetljujejo družbeno vlogo in pomen športa, gibalne dejavnosti in vadbe, in razpravljajo o njih.

Letošnji glavni vabljeni predavatelji so predstavili bogat in raznolik nabor tem, vsaka pa je osvetlila kompleksne izzive in realnosti, s katerimi se danes sooča šport. Teme so segale od podatkovne obdelave in avtomatizacije športa ter vplivov umetne inteligence (prof. Brad Millington) do raziskovanja športnih



klubov kot ključnih prostorov za organizacijo skupnosti, politično mobilizacijo in občutek pripadnosti (prof. Dorota Woroniecka-Krzyzanowska). Pogledi v prihodnost športa ob upoštevanju digitalne preobrazbe, podnebnih sprememb, geopolitične nestabilnosti in demografskih sprememb, ki jih je predstavil prof. Holger Preussa, pa so poudarili, kako tesno je šport povezan z najnujnejšimi družbenimi, političnimi in gospodarskimi vprašanji našega časa.

Nabor več kot 150 prispevkov in predstavitev posterjev je bil zelo širok in raznolik. Na tej konferenci sva z mag. Ano Cikač predstavili prispevek *Perfectionism and Injuries in Women's Team Sports: Preliminary Findings*, ki prinaša del rezultatov projekta *Machine Learning to Reduce Injury Gaps in Women's Team Sports*, sofinanciranega s strani Agencije za raziskave in inovacije RS. Zaradi številnih sočasnih predstavitev je bilo te sicer težko izbrati, vendar so ponujale nove perspektive in vpoglede ter ne samo vnaprej pripravljenih odgovorov.

Nagrada mladega_ e raziskovalca_ ke 2025 je prejela Marit Hiemstra za prispevek *Knowing More Than Rationally in Guided Running*, ki raziskuje, kako se varnost in užitek doživljata v partnerskih odnosih med tekači z okvaro vida in njihovimi vodniki ter kako standardizirano usposabljanje lahko omejuje utelešeno zaupanje in relacijske načine dojemanja.

Družabni program: Sprehod po mestu je ponudil naš prvi stik z Varšavo, pri čemer je vodnikova živahna predstavitev njene dramatične zgodovine pustila močen vtis. Chopinova glasba, vgrajena v mesto prek zvočnih klopi, je dodala posebno senzorično dimenzijo. Konferenčna večerja s čudovitim razgledom na trg je bila prav tako zelo prijetna. Zelo se že veselimo naslednje 22. konference v kraju Jyväskylä na Finskem, ki bo potekala od 15. do 18. junija 2026.

Saša Pišot



WORLD CONGRESS OF SOCIOLOGY OF SPORT “60 YEARS OF THE SOCIOLOGY OF SPORT: PAST, PRESENT, AND FUTURE TRAJECTORIES”

Republic of Korea (South Korea), 8–11 July 2025

This year’s International Sociology of Sport Association (ISSA) congress was situated in Seoul, the capital of South Korea, a dynamic city known for its blend of rich history and modern urban development. As a major cultural and economic hub, Seoul provided an engaging setting for the event. The congress was held at Seoul National University.

The academic programme began with a graduate student workshop, which discussed pathways to an academic career and outlined guidelines for academic publishing. This was followed by a keynote address, “The Sociology of Sport: From Positivist to Post-truth Science” by Professor Dominic Malcolm, which highlighted the future direction of the sociology of sport in light of twenty-first century politics of knowledge and called for the development of a ‘theory of sport’ to achieve greater academic and social influence. The programme included three panel sessions, featuring a diverse range of topics and opportunities for discussion, covering themes related to the sociology of sport, such as climate action and sustainability, empowerment and gender dynamics, and equality, with a focus on de-centring Western hegemony.



The congress sessions featured over 250 oral presentations covering a wide range of topics within the sociology of sport. Key themes included the social, cultural, political, organizational, and educational dimensions of sport, as well as issues related to gender, power relations, globalization, media, technology, violence, and inclusion. Together with poster presentations, these diverse perspectives fostered rich and engaging discussions during the sessions and in informal exchanges during social breaks.

The rich programme concluded with the ISSA 60th Anniversary Event, featuring inspiring words from Professor Parisa Safai, President of ISSA, and an engaging cultural programme prepared by the host partner organization, the Korean Society for the Sociology of Sport (KSSS).

While the mornings were filled with presentations and talks, the afternoons offered a series of organized social activities. These provided participants with the opportunity to explore Seoul, enjoy its vibrant culinary scene, visit technology-focused shopping districts, and discover its diverse museums. We are now looking forward to the next ISSA Congress, which will be hosted jointly by ISSA and the European Association for Sociology of Sport in 2026. The event will take place in Jyväskylä, Finland, and promises an engaging programme under the theme: Responsibilities and Responses of Sport in Contemporary Society.

Ana Cikač

SVETOVNI KONGRES SOCIOLOGIJE ŠPORTA »60 LET SOCIOLOGIJE ŠPORTA: PRETEKLOST, SEDANJOST IN PRIHODNJI TRENDI«

Seul, Južna Koreja, 8.–11. julij 2025

Tokrat je bil kongres Mednarodnega združenja za sociologijo športa (*International Sociology of Sport Association – ISSA*) organiziran v Seulu, dinamičnem glavnem mestu Republike Južne Koreje, znanem po združevanju bogate zgodovine in sodobnega urbanega razvoja. Kot pomembno kulturno in gospodarsko središče se je Seul izkazal za privlačno lokacijo kongresa, ki je potekal v prostorih nacionalne univerze Seul v Južni Koreji.

Akademski program se je začel z delavnico za magistrske in doktorske študente, ki je obravnavala poti akademske kariere in dala napotke za objavo znanstvenih besedil. Sledil je osrednji govor profesorja Dominica Malcolma Sociologija športa: od pozitivizma do znanosti v dobi postresničnosti (*The Sociology of Sport: From Positivist to Post-truth Science*), v katerem je poudaril prihodnje usmeritve sociologije športa kot znanstvenoraziskovalne discipline v kontekstu politik znanja 21. stoletja ter pozval k razvoju »teorije športa« za večji akademski in družbeni vpliv. Program je vključeval tri diskusijske seje z raznolikimi temami, ki so obravnavale vprašanja s področja sociologije športa, kot so podnebne spremembe in trajnostni razvoj, opolnomočenje in dinamika spolov ter enakopravnost v športu, s posebnim poudarkom na zmanjševanju zahodne hegemonije.



Kongres je vključeval več kot 250 ustnih predstavitev, ki so zajemale širok spekter tem iz sociologije športa, med drugim družbene, kulturne, politične, organizacijske in pedagoške dimenzije športa, ter vprašanja spola, razmerij moči, globalizacije, medijev, tehnologije, nasilja in integracije. Skupaj s plakatnimi predstavitvami so ti različni vidiki spodbujali bogate in angažirane razprave med sejami in v neformalnih pogovorih med odmori.

Pester program se je končal s sklepnim dogodkom ob 60. obletnici delovanja združenja ISSA, ki je vključeval navdihujoče besede predsednice profesorice Parise Safai in zanimiv kulturni program, ki ga je pripravilo korejsko združenje za sociologijo športa (*Korean Society for the Sociology of Sport – KSSS*) kot gostujoča partnerska organizacija.

Dopoldanske predstavitve in predavanja so dopolnjevali popoldnevi z organiziranimi družabnimi dejavnostmi, ki so udeležencem omogočile raziskovanje Seula, uživanje v živahni kulinarčni ponudbi mesta, obisk tehnološko usmerjenih nakupovalnih središč in odkrivanje inovativnih muzejev.

Z velikim pričakovanjem se veselimo naslednjega kongresa ISSA, ki bo leta 2026 soorganiziran z Evropskim združenjem za sociologijo športa (*European Association for Sociology of Sport – EASS*). Dogodek bo potekal v mestu Jyväskylä na Finskem. Obeta se zanimiv program na temo Odgovornosti in odzivi športa v sodobni družbi (*Responsibilities and Responses of Sport in Contemporary Society*).

Ana Cikač

1ST INTERNATIONAL CONGRESS OF HUMAN IN MOTION (ICHM)

Piran, Slovenia, 28 September–1 October 2025

For more than 20 years, the Science and Research Centre Koper (ZRS Koper) has organized the biennial Child in Motion conference, establishing itself as a reference event for research on child development and healthy growth. This conference has created a strong scientific and organizational foundation, bringing together researchers, practitioners, and policymakers around the importance of movement in early life.

Building directly on this experience and expertise, ZRS Koper has expanded the original Child in Motion concept into a broader, lifespan-oriented initiative: the International Congress of Human in Motion (ICHM). While retaining its strong focus on movement science, ICHM extends the scope from childhood to all stages of life and integrates emerging topics in health, technology, and rehabilitation.

The 1st International Congress of Human in Motion (Piran, 2025) was co-organized with partners from the European Union (Germany, Portugal, Spain, Italy, Slovenia) and Asia (Azerbaijan, Taiwan). The congress featured more than 150 scientific and professional presentations and four professional workshops and was structured around four thematic sections: Physical Activity vs Physical Inactivity, Healthy Ageing, Child in Motion, and Mobile Brain Body Imaging and XR Technologies in Healthcare. The congress highlighted human movement as a cornerstone of prevention and rehabilitation throughout the lifespan.

Physical Activity vs Physical Inactivity

Regular and structured physical activity remains one of the most powerful determinants of physical and mental health. It supports metabolic, cardiovascular, and cognitive functions and contributes to overall well-being and longevity. The findings presented emphasize that even moderate daily movement can substantially reduce the risk of chronic diseases and improve quality of life at all ages. Despite these well-established benefits, objective data indicate that most individuals do not meet the recommended levels of physical activity, underscoring the need for stronger public health efforts and education.

In contrast, physical inactivity, especially when caused by illness, injury, or prolonged immobilization, emerges as a critical health concern. For many individuals, particularly older adults, inactivity during recovery can lead to

rapid muscle loss, functional decline, and increased dependence, sometimes with effects more harmful than the initial condition itself. The congress findings highlight that preventing disuse through early mobilization, nutritional support, and adapted exercise programmes is essential for maintaining autonomy and preserving health. Addressing inactivity must therefore become a central part of prevention, rehabilitation, and healthy ageing strategies.

Healthy Ageing

Advances in gerontology and exercise science confirm that ageing is modifiable through lifestyle. While genetic factors play a role, the combined effects of regular physical activity, balanced nutrition, and psychosocial engagement are decisive in maintaining functional independence. Key challenges include the management of polypharmacy, sarcopenia, and frailty, which require multimodal and interdisciplinary approaches. The congress emphasized the need for preventive action early in adulthood, nutrition literacy, and integrated care pathways that bridge research and practice.

Child in Motion

Childhood and adolescence represent critical stages for developing movement literacy and establishing lifelong habits of physical activity. The congress findings suggest that children's motivation and teachers' engagement play an equally significant role in supporting motor development as socioeconomic and environmental factors. Effective models presented by teachers and educators show how well-designed and engaging approaches to movement can



successfully promote physical activity among children. These initiatives extend beyond the school environment, encouraging parents to be active together with their children. Such shared experiences strengthen family relationships, build positive attitudes toward movement, and help establish lifelong healthy habits. To ensure lasting engagement, educational systems should continue developing holistic and inclusive curricula that connect physical activity with creativity, emotional and social development, and overall learning outcomes.

Mobile Brain/Body Imaging and XR Technologies in Healthcare

Technological innovation is redefining the study of movement and cognition. Mobile neuroimaging (EEG, fNIRS) and extended reality (XR) platforms enable real-time assessment of brain–body interactions in naturalistic settings. These tools provide new insights into neuroplasticity, balance, and gait control, especially in ageing and neurological conditions such as Parkinson’s disease. Nevertheless, greater methodological standardization and integration into clinical rehabilitation are required. The convergence of neuroscience, physiotherapy, and digital health represents a promising frontier for personalized medicine.

Concluding Perspective

The congress highlighted a shared vision: health begins with movement, and movement must be addressed as a multidimensional construct encompassing physical, cognitive, emotional, and social domains. The findings collectively call for evidence-based, interdisciplinary, and technologically supported strategies that promote movement for all ages. Building an active society is not only a scientific challenge but a moral imperative for sustainable health and well-being.

Luka Šlosar

1. MEDNARODNI KONGRES ČLOVEK V GIBANJU (ICHM)

Piran, Slovenija, 28. september–1. oktober 2025

Znanstveno-raziskovalno središče Koper (ZRS Koper) v sodelovanju z uglednimi partnerji že več kot 20 let organizira priznano bienalno konferenco *Otrok v gibanju* (Child in Motion), posvečeno raziskovanju razvoja otrok in spodbujanju zdrave rasti. Konferenca je vzpostavila trdne znanstvene in organizacijske temelje ter povezala raziskovalce in strokovnjake, ki se ukvarjajo/poudarjajo/raziskujejo s pomenom gibanja v zgodnjem obdobju življenja in odločevalce na tem področju.

Na tej bogati dediščini in obsežnem raziskovalnem poznavanju se je ZRS Koper odločil razširiti obseg konference. Mednarodni kongres *Človek v gibanju* (ICHM) ob ohranjanju močnega poudarka na znanosti o gibanju razširja vsebinsko usmeritev z otroštva na vsa življenjska obdobja ter vključuje sodobne teme s področij zdravja, tehnologije in rehabilitacije.

Kongres so soorganizirali partnerji iz držav Evropske unije (Nemčija, Portugalska, Španija, Italija, Slovenija) in Azije (Azerbajdžan, Tajvan). Na njem je bilo predstavljenih več kot 150 znanstvenih in strokovnih prispevkov, organizirane pa so bile tudi štiri strokovne delavnice. Razdeljen je bil na štiri tematske sklope: *Gibalna aktivnost proti gibalni neaktivnosti*, *Zdravo staranje*, *Otrok v gibanju* ter *Mobilno slikanje možganov/telesa in XR tehnologije v zdravstvu*. Poudaril je pomen človeškega gibanja kot temeljnega stebra preventive in rehabilitacije v vseh življenjskih obdobjih.

Gibalna aktivnost proti gibalni neaktivnosti

Redna in strukturirana gibalna aktivnost je eden najpomembnejših dejavnikov za ohranjanje telesnega in duševnega zdravja. Ugodno vpliva na presnovo, delovanje srčno-žilnega sistema in kognitivne funkcije ter pomembno prispeva k dobremu počutju in dolgoživosti. Ugotovitve kažejo, da že zmerno vsakodnevno gibanje občutno zmanjša tveganje za razvoj kroničnih bolezni in izboljša kakovost življenja v vseh starostnih obdobjih. Kljub dobro znanim koristim pa objektivni podatki razkrivajo, da večina ljudi še vedno ne dosega priporočenih ravni gibalne aktivnosti, kar potrjuje nujnost okrepljenih javnozdravstvenih ukrepov, sistemske podpore in doslednega ozaveščanja prebivalstva o pomenu gibanja.

Nasprotno pa je gibalna neaktivnost, zlasti kadar je posledica bolezni, poškodb ali daljše nepokretnosti, eden ključnih izzivov sodobnega zdravstva. Pri

številnih posameznikov, zlasti starejših, lahko obdobja neaktivnosti med zdravljenjem ali okrevanjem povzročijo hitro izgubo mišične mase, zmanjšano funkcionalnost in večjo odvisnost od pomoči drugih, pogosto z dolgoročnimi posledicami, ki presegajo vpliv osnovne bolezni. Ugotovitve kongresa poudarjajo pomen zgodnje in varne ponovne aktivacije, ustrezne prehranske podpore ter prilagojenih vadbenih pristopov, ki omogočajo ohranjanje samostojnosti, telesne zmogljivosti in dostojanstva posameznika. Obvladovanje gibalne neaktivnosti mora zato postati sestavni del strategij preventive, rehabilitacije in zdravega staranja.

Zdravo staranje

Napredek na področju gerontologije in kineziologije potrjuje, da je z zdravim življenjskim slogom mogoče pomembno upočasniti in omiliti proces staranja. Čeprav imajo genetski dejavniki določeno vlogo, raziskave jasno kažejo, da redna gibalna aktivnost, uravnotežena prehrana ter družbena in duševna vključenost odločilno prispevajo k ohranjanju funkcionalne samostojnosti in kakovosti življenja v starosti. Med ključne izzive spadajo obvladovanje polifarmacije, sarkopenije in krhkosti, ki zahtevajo celostne, interdisciplinarne pristope. Ugotovitve kongresa poudarjajo pomen zgodnjega preventivnega delovanja že v srednjih letih, krepitve prehranske pismenosti ter vzpostavljanja povezanih poti oskrbe, ki učinkovito združujejo znanstvena spoznanja s klinično in skupnostno prakso.



Otrok v gibanju

Otroštvo in mladostništvo sta pomembni obdobji za razvoj gibalne pismenosti in oblikovanje trajnih gibalnih navad. Ugotovitve kongresa kažejo, da imata motivacija otrok in zavzetost učiteljev enakovredno vlogo pri spodbujanju gibalnega razvoja kot družbeno-gospodarski dejavniki in dejavniki okolja. Predstavljeni pristopi učiteljev in vzgojiteljev dokazujejo, da premišljeno načrtovane, raznolike in privlačne oblike gibanja učinkovito spodbujajo gibalno aktivnost otrok in hkrati vključujejo tudi starše, ki skupaj z otroki sodelujejo pri gibalnih dejavnostih. Taka sodelovalna praksa krepi družinske vezi, spodbuja pozitiven odnos do gibanja in prispeva k oblikovanju zdravih življenjskih navad. Za dolgoročno ohranjanje teh učinkov je ključno, da izobraževalni sistemi razvijajo celostne in vključujoče učne programe, ki povezujejo gibanje z ustvarjalnostjo, čustvenim in družbenim razvojem ter učenjem z izkušnjami.

Mobilno slikanje možganov/telesa in XR-tehnologije v zdravstvu

Tehnološke inovacije na novo opredeljujejo razumevanje gibanja in kognicije. Mobilne nevroslikovne metode (EEG, fNIRS) in razširjena resničnost (XR) omogočajo spremljanje možgansko-telesnih odzivov v naravnih pogojih, kar odpira nove možnosti za raziskovanje gibanja in kognitivnega nadzora. Ugotovitve kažejo velik potencial teh pristopov pri proučevanju staranja in nevroloških bolezni, kot je Parkinsonova bolezen. Kljub napredku ostaja potreba po metodološki uskladitvi in večjem vključevanju teh tehnologij v klinično prakso. Povezovanje nevroznanosti, fizioterapije in digitalnega zdravja je obetavna smer razvoja sodobne, personalizirane rehabilitacije in medicine prihodnosti.

Sklepna misel

Kongres je poudaril skupno sporočilo: zdravje se začne z gibanjem, gibanje pa je treba razumeti kot večdimenzionalen proces, ki vključuje telesne, kognitivne, čustvene in družbene razsežnosti. Ugotovitve enotno poudarjajo potrebo po uvedbi pristopov, ki temeljijo na dokazih ter so interdisciplinarno in tehnološko podprti, hkrati pa spodbujajo gibanje in zdrav življenjski slog v vseh starostnih obdobjih. Spodbujanje aktivne družbe tako ni le strokovni ali raziskovalni izziv, temveč tudi širša družbena odgovornost, usmerjena v trajnostno zdravje ter blagor posameznika in skupnosti.

Luka Šlosar

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1. Aim and scope of the journal:

Annales Kinesiologiae is an international interdisciplinary journal covering kinesiology and its related areas. It combines fields and topics directed towards the study and research of human movement, physical activity, exercise and sport in the context of human life style and influences of specific environments. The journal publishes original scientific articles, review articles, technical notes and reports.

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Examples of reference list:

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Latash, M. L. (2008). Neurophysiologic basis of movement. Campaign (USA): Human Kinetic.

Journal articles

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ISSN 2232-2620



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