

# Book of Summaries



**15 MEĐUNARODNA  
KONFERENCIJA  
"SPORTSKE NAUKE I  
ZDRAVLJE"**  
*15<sup>th</sup> INTERNATIONAL  
CONFERENCE ON "SPORTS  
SCIENCE AND HEALTH"*

suorganizatori:



KAZAKH NATIONAL PEDAGOGICAL  
UNIVERSITY ABAI



FAKULTET ZA SPORT I TURIZAM

„Idem tamo gde je lepota... i gde je tesko.“  
Clark Little

**JA SAM DRUGACJI**

**Nikon**



15 MEĐUNARODNA  
KONFERENCIJA "SPORTSKE  
NAUKE I ZDRAVLJE"  
15<sup>th</sup> INTERNATIONAL  
CONFERENCE ON "SPORTS  
SCIENCE AND HEALTH"

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- MINISTARSTVO NAUKE I TEHNOLOGIJE RS
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## THE IMPACT OF SPORTS AND RECREATIONAL TOURISM OFFERINGS ON THE SUSTAINABLE DEVELOPMENT OF URBAN TOURIST DESTINATIONS

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### ABSTRACT

In modern society, stress significantly affects people's physical and mental well-being, especially in urban tourist destinations where factors like pollution, overcrowding, and social inequality impact health. Engaging in sports and recreational activities can counteract these negative effects, improving various aspects of health, such as physical fitness, mental well-being, cognitive function, and social interaction (Angelucci, F., 2024). Tourism, particularly sports and recreational tourism, is increasingly recognized as a key avenue for meeting the need for health, with studies highlighting its positive effects on both individual well-being and local economies. Sports tourism not only promotes physical health but also fosters social cohesion, environmental awareness, and economic development. Novi Sad, a city with rich natural and cultural resources, is a prime candidate for developing sports and recreational tourism offerings. However, research reveals insufficient sports infrastructure, such as recreational areas, walking and cycling paths, and sports facilities, limiting the city's potential. Existing resources, such as SPENS, Kopački rit, and the Danube cycling paths, offer opportunities to develop sports tourism, yet they remain underutilized. Events like the Novi Sad Marathon help promote the city's sports tourism potential, but further investment in sports infrastructure and promotion is needed. By developing such infrastructure and expanding accommodation services, Novi Sad can enhance its appeal as a sustainable tourist destination, contributing to its economic growth and the overall development of the tourism sector.

**Keywords:** sustainability, tourist offer, recreation, motives, Novi Sad

## REFERENTNI OKVIR KOMPETENCIJA ZA DEMOKRATSKU KULTURU U VRTIĆU

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### SAŽETAK

Cilj rada je prikaz primene modela Referentnog okvira kompetencija za demokratsku kulturu u igrama dece predškolskog uzrasta koja pohađaju vrtić. Na osnovu rezultata sistematskog posmatranja koje je realizovano u decembru 2024. godine u Predškolskoj ustanovi „Radosno detinjstvo“ u Novom Sadu, bilo je moguće ostvariti uvid u primenu Referentnog okvira u igri dece među sobom i sa roditeljima, te uviđanje postojanja visokog nivoa demokratske kulture i interkulturalnog dijaloga. U postupanju dece je primećeno prisustvo sve četiri oblasti iz Referentnog okvira i pojedinačnih skupova uverenja, stavova, veština, znanja i kritičkog razumevanja. Deca su prikazala da su u stanju da zadovolje i svoje relacije potrebe i kreiraju kvalitetne odnose sa drugima, čime su komunikaciju sa odraslima postavila na nivou ravnopravnog dostojanstva.

**Ključne reči:** Referentni okvir kompetencija za demokratsku kulturu, dete predškolskog uzrasta, relacije kompetencije, igra, vrtić.

## REFERENCE FRAMEWORK OF COMPETENCES FOR DEMOCRATIC CULTURE IN KINDERGARTEN

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### ABSTRACT

The goal of the paper is to present the application of the model of the Reference Framework of Competences for Democratic Culture in the games of preschool children who attend kindergarten. Based on the results of the systematic observation that was carried out in December 2024 at the "Radosno detinjstvo" Preschool in Novi Sad, it was possible to gain insight into the application of the Reference Framework in the play of children among themselves and with their parents, and the existence of a high level of democratic culture and intercultural dialogue. The presence of all four areas from the Reference Framework and individual sets of beliefs, attitudes, skills, knowledge and critical understanding was observed in the children's behavior. The children showed that they are able to satisfy their relational needs and create quality relationships with others, thus placing communication with adults on the level of equal dignity.

**Keywords:** Reference framework of competences for democratic culture, preschool child, relational competences, play, kindergarten.

## EFEKTI VIŠEDNEVNIH PRIPREMA KOŠARKAŠKOG TIMA IZ ASPEKTA SOCIJALNIH ODNOSA UČESNIKA

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### **SAŽETAK**

Ovo istraživanje realizovano je sa ciljem da utvrdi da li i u kojoj meri zajednički boravak na pripremama utiče na snagu socijalnih odnosa unutar košarkaške ekipe. Na uzorku od 15 ispitanika, članova seniorskog košarkaškog tima, koji se takmiče u najnižem rangu takmičenja, sprovedeno je longitudinalno istraživanje, u kome je kao osnovni alat za prikupljanje podataka korišćen anketni list (sociometrijski upitnik). Snaga socijalnih odnosa praćena je kroz izbor najomiljenijeg igrača (izvor socijalne moći), najneomiljenijeg (socijalni izolot), te uvidom u eventualno formiranje tabora u ekipi. Upoređivanjem rezultata dobijenih primenom sociometrijskog upitnika pre i posle višednevnih priprema (T-test uparenih merenja), zaključuje se da je zajednički provedeno vreme pozitivno uticalo na socijalne odnose unutar ekipe.

## EFFECTS OF MULTI-DAY PREPARATION OF THE BASKETBALL TEAM FROM THE ASPECT OF THE SOCIAL RELATIONS OF THE PARTICIPANTS

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### **ABSTRACT**

This research was carried out with the aim of determining whether and to what extent staying together during preparations affects the strength of social relations within the basketball team. A longitudinal study was conducted on a sample of 15 respondents, members of the senior basketball team, which competes in the lowest level of the competition, in which a questionnaire (sociometric questionnaire) was used as the basic tool for data collection. The strength of social relations was monitored through the selection of the most popular player (source of social power), the least popular (social isolate), and insight into the possible formation of camps in the team. By comparing the results obtained using a sociometric questionnaire before and after several days of preparation (Paired Samples T-test), it is concluded that the time spent together had a positive effect on social relations within the team.

## RAZLIKE U ZASTUPLJENOSTI POSTURALNIH POREMEĆAJA KIČMENOG STUBA KOD UČENIKA NIŽIH RAZREDA OSNOVNE ŠKOLE

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### SAŽETAK

Istraživanje je provedeno na uzorku od 146 ispitanika-učenika nižih razreda osnovne škole, hronološke dobi 7 – 11 godina urbanog područja grada Banja Luka. Ukupan uzorak ispitanika podijeljen je na pet subuzoraka u odnosu na hronološku dob.

Osnovni cilj istraživanja bio je da se transversalnim presjekom utvrdi frekvencija i struktura posturalnih poremećaja kičmenog stuba kod ispitivanog uzorka ispitanika kao i razlike u zastupljenosti posturalnih poremećaja s obzirom na hronološku dob ispitanika. Za procjenu zastupljenosti i razlika posturalnih poremećaja kičmenog stuba analizirani su poremećaji u sagitalnoj ravni (kifoza i lordoza), te poremećaj u frontalnoj ravni (skolioza).

Stepen posturalnih poremećaja kičmenog stuba utvrđen je Kontigencijskim tablicama – izračunom frekvencija (F) i postotka (%).

Statistička značajnost razlika zastupljenosti posturalnih poremećaja kičmenog stuba u sagitalnoj (kifoza i lordoza) i frontalnoj ravni (skolioza) kod učenika nižih razreda osnovne škole utvrđena je primjenom Univarijantne analize varijanse (ANOVA), a razlike u odnosu na njihovu hronološku dob za svaku vrstu poremećaja ponaosob utvrđena je primjenom analize rezultata Post Hock testa upoređivanja. Stepen posturalnih poremećaja kičmenog stuba utvrđivan Kontigencijskim tablicama – izračunavanjem frekvencije (F) i postotka (%) ukazuje na značajan postotak zastupljenosti poremećaja kičmenog stuba (kifoza 21,2%, skolioza 19,9%, lordoza 19,2%) i to uglavnom u prvom stepenu deformacija (manje odstupanje od normalnog statusa), što omogućava korekciju stanja uz primjenu adekvatnih korektivnih vježbi u radu sa učenicima ovog uzrasta.

Rezultati univarijantne analize Varijanse (ANOVA) pokazuju da je zastupljenost kifoze statistički značajna na nivou statističke značajnosti  $p < .007$  i skolioze  $p < .001$  kod ispitivanog uzorka učenika. Statistička značajnost zastupljenosti lordoze kod ispitivanog uzorka učenika nije utvrđena ( $p = .255$ ). Rezultati LSD Post Hock testa upoređivanja pokazuju da postoji statistički značajna razlika zastupljenosti kifoze i skolioze između grupa učenika s obzirom na njihovu hronološku dob.

**Ključne riječi:** kičmeni stub, posturalni poremećaji, razlike, učenici, Post Hock test

## DIFFERENCES IN THE REPRESENTATION OF POSTURAL DISORDERS OF THE SPINAL COLUMN IN PRIMARY SCHOOL STUDENTS

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### SUMMARY

The research was carried out on a sample of 146 respondents-students of lower grades of elementary school, chronological age 7-11 years, from the urban area of the city of Banja Luka. The total sample of respondents was divided into five subsamples in relation to chronological age.

The main goal of the research was to determine the frequency and structure of postural disorders of the spinal column in the examined sample of subjects, as well as the differences in the prevalence of postural disorders with regard to the chronological age of the subjects. To assess the prevalence and differences of postural disorders of the spinal column, disorders in the sagittal plane (kyphosis and lordosis) and disorders in the frontal plane (scoliosis) were analyzed.

The degree of postural disorders of the spinal column was determined by Contingency Tables - by calculating frequencies (F) and percentage (%).

The statistical significance of the differences in the prevalence of postural disorders of the spinal column in the sagittal (kyphosis and lordosis) and frontal plane (scoliosis) among students of the lower grades of elementary school was determined using Univariate Analysis of Variance (ANOVA), and the differences in relation to their chronological age for each type of disorder separately it was determined by applying the analysis of the results of the Post Hock comparison test.

The degree of postural disorders of the spinal column, determined by contingency tables - by calculating the frequency (F) and percentage (%) indicates a significant percentage of spinal disorders (kyphosis 21.2%, scoliosis 19.9%, lordosis 19.2%), mostly in the first the degree of deformation (minor deviation from the normal status), which enables the correction of the condition with the application of adequate corrective exercises in working with students of this age.

The results of the univariate analysis of variance (ANOVA) show that the prevalence of kyphosis is statistically significant at the level of statistical significance  $p < .007$  and scoliosis  $p < .001$  in the studied sample of students. The statistical significance of the presence of lordosis in the studied sample of students was not established ( $p = .255$ ).

The results of the LSD Post Hock comparison test show that there is a statistically significant difference in the prevalence of kyphosis and scoliosis between groups of students with regard to their chronological age.

**Key words:** spinal column, postural disorders, differences, students, LSD Post Hock test

## PRECIZNOST KOŠARKAŠA OSTVARENA TOKOM ŠUTIRANJA BEZ I SA DEJSTVOM BUKE

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### APSTRAKT

Buka, kao deo svakodnevnice stanovništva urbanih sredina, osim štetnog dejstva na zdravstveni status, reflektuje se i na sport, kao i takmičarska postignuća učesnika. Dejstvo ovog faktora ne zaobilazi ni košarku i predstavlja predmet velikog broja studija. Cilj ovog istraživanja je da se utvrdi kako remeteći faktor utiče na situacionu preciznost košarkaša. Istraživanje je sprovedeno na seniorskom timu KK „Student“ iz Bajine Bašte, koji su šutirali sa pet karakterističnih pozicija, kako za dva tako i za tri poena, u dve situacije: bez i sa prisustvom buke. Rezultati ovog testiranja, dobijeni primenom Vilkoksonovog testa, uprkos blagom padu procenata u šutu za dva i tri poena, nisu bili signifikantno značajni ( $p < 0,05$ ). Ova studija ukazuje na potrebu za daljim istraživanjima koja bi uključila realne takmičarske uslove, gde bi buka delovala u sinergiji sa ostalim remetilačkim faktorima, kao što su vremensko ograničenje i prisustvo protivničkih igrača u takmičarskim uslovima. Preporučuje se dizajniranje trenažnih situacija u kojima bi remeteći faktor buke bio integralni deo šuterskog treninga.

**Ključne reči:** košarka, situaciona preciznost, buka.

## ACCURACY OF BASKETBALL PLAYERS ACHIEVED DURING SHOOTING WITHOUT AND WITH THE EFFECT OF NOISE

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### ABSTRACT

Noise, as a part of the daily life of the population of urban areas, apart from its harmful effect on the health status, also affects sports, as well as the competitive achievements of the participants. The effect of this factor does not bypass basketball and is the subject of a large number of studies. The goal of this research is to determine how the disturbing factor affects the situational accuracy of basketball players. The research was conducted on the senior team of BC "Student" from Bajina Bašta, who shot from five characteristic positions, both for two and three points, in two situations: without and with the presence of noise. The results of this test, obtained by applying the Wilcoxon coefficient, despite a slight drop in percentages in two- and three-point shooting, were not significantly significant ( $p < 0.05$ ). This study points to the need for further research that would include realistic competitive conditions, where noise would act in synergy with other disruptive factors, such as time limits and the presence of opposing players in competitive conditions. It is recommended to design training situations in which the disruptive factor of noise would be an integral part of shooting training.

**Keywords:** basketball, situational accuracy, noise.

## AEROBNO FIZIČKO VEŽBANJE I VREDNOSTI BMI KOD UČENIKA SA VIŠKOM KILOGRAMA

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## AEROBIC PHYSICAL EXERCISE AND BMI VALUES IN STUDENTS WITH AN EXTRA KILOGRAM

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### SAŽETAK

Savremeni način života i nedovoljno fizičke aktivnosti sve češće postaju problem mlađeg naraštaja. Postavlja se pitanje na koji način vaspitno-obrazovni sistem može uticati na rešavanje navedenog problema. Jedan od načina jeste da se u okviru redovne nastave uvedu dodatni časovi fizičkog vežbanja ili da se unapredi program organizovanog fizičkog vežbanja sa učenicima. Ova studija je izvršila analizu tri individualne studije koje su se bavile uticajem organizovanog aerobnog fizičkog vežbanja na vrednosti BMI i procenta masnog tkiva učenika adolescentne dobi. U ovoj meta-analizi standardizovane srednje razlike i relativni rizik sa 95% intervala poverenja prikupljene su iz slučajnih efekata. Objedinjena vrednost standardizovane razlike aritmetičkih sredina izračunata je iz modela slučajnih efekata i iznosi 0,32 (95% CI; -2,74; 3,38). Objedinjena vrednost RR iz modela slučajnih efekata iznosi 0,34 (-1,15; 1,83). RR nije statistički značajno različit od jedinice ( $p=0,6527$ ). Nije uočena statistički značajna razlika između učenika koji su pored redovne nastave imali organizovano aerobno fizičko vežbanje radi regulisanja viška kilograma. U ovom radu nije moguće generalizovati zaključak zbog malog broja ispitanika.

### ABSTRACT

The modern way of life and insufficient physical activity are increasingly becoming a problem for the younger generation. The question arises as to how the educational system can influence the solution of the mentioned problem. One of the ways is to introduce additional physical exercise classes within regular classes or to improve the program of organized physical exercise with students. This study performed an analysis of three individual studies that dealt with the impact of organized aerobic physical exercise on BMI values and the percentage of fat tissue of adolescent students. In this meta-analysis, standardized mean differences and relative risk with 95% confidence intervals were collected from random effects. The pooled value of the standardized difference of the arithmetic means was calculated from the random effects model and is 0.32 (95% CI; -2.74, 3.38). The combined RR value from the random effects model is 0.34 (-1.15, 1.83). RR is not statistically significantly different from unity ( $p=0.6527$ ). No statistically significant difference was observed between students who, in addition to regular classes, had organized aerobic physical exercise in order to regulate excess weight. In this paper, it is not possible to generalize the conclusion due to the small number of respondents.

**Keywords:** BMI, exercise, students

## PROCJENA STANJA UHRANJENOSTI DJECE RANE ŠKOLSKE DOBI NEKAD I SAD

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### SAŽETAK

Cilj istraživanja bio je da se na uzorku 386-ero djece rane školske dobi (191 dječaka i 195 djevojčica) primjeni sustav od ukupno 5 morfoloških varijabli (visina tijela, masa tijela, indeks tjelesne mase, kožni nabor nadlaktice i kožni nabor leđa) kako bi se utvrdile prosječne vrijednosti navedenih varijabli po razredu, te da se u ukupnom uzorku utvrdi postojanja spolnih razlika. Dobiveni rezultati komparirani će se s rezultatima visine tijela, mase tijela, indeksa tjelesne mase i kožnog nabora nadlaktice s prosječnim rezultatima starijim 30-ak godina u Republici Hrvatskoj, kako bi se utvrdio trend akceleracije rasta, povećanja tjelesne mase te lošijih vrijednostima indeksa tjelesne mase. Utvrđivanje spolnih razlika vršeno je putem t-testa za nezavisne uzorke. Rezultati t-testa su pokazali značajne razlike u svim mjerenim varijablama između dječaka i djevojčica, odnosno da su dječaci viši i teži, ali da djevojčice imaju bolji indeks tjelesne mase i manji udio masnoća u tijelu od dječaka. Usporedba sadašnjih rezultata s rezultatima od prije 30-ak godina po razredu ukazuju na povećanje svih varijabli, i kod dječaka i kod djevojčica, iako se je dječacima indeks tjelesne mase značajnije pogoršavao, kao i udio masnoća, nego djevojčicama.

**Ključne riječi:** dječaci, djevojčice, morfologija, razlike.

## ASSESSMENT OF NUTRITIONAL STATUS OF EARLY SCHOOL-AGE CHILDREN THEN AND NOW

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### ABSTRACT

The aim of the study was to apply a system of five morphological variables (body height, body weight, body mass index, upper arm skinfold, and back skinfold) to a sample of 386 early school-age children (191 boys and 195 girls) in order to determine the average values of these variables by grade level and to identify gender differences within the total sample. The obtained results will be compared with the average results for body height, body weight, body mass index, and upper arm skinfold from 30 years ago in the Republic of Croatia to determine trends in growth acceleration, increased body weight, and worsening body mass index values. Gender differences were analyzed using an independent samples t-test. The t-test results showed significant differences in all measured variables between boys and girls, indicating that boys are taller and heavier, while girls have a better body mass index and a lower percentage of body fat than boys. A comparison of the current results with those from 30 years ago by grade level indicates an increase in all variables for both boys and girls, although boys have experienced a more significant deterioration in body mass index and body fat percentage than girls.

**Keywords:** boys, girls, morphology, differences.



## RAZVOJ CENTARA SPORTOVA NA VODI U KONTINENTALNIM SREDINAMA

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## DEVELOPMENT OF WATER SPORTS CENTERS IN CONTINENTAL ENVIRONMENTS

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### SAŽETAK

Istraživanje se fokusira na utvrđivanje interesa i stavova stanovnika grada Novske prema izgradnji centra sportova na vodi na Novljanskom jezeru. Anketom je obuhvaćeno 340 ispitanika, pri čemu 84% preferira aktivnosti na otvorenom, a 80% izražava interes za rekreacijske sportove na vodi. Gotovo svi sudionici s prethodnim iskustvom u sportovima na vodi (98%) imali su pozitivno mišljenje o tim aktivnostima. Rezultati ukazuju na snažnu podršku izgradnji centra sportova na vodi, s 90% ispitanika koji smatraju da je centar potreban, dok 97% njih podržava njegovu izgradnju. Osim poboljšanja rekreacijskih mogućnosti, takav centar mogao bi imati značajan utjecaj na lokalni turizam i gospodarstvo, potičući aktivni turizam u unutrašnjosti. Ovaj rad naglašava potrebu za daljnjim istraživanjem financijskih, ekoloških i infrastrukturnih izazova kako bi se osigurala održivost projekta.

**Cljučne riječi:** tjelesna aktivnost, jedrenje, jedrenje na dasci, veslanje

### ABSTRACT

This research focuses on assessing the interests and attitudes of Novska residents regarding the establishment of a water sports center at Novljansko Lake. A survey of 340 respondents revealed that 84% prefer outdoor activities, while 80% expressed interest in recreational water sports. Nearly all participants with prior experience in water sports (98%) had positive opinions about these activities. The findings demonstrate strong support for the construction of a water sports center, with 90% of respondents believing it is necessary and 97% supporting its development. In addition to enhancing recreational opportunities, such a center could have a significant impact on local tourism and the economy, fostering active tourism in inland areas. This study highlights the need for further research into the financial, environmental, and infrastructural challenges to ensure the project's sustainability.

**Keywords:** physical activity, sailing, windsurfing, rowing

## RAZVOJ MOTORIČKE UČINKOVITOSTI U PREDŠKOLSKOM RAZDOBLJU PREMA TJELESNIM AKTIVNOSTIMA DJECE

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## DEVELOPMENT OF MOTOR EFFICIENCY IN PRESCHOOL CHILDREN IN RELATION TO CHILDREN'S MOTOR ACTIVITIES

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### SAŽETAK

Suvremeni način života, koji nam posao olakšava suvremena tehnologija i sjedilački način života, nosi brojne nedostatke u području motoričkog razvoja, a posljedično i motoričke učinkovitosti. Svijest o važnosti kretanja drastično opada, a samim time i naše svakodnevno kretanje postaje sve manje kvalitetno i učinkovito. Kretanje je jedna od osnovnih potreba svakoga od nas, a kretanje je također od ključne važnosti za cjeloviti razvoj čovjeka jer se motoričke vještine i sposobnosti definiraju u ranom djetinjstvu. Na temelju dosadašnjih promišljanja o važnosti motoričkog razvoja, proveli smo istraživanje u kojem smo utvrdili utjecaj dodatnih motoričkih aktivnosti na motoričku učinkovitost djece od 4–6 godina. U sklopu pedagoškog eksperimenta baterijom motoričkih testova MOT4–6 dobili smo podatke o različitim područjima motoričkog razvoja djece predškolske dobi. Utvrdili smo da su djeca koja su se tijekom pedagoškog eksperimenta bavila dodatnim tjelesnim aktivnostima postigla bolje rezultate u testovima motoričke učinkovitosti (MQ = 117,86) u odnosu na djecu koja nisu provodila dodatne tjelesne aktivnosti (MQ = 111,50). Razlika između dvije skupine nije statistički značajna ( $p > 0,05$ ).

**Ključne riječi:** motorička učinkovitost, motorički razvoj, predškolsko dijete, motoričke aktivnosti, MOT4–6

### ABSTRACT

The modern lifestyle, which allows working with modern technology and a sedentary lifestyle, brings many disadvantages for motor development and thus for motor performance. The awareness of the importance of movement is drastically decreasing, which makes our daily movement less efficient and of lower quality. Movement is one of the basic needs of each of us, and movement is also crucial to a person's overall development, as motor skills and abilities are established at a young age. Based on previous thinking about the importance of motor development, we conducted a study to examine the effects of additional physical activity on motor performance in 4–6-year-old children. As part of an educational experiment, we used a battery of MOT4–6 motor tests to obtain data on different domains of preschool children's motor development. We found that children who performed additional motor activities during the educational experiment performed better on the motor performance tests (MQ = 117,86) than children who did not perform additional motor activities (MQ = 111,50). The difference between the two groups is not statistically significant ( $p > 0.05$ ). Based on the MOT4–6 test results obtained, we conclude that the children in the experimental group made progress in motor efficiency within the framework of this test battery by performing various motor activities during the period of the educational experiment.

**Key words:** motor efficiency, motor development, preschool child, physical activities, MOT4–6

## PREDIKTORI STAVOVA ODBOJKAŠA JUNIORA PREMA HOMOSEKSUALCIMA: DOPRINOS RELIGIOZNIH I MORALNIH FAKTORA

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## PREDICTORS OF JUNIOR VOLLEYBALL PLAYERS' ATTITUDES TOWARDS HOMOSEXUALS: THE CONTRIBUTION OF RELIGIOUS AND MORAL FACTORS

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### APSTRAKT

Cilj ovog transverzalnog istraživanja je dvostruk: 1) provera konstruktne i kriterijumske validnosti pet ili dva faktora višeg reda korišćenog Upitnika moralnih temelja i 2) testiranje relativnog doprinosa determinanti moralnih temelja odbojkaša juniora u objašnjenju stava prema homoseksualcima. Prigodni uzorak je obuhvatio ( $N = 150$ ) sportista adolescencenata. Prosečna dob ispitanika je bila ( $M = 15.70$ ,  $SD = 0.56$  godina). U istraživanju su primenjeni merni instrumenti: Skala stavova prema homoseksualnim osobama (HAS), Upitnik religioznosti i Upitnik moralnih temelja (MFQ). Rezultati sprovedene hijerarhijske regresione analize pokazali su da prediktorske varijable predviđaju 50% proporcije ukupne varijanse kriterijuma stavova prema homoseksualnim osobama. Pritom, statistički značajan parcijalni doprinos kriterijumu stava prema homoseksualnim osobama pokazala su oba testirana konstrukta moralnih faktora: pozitivan prediktor - individualistički moralni temelji ( $\beta = 0.21$ ,  $p \leq 0.05$ ) i negativan prediktor - kolektivistički moralni temelji ( $\beta = -0.24$ ,  $p \leq 0.01$ ). Regresiona linearna funkcija u ovoj pilot studiji omogućuju bolje razumevanje relevantne uloge konteksta religioznih i moralnih determinanti odbojkaša juniorskog uzrasta u predikciji njihovih stavova prema homoseksualcima.

**Ključne reči:** psihološki temelji, individualistički faktori, kolektivistički faktori, odbojka, homoseksualci

### ABSTRACT

The aim of this transversal research is twofold: 1) testing the construct and criterion validity of the five or two higher-order factors of the used Moral Foundations Questionnaire and 2) testing the relative contribution of the determinants of the moral foundations of junior volleyball players in explaining attitudes towards homosexuals. The pertinent sample included ( $N = 150$ ) adolescent athletes. The average age of the subjects was ( $M = 15.70$ ,  $SD = 0.56$  years). The following measuring instruments were used in the research: The Homosexuality Attitude Scale (HAS), The Religiosity Questionnaire, and Moral Foundations Questionnaire (MFQ). The results of the conducted hierarchical regression analysis showed that the predictor variables predict 50% of the proportion of the total variance of the criteria of attitudes towards homosexuals. At the same time, a statistically significant partial contribution to the criterion of attitude towards homosexuals was shown by both tested constructs of moral factors: a positive predictor - individualistic moral foundations ( $\beta = 0.21$ ,  $p \leq 0.05$ ) and a negative predictor - collectivist moral foundations ( $\beta = -0.24$ ,  $p \leq 0.01$ ). The linear regression function in this pilot study provides a better understanding of the relevant role of the context of religious and moral determinants of junior volleyball players in predicting their attitudes towards homosexuals.

**Key words:** psychological foundations, individualistic factors, collectivist factors, volleyball, homosexuals

## RAZLIKE U MOTORIČKO-FUNKCIONALNIM SPOSOBNOSTIMA I MORFOLOŠKIM KARAKTERISTIKAMA DJECE U CJELODNEVNOM I POLUDNEVNOM NASTAVNOM PROCESU

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## DIFFERENCES IN MOTOR-FUNCTIONAL ABILITIES AND MORPHOLOGICAL CHARACTERISTICS OF CHILDREN IN FULL-DAY AND HALF-DAY EDUCATION

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### ABSTRACT

### SAŽETAK

Cilj ovog istraživanja bio je ispitati razlike u morfološkim karakteristikama i motoričko-funkcionalnim sposobnostima djece uključenih u produženi boravak i poludnevnu nastavu te utvrditi utjecaj organizacije školskog dana na razinu tjelesne aktivnosti. Istraživanje je provedeno na 73 osnovnoškolske djece (34 u produženom boravku, 39 u poludnevnoj nastavi), prosječne dobi  $8 \pm 0.44$  godina. Rezultati su pokazali više vrijednosti indeksa tjelesne mase (BMI) kod djece u produženom boravku ( $16.92 \pm 2.53$ ) u odnosu na one iz poludnevne nastave ( $15.91 \pm 2.04$ ), pri čemu su razlike bile izraženije kod djevojčica ( $p < 0.05$ ). Djeca iz poludnevne nastave postigla su bolje rezultate u testovima fleksibilnosti (MPR:  $34.09 \pm 9.58$  cm vs.  $28.51 \pm 8.35$  cm), agilnosti (MKS:  $11.57 \pm 1.26$  sek vs.  $12.32 \pm 1.45$  sek) i mišićne izdržljivosti (MPRT:  $31.76 \pm 7.65$  vs.  $27.90 \pm 7.59$  ponavljanja), što može upućivati na veću razinu spontanijih tjelesnih aktivnosti. Razlike među spolovima bile su značajnije kod dječaka, pri čemu su oni iz poludnevne nastave ostvarili bolje rezultate u testovima snage i izdržljivosti (MIV:  $17.46 \pm 17.09$  sek vs.  $8.81 \pm 5.98$  sek). Nalazi istraživanja ukazuju na potrebu za sustavnim uključivanjem tjelesne aktivnosti u programe produženog boravka kako bi se smanjilo sedentarna ponašanja i poboljšao motorički razvoj djece.

**Ključne riječi:** tjelesna aktivnost, produženi boravak, motorički razvoj, poludnevna nastava

The aim of this study was to examine differences in morphological characteristics and motor-functional abilities of children included in extended stay and half-day education and to determine the influence of the organization of the school day on the level of physical activity. The study was conducted on 73 primary school children (34 in extended stay, 39 in half-day education), average age  $8 \pm 0.44$  years. The results showed higher body mass index (BMI) values in children in extended care ( $16.92 \pm 2.53$ ) compared to those in half-day care ( $15.91 \pm 2.04$ ), with the differences being more pronounced in girls ( $p < 0.05$ ). Children in half-day care achieved better results in tests of flexibility (MPR:  $34.09 \pm 9.58$  cm vs.  $28.51 \pm 8.35$  cm), agility (MKS:  $11.57 \pm 1.26$  sec vs.  $12.32 \pm 1.45$  sec) and muscular endurance (MPRT:  $31.76 \pm 7.65$  vs.  $27.90 \pm 7.59$  repetitions), which may indicate a higher level of spontaneous physical activity. Gender differences were more significant for boys, with those in half-day classes achieving better results in strength and endurance tests (MIV:  $17.46 \pm 17.09$  sec vs.  $8.81 \pm 5.98$  sec). The findings of the study indicate the need for systematic inclusion of physical activity in after-school programs in order to reduce sedentary behavior and improve motor development in children.

**Keywords:** physical activity, after-school, motor development, half-day classes

## MORFOLOŠKA I FUNKCIONALNA DIFERENCIJACIJA IZMEĐU UČENIKA SREDNJE ŠKOLE

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## MORPHOLOGICAL AND FUNCTIONAL DIFFERENTIATION BETWEEN HIGH SCHOOL STUDENTS

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### SAŽETAK

Ovo istraživanje provedeno je s ciljem utvrđivanja razlika u morfološkim karakteristikama i funkcionalnim sposobnostima kod srednjoškolaca. Provedeno je na uzorku od 196 ispitanika (učenika) I, II, III i IV razreda JU Srednja medicinska škola u Tuzli, starih 15-18 godina  $\pm$  6 mjeseci, koji su podijeljeni u 4 grupe shodno razredu koji pohađaju. Uzorak varijabli činio je skup od 5 (pet) testova (morfoloških i funkcionalnih) za procjenu antropoloških dimenzija, primjeren uzrastu istraživane populacije. Za utvrđivanje razlika u morfološkom i funkcionalnom prostoru između učenika različitih razreda srednje škole korištena je univarijatna analiza varijanse sa višestrukim komparacijama, uz primijenjeni post hoc Bonferronijev test. Analizom varijanse u prostoru testova za procjenu morfoloških karakteristika i funkcionalnih sposobnosti, dobijena je statistički značajna razlika između grupa u četiri testa.

**Ključne riječi:** razlike, srednjoškolci, antropološke dimenzije

### ABSTRACT

This research was conducted with the aim of determining differences in morphological characteristics and functional abilities in high school students. It was conducted on a sample of 196 respondents (students) of grades I, II, III and IV of the Secondary Medical School in Tuzla, aged 15-18 years  $\pm$  6 months, who were divided into 4 groups according to the grade they attend. The sample of variables consisted of a set of 5 (five) tests (morphological and functional) for the assessment of anthropological dimensions, appropriate to the age of the research population. Univariate analysis of variance with multiple comparisons was used to determine the differences in morphological and functional space between students of different grades of high school, with the applied post hoc Bonferroni test. By analysis of variance in the space of tests for the assessment of morphological characteristics and functional abilities, a statistically significant difference was obtained between the groups in four tests.

**Key words:** differences, high school students, anthropological dimensions

## RAZLIKE U MOTORIČKIM SPOSOBNOSTIMA MLADIH NOGOMETAŠA

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## DIFFERENCES IN MOTOR SKILLS OF YOUNG FOOTBALL PLAYERS

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### SAŽETAK

Motoričke sposobnosti mladih nogometaša igraju ključnu ulogu u njihovom razvoju i performansama u nogometu. Razvoj ovih sposobnosti značajno utiče na njihovu sposobnost da se takmiče na visokom nivou. Istraživanje je provedeno s ciljem utvrđivanja razlika u varijablama za procjenu motoričkih sposobnosti mladih nogometaša. Provedeno je na uzorku od 58 ispitanika, uzrasta od 14 do 16 godina, podijeljenih u 2 grupe (pioniri i kadeti). Uzorak varijabli činio je skup od deset motoričkih testova, koji pokrivaju prostore fleksibilnosti, eksplozivne snage, repetitivne snage i agilnosti. Za utvrđivanje kvantitativnih razlika između ispitivanih grupa primijenjen je t - test za nezavisne uzorke. Dobijeni rezultati pokazuju postojanje statistički značajnih razlika u osam od ukupno deset tretiranih varijabli, i to: pretklon u sjedu, bočna špaga, squat jump, counter movement jump, leteći start na 10 m, leteći start na 20 m, leteći start na 20 m s loptom i koverta test.

**Ključne riječi:** dječaci, diferencijacija, motorika, kadeti, pioniri, nogomet

### ABSTRACT

Motor skills of young football players play a key role in their development and performance in football. The development of these skills significantly affects their ability to compete at a high level. The study was conducted with the aim of determining differences in variables for assessing motor skills of young football players. The study was conducted on a sample of 58 subjects, aged 14 to 16, divided into 2 groups (pioneers and cadets). The sample of variables consisted of a set of ten motor tests, covering the areas of flexibility, explosive strength, repetitive strength and agility. To determine quantitative differences between the studied groups, a t - test for independent samples was applied. The obtained results show the existence of statistically significant differences in eight out of a total of ten treated variables, namely: seated forward bend, side plank, squat jump, counter movement jump, flying start at 10 m, flying start at 20 m, flying start at 20 m with a ball and envelope test.

**Key words:** boys, differentiation, motor skills, cadets, pioneers, football

## EXPERIENTIAL PEDAGOGY AS A WARNING TO MODERN SCHOOLING: A CRITICAL ANALYSIS OF HAHN'S CRITIQUE

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### **ABSTRACT**

The modern school system leads to student passivity, which negatively affects their physical and mental health. Experiential pedagogy offers an alternative that integrates movement, experiences, and active participation in learning. Critics argue that traditional schooling favors cognitive learning while neglecting the importance of physical activity and social interaction. Hahn (Ziegenspeck, 1987) highlights six key declines: physical ability, initiative, memory, craftsmanship, self-discipline, and compassion. His solutions, such as expeditions, physical training, and projects, promote the holistic development of individuals. Educational reform must incorporate methods that support physical activity and experiential learning; otherwise, the negative effects of passivity will only worsen.

**Keywords:** Experiential pedagogy, school, movement, passivity

## RAZLIKE U MORFOLOŠKIM KARAKTERISTIKAMA I MOTORIČKIM SPOSOBNOSTIMA IZMEĐU DJEČAKA I DJEVOJČICA OD II DO V RAZREDA

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### SAŽETAK

Istraživanje je sprovedeno na uzorku od ukupno N=1850 učenika od II do V razreda osnovne škole, a od toga je bilo N=989 (53%) muških ispitanika i N=861 (47%) ženskih ispitanika. Cilj istraživanja bio je utvrditi razlike u morfološkim karakteristikama i motoričkim sposobnostima između dječaka i djevojčica od II do V razreda osnovne škole. Od statističkih metoda primijenjeni su deskriptivno statistički metod i t-test za nezavisne uzorke. Za obradu podataka korišten je statistički program za personalne računare SPSS za Windows verzija 22. Analizirajući rezultate morfoloških karakteristika utvrđeno je da dječaci u odnosu na djevojčice imaju veći indeks tjelesne mase (BMI) i kožni nabor na leđima (subscapular). Nisu utvrđene razlike u kožnom naboru nadlaktice (triceps) i kožnom naboru na stomaku (suprailiac). Analizirajući rezultate motoričkih sposobnosti utvrđeno je da su dječaci bolji u: dohvat u sijedu (gipkost), ležanje/sijedu (snaga trupa) i izdržaju u zgibu (funkcionalna snaga), dok su djevojčice bolje u skoku u dalj iz mjesta (eksplozivna snaga nogu) i snazi šaka (statička snaga). Svi navedeni testovi su bili statistički značajni na nivou manjem od 1% ( $p < 0,01$ ), samo je test izdržaj u zgibu (funkcionalna snaga) bio statistički značajan na nivou od ( $p < 0,05$ ). U testovima flamingo (ravnoteža) i trčanje 10x5m tamo-ovamo (brzina trčanja i agilnost) rezultati su bili u korist djevojčica, a kod testa taping rukom (brzina pokreta) rezultati su bili u korist dječaka ali ove razlike nisu bile statistički značajne. Potrebno je preventivno djelovati na vrijeme i vršiti češća testiranja i mjerenja učenika osnovnoškolskog uzrasta u cilju praćenja promjena rasta i razvoja.

**Ključne riječi:** morfologija, motorika, eurofit, mladi školski uzrast, razlike.



## DIFFERENCES IN MORPHOLOGICAL CHARACTERISTICS AND MOTORIC ABILITIES BETWEEN BOYS AND GIRLS FROM II TO V GRADES

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### ABSTRACT

The research was conducted on a sample of N=1850 students from the 2nd to the 5th grade of elementary school, of which there were N=989 (53%) male respondents and N=861 (47%) female respondents. The research aimed to determine the differences in morphological characteristics and motor abilities between boys and girls from the 2nd to the 5th grade of elementary school. The descriptive statistical method and the t-test for independent samples were applied from the statistical methods. The statistical program for personal computers SPSS for Windows version 22 was used for data processing. Analyzing the results of morphological characteristics, it was determined that boys have a higher body mass index (BMI) and skin fold on the back (subscapular) than girls. No differences were found in the skin fold of the upper arm (triceps), and the skin folds on the abdomen (suprailiac). Analyzing the results of motor skills, it was determined that boys are better at reaching in a squat (flexibility), lying/squatting (trunk strength), and resisting in a push-up (functional strength). At the same time, girls are better at standing long jump (explosive leg strength) and hand strength (static strength). All the mentioned tests were statistically significant at the level of less than 1% ( $p < 0.01$ ), only the flexion endurance test (functional strength) was statistically significant at the level of ( $p < 0.05$ ). In the flamingo tests (balance) and running 10x5m back and forth (running speed and agility), the results were in favor of girls, and in the hand tapping test (movement speed), the results were in favor of boys, but these differences were not statistically significant. It is necessary to act preventively on time and carry out more frequent tests and measurements of elementary school-aged students to monitor changes in growth and development.

**Keywords:** morphology, motor skills, eurofit, younger school age, differences.

## SPECIFIČNOST RODITELJSTVA U DIGITALNOM DOBU

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### SAŽETAK

Cilj ovog rada je utvrditi na koji način djeca odrastaju u digitalnom dobu, kako tehnologija utiče na razvoj djece rane i predškolske dobi, te ulogu roditelja pri upotrebi tehnologije kod djece. U radu je prikazano istraživanje provedeno metodom anketnog upitnika na uzorku od 210 roditelja predškolske djece u dobi od jedne do sedam godina. Kompleksnost savremenog društva u kojemu živimo, čini sve izazovnijim ispunjavanje uloga koje kroz život preuzimamo. Jedna od njih, možda i najodgovornija, je ona roditeljska. Upravo je pred roditeljima, kao primarnim odgojiteljima, sve više izazova i dilema kako kvalitetno odgajati djecu u globalnom okruženju. Najveću odgovornost u razvoju ispravnog odnosa djece prema korištenju novih tehnologija, a time i medijskih sadržaja, snose upravo roditelji. Roditelji su dužni svom djetetu osigurati što sigurniju i podsticajnu razvojnu okolinu, a u današnje vrijeme tu okolinu u velikoj mjeri oblikuje korištenje nove tehnologije (računari, tableti, mobilni telefoni) i time pristup različitim medijskim sadržajima.

Bitna je i roditeljska spremnost na kvalitetno provođenje vremena sa svojom djecom u drugim aktivnostima. Rezultati prikazuju dostupnost novih tehnologija (računara, tableta, pametnih telefona) predškolskoj djeci, a odnosi se na vrijeme, sadržaje i okolnosti u kojima koriste male ekrane te koliko aktivno vremena roditelji provode sa svojom djecom u drugim aktivnostima. Može se reći da moderna tehnologija ima svoje prednosti i nedostatke. Prednosti se mogu iskoristiti ako je upotreba novih tehnologija ciljana i primjerena uzrastu te ako predstavlja samo dodatak drugim sadržajima, odnosno ako nije osnovno i jedino sredstvo druženja, učenja i zabave. Prevencijom uticaja nedostataka moguće je prednosti tehnologije usmjeriti ka zdravom razvoju djece i mladih.

**Ključne riječi:** djeca, roditelji, nove tehnologije, digitalna dob, tablet, pametni telefon

## SPECIFICITY OF PARENTING IN THE DIGITAL AGE

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### **ABSTRACT**

The aim of this paper is to determine how children grow up in the digital age, how technology affects the development of early and preschool children, and the role of parents in the use of technology by children. The paper presents research conducted using a questionnaire method on a sample of 210 parents of preschool children aged one to seven. The complexity of the modern society in which we live makes it increasingly challenging to fulfill the roles we take on throughout life. One of them, perhaps the most responsible, is that of parents. Parents, as primary educators, are faced with more and more challenges and dilemmas on how to raise children in a global environment. The biggest responsibility in developing children's correct attitude towards the use of new technologies, and thus media content, is borne by parents. Parents are obliged to provide their child with the safest and most stimulating development environment possible, and nowadays that environment is largely shaped by the use of new technology (computers, tablets, mobile phones) and thus access to various media content.

Parental willingness to spend quality time with their children in other activities is also important. The results show the availability of new technologies (computers, tablets, smartphones) to preschool children, and it refers to the time, contents and circumstances in which they use small screens and how much active time parents spend with their children in other activities. It can be said that modern technology has its advantages and disadvantages. The advantages can be used if the use of new technologies is targeted and age-appropriate and if it is only an addition to other content, i.e. if it is not the primary and only means of socializing, learning and entertainment. By preventing the impact of shortcomings, it is possible to direct the advantages of technology towards the healthy development of children and young people.

**Keywords:** children, parents, new technologies, digital age, tablet, smartphone

## PHYSICAL EDUCATION AND EXTRACURRICULAR SPORTS: IMPACT ON COGNITIVE AND MOTOR SKILLS IN PRIMARY SCHOOL

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### **ABSTRACT**

**Background:** Physical education in schools should promote a balanced and optimal development of the pupil. The National Curriculum Guidelines for primary schools clearly highlight an approach to education through movement, whereas the concept of education for movement is less evident. In particular, the aspect of skills-related fitness is not adequately considered, meaning that fitness is not linked to the acquisition of cognitive skills. Consequently, scientific evidence has revealed a lack of physical activity in terms of motor literacy. **Purpose:** The aim of the study is to implement specific physical education protocols alongside the curricular activities to address gaps in motor literacy and skills-related fitness. **Methods:** The sample consists of 21 children from Year 4 and Year 5 of the primary school at the Comprehensive Institute of Centola Speranza-Lettieri, who took part in an extracurricular motor education project. The activities involved moderate multitasking physical exercises. Subsequently, a specially designed questionnaire was administered to assess their perception and awareness of physical education, as well as their level of engagement during lessons. **Results:** The application of the paired sample T-test revealed an improvement following the training protocol, with average percentage increases in results between the pre- and post-tests across the various assessments. The analysis of the Chi-square test identified significant relationships between qualitative variables. **Conclusion:** The physical education protocols used proved effective in enhancing the pupils' motor skills. The children also showed improvements in their perception and awareness of the importance of physical activity.

**Key Words:** Physical literacy, Sport Pedagogy, Skill development

## DEVELOPMENT OF INSTRUMENT TO DETECT MOTIVATIONAL DATA WITH RESPECT TO FREQUENCY OF PHYSICAL PRACTICE

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### ABSTRACT

**Background:** Today in terms of physical activity, there is little motivation on the part of subjects in preferring motor practice in their leisure time. There are no data and studies in the literature that focus on detecting the main motivations, which drive subjects to engage in physical activity. **Purpose:** The objective of the study is to develop a survey instrument that would allow for an account of the data regarding the most common motivation that makes one or more subjects prefer a lifestyle aimed at devoting their free time to physical activity. **Methods:** A sample of 26 subjects aged 18-40 years was recruited. An ad hoc questionnaire was developed through Google forms and administered to the participants. The questionnaire consisted of 9 Items divided into two sections: the first section included 4 questions aimed at investigating subjects' demographic characteristics and information related to physical practice, and the second section included 5 questions aimed at investigating subjects' perceptions regarding a number of statements pertaining to motivation and the effects of physical practice on health and social wellness. **Results:** The results of the questionnaire show that 69.2% of the sample engage in moderate to vigorous physical activity for more than 150 minutes for week. On the motivation for which they practice physical activity, 46.2% prefer psychophysical benefits. The Chi Squared analysis conducted showed a significant relationship between the question regarding the practice of physical activity in leisure time and the perception regarding its impact on combating depressive disorders and stress ( $P=.007$ ). **Conclusion:** It was found that it is possible to use as a data collection tool, concerning the motivation for engaging in physical activity, the application of the questionnaire, which provided an understanding that subjects are willing to use their free time to engage in physical activity, because of the psychophysical benefits it brings.

**KeyWords:** Physical Activity, wellness, motivation, questionnaire

## HIPERMOBILNOSTI KOLJENA I OMJER JAKOSTI MIŠIĆA STRAŽNJE I PREDNJE STRANE NATKOLJENICE KOD REKREATIVNIH I NATJECATELJSKIH SPORTAŠA

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## KNEE HYPERMOBILITY AND RATIO OF STRENGTH OF THE POSTERIOR TO ANTERIOR THIGH MUSCLES IN RECREATIONAL AND COMPETITIVE ATHLETES

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### SAŽETAK

Cilj ovog istraživanja bio je ispitati povezanost između stupnja hipermobilitnosti koljena i omjera jakosti kvadricepsa i hamstringsa kod rekreativnih i natjecateljskih sportaša. U istraživanju je sudjelovalo 22 sportaša s hiperekstenzijom koljena većom od 10°. Procijenjene su antropometrijske karakteristike, stupanj hipermobilitnosti te izokinetička jakost mišića natkoljenice pri kutnim brzinama od 60°/s i 180°/s. Rezultati su pokazali da stupanj hipermobilitnosti nije imao značajnu povezanost s H/Q omjerom pri 60°/s (H/Q60 D: 0,55±0,08; H/Q60 L: 0,53±0,07), dok je pri 180°/s zabilježena umjerena pozitivna korelacija između hipermobilitnosti i H/Q omjera ( $r = 0,43$ ). To sugerira da osobe s većom hipermobilitnošću mogu razviti kompenzacijske strategije povećane aktivacije hamstringsa kako bi nadoknadile smanjenu pasivnu stabilnost koljena. Ovi nalazi naglašavaju važnost prilagođenih treninga za sportaše s hiperobilnim koljenima, osobito u pogledu jačanja stražnje strane natkoljenice i neuromuskularne kontrole. Buduća istraživanja trebala bi uključiti veći uzorak te dodatne biomehaničke parametre kako bi se dublje istražio utjecaj hipermobilitnosti na sportsku izvedbu i rizik od ozljeda.

**Ključne riječi:** mobilnost, izokinetička jakost, rekreativni sportaši, prevencija ozljeda

### ABSTRACT

The aim of this study was to examine the relationship between the degree of knee hypermobility and the ratio of quadriceps to hamstring strength in recreational and competitive athletes. The study included 22 athletes with knee hyperextension greater than 10°. Anthropometric characteristics, degree of hypermobility, and isokinetic strength of the thigh muscles at angular velocities of 60°/s and 180°/s were assessed. The results showed that the degree of hypermobility had no significant association with H/Q ratio at 60°/s (H/Q60 D: 0.55±0.08; H/Q60 L: 0.53±0.07), while at 180°/s a moderate positive correlation was observed between hypermobility and H/Q ratio ( $r = 0.43$ ). This suggests that individuals with greater hypermobility may develop compensatory strategies of increased hamstring activation to compensate for reduced passive knee stability. These findings highlight the importance of tailored training for athletes with hypermobile knees, particularly in terms of hamstring strengthening and neuromuscular control. Future research should include a larger sample size and additional biomechanical parameters to further investigate the impact of hypermobility on sports performance and injury risk.

**Keywords:** mobility, isokinetic strength, recreational athletes, injury prevention

## MOTIVACIJSKI PROFIL REKREATIVNIH SPORTAŠA; RAZLIKE PREMA VRSTI SPORTA

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## MOTIVATIONAL PROFILE OF RECREATIONAL ATHLETES; DIFFERENCES BY TYPE OF SPORT

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### SAŽETAK

Ovo istraživanje je imalo za cilj analizirati motivacijske profile rekreativnih sportaša i razlike između onih koji se bave timskim i individualnim sportovima. U istraživanju je sudjelovalo 15 rekreativnih sportaša (6 iz timskih i 9 iz individualnih sportova), a njihova motivacija procijenjena je pomoću revidirane skale sportske motivacije (SMS-II). Rezultati su pokazali da nema značajnih razlika u motivaciji između dvije skupine, iako su uočeni trendovi koji sugeriraju nešto više introjektiranu regulaciju kod sportaša u timskim sportovima te više amotivaciju kod onih u individualnim sportovima. Također, nije pronađena značajna povezanost između motivacijskih varijabli i trenažnog iskustva. Međutim, ovi nalazi naglašavaju važnost intrinzične motivacije za dugoročno sudjelovanje u sportu i sugeriraju potrebu za prilagođenim trenažnim strategijama za održavanje motivacije sportaša.

**Ključne riječi:** rekreativni sport, intrinzična motivacija, timski sportovi, individualni sportovi

### ABSTRACT

This study aimed to analyze the motivational profiles of recreational athletes and the differences between those who engage in team and individual sports. The study included 15 recreational athletes (6 from team sports and 9 from individual sports), and their motivation was assessed using the revised Sports Motivation Scale (SMS-II). The results showed that there were no significant differences in motivation between the two groups, although trends were observed suggesting somewhat higher introjected regulation in athletes in team sports and higher amotivation in those in individual sports. Also, no significant correlation was found between motivational variables and training experience. However, these findings highlight the importance of intrinsic motivation for long-term participation in sport and suggest the need for tailored training strategies to maintain athlete motivation.

**Keywords:** recreational sport, intrinsic motivation, team sports, individual sports

## UTJECAJ REKREATIVNOG TRČANJA NA PROMJENE ŽIVOTNOG STILA I POBOLJŠANJE ZDRAVLJA

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### SAŽETAK

Trčanje je jedna od najjednostavnijih i najdostupnijih tjelesnih aktivnosti koja pozitivno utječe na fizičko i mentalno zdravlje pojedinca. Cilj ovog rada je analizirati kako redovito rekreativno trčanje može doprinijeti promjenama u načinu života, uključujući poboljšanje kardiovaskularnog zdravlja, regulaciju tjelesne mase, smanjenje stresa i poboljšanje opće kvalitete života. Poseban naglasak stavljen je na ulogu trčanja u prevenciji kroničnih bolesti i njegovu sposobnost poticanja dugoročnih zdravih navika. Analizom dostupne znanstvene literature, kao i istraživanja provedenih u Hrvatskoj i svijetu, rad prikazuje široki spektar pozitivnih učinaka koje trčanje ima na fiziološke, psihološke i socijalne aspekte ljudskog zdravlja.

**Ključne riječi:** mentalno zdravlje, rekreacija, tjelesna aktivnost, trčanje, zdrav način života

## THE IMPACT OF RECREATIONAL RUNNING ON LIFESTYLE CHANGES AND HEALTH IMPROVEMENT

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### ABSTRACT

Running is one of the simplest and most accessible physical activities that positively affects an individual's physical and mental health. The aim of this paper is to analyze how regular recreational running can contribute to lifestyle changes, including improvements in cardiovascular health, body weight regulation, stress reduction, and overall quality of life. Special emphasis is placed on the role of running in the prevention of chronic diseases and its ability to encourage long-term healthy habits. Through the analysis of available scientific literature, as well as research conducted in Croatia and globally, this paper demonstrates the wide range of positive effects that running has on the physiological, psychological, and social aspects of human health.

**Keywords:** mental health, recreation, physical activity, running, healthy lifestyle



## THE IMPACT OF PLYOMETRIC TRAINING ON DECELERATIVE RFD IN YOUNG ATHLETES.

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### ABSTRACT

**Background:** Il tasso di sviluppo della forza di decelerazione (RFD) si riferisce alla velocità con cui la forza aumenta durante la fase di frenata di un movimento. È un parametro utilizzato nel contesto sportivo in quanto la capacità di esprimere potenza e sono indice dell'efficacia del SNC dell'atleta e della salute del sistema muscolo-scheletrico. In letteratura non ci sono studi che evidenziano chiaramente i miglioramenti di tale parametro successivamente ad un determinato protocollo di allenamento. **Purpose:** lo studio si propone di dimostrare l'efficacia di un determinato protocollo di allenamento pliometrico sul tasso di sviluppo della forza di decelerazione nei giovani atleti. **Methods:** un campione di convenienza di 30 atleti è stato reclutato tramite campionamento di convenienza. Ad ognuno di essi è stato somministrato il CMJ come test di ingresso. I soggetti sono stati accoppiati per altezza di salto e poi divisi in maniera randomizzata in due gruppi: controllo e intervento. I soggetti del gruppo di controllo hanno eseguito un protocollo di allenamento basato su pliometria a basso impatto per 6 settimane. Al termine di ciò sono stati testati nuovamente tramite CMJ test. **Results:** L'ANOVA a misure ripetute ha evidenziato un effetto significativo del protocollo sul tempo ( $F(1,28) = 43.757, p < .001$ ) e sui diversi Gruppi ( $F(1,28) = 52.489, p < .001$ ), con un'interazione significativa ( $F(1,28) = 45.712, p < .001$ ). Il gruppo Intervento ha mostrato un miglioramento significativo tra PRE e POST ( $p < .001$ ), mentre il gruppo Controllo non ha evidenziato miglioramenti. Questi risultati indicano che l'intervento ha avuto un impatto positivo. **Conclusion:** il regime di contrazione pliometrico si è mostrato efficace nel migliorare la capacità degli atleti di decelerare in maniera più efficace e rapida, andando a elevare l'efficacia di questi tipi di metodo, non solo per la performance ma anche per mitigare il rischio di infortunio.

**Keywords:** health, performance, physical activity, sport

## POVEZANOST FIZIČKE AKTIVNOSTI I UPOTREBE TEHNOLOGIJE KOD DJECE RANOG ŠKOLSKOG UZRASTA

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### SAŽETAK

Praćenje fizičke spremnosti moćan je prediktor zdravstvenog statusa u djetinjstvu, adolescenciji i odrasloj dobi. Kod djece i adolescenata, fizička spremnost je u negativnoj korelaciji sa kardiorespiratornim bolestima, visokim krvnim pritiskom, abdominalnom gojaznošću, ukupnom gojaznošću, narušeno zdravlje skeletal. Upotreba tehnologija kod dece je jedan od rizik faktora samnjenem fizicke aktivnosti kod dece. Dece zavisni od tehnologije imaju tendenciju narušenog kvaliteta života i često su pogodni emocionalno i socijalno. Povecana zavisnost od tehnologije bila je usklađena sa nivom praćenja anksioznosti, depresije, agresije i problema sa pažnjom i ponasanem. Cilj istraživanja je utvrditi povezanost fizičke spremnosti i upotrebe tehnologije kod djece ranog **školskog** uzrasta. Istraživanje je sprovedeno na uzorku od 940 ispitanika, po slučajnom izboru iz nekoliko osnovnih škola u regionu Skoplja. Uzorak je podijeljen u dva poduzorka prema polu, i to 466 ispitanika muškog spola i 474 ispitanice. Razlike između grupa utvrđene su jednofaktorskom multivarijantnom i univarijantnom analizom kovarijanse (MANKOVA i ANKOVA) uz parcijalizaciju po godinama. Na osnovi dobivenih podataka konstatovano je da devojčice koje prolaze više od 2 sata ispred kompjutera/interneta u toku dane vikenda pokazali su slabije rezultate kod varijable trčanja na 20 metara sa progresivnim povećanjem brzine (VO2 max). Iz dobivenih rezultata kod ispitanika muškog pola nemožese konstatovati povezanost korištenje elektronske tehnologije sa fizičkom aktivnošću.

**Ključne reči:** fizičke aktivnosti, tehnologije, deca

## THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND TECHNOLOGY USE IN EARLY SCHOOL-AGE CHILDREN

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### ABSTRACT

Monitoring physical fitness is a powerful predictor of health status in childhood, adolescence, and adulthood. Among children and adolescents, physical fitness is negatively correlated with cardiorespiratory diseases, high blood pressure, abdominal obesity, overall obesity, and impaired skeletal health. The use of technology by children is one of the risk factors for reduced physical activity. Children dependent on technology tend to have a lower quality of life and are often susceptible to emotional and social problems. Increased dependence on technology has been associated with levels of anxiety, depression, aggression, and attention and behavioral problems. The aim of this research is to determine the relationship between physical fitness and technology use in early school-age children. The study was conducted on a sample of 940 participants, randomly selected from several elementary schools in the Skopje region. The sample was divided into two subgroups by gender: 466 male participants and 474 female participants. Differences between the groups were determined using one-factor multivariate and univariate analysis of covariance (MANCOVA and ANCOVA), with age division. Based on the obtained data, it was found that girls who spent more than two hours on a computer or the internet during weekends showed weaker results in the 20-meter progressive running test (VO<sub>2</sub> max). The results for male participants did not show a correlation between the use of electronic technology and physical activity.

**Keywords:** physical activity, technology, children

## THE INFLUENCE OF MORPHOLOGICAL INDICATORS ON PHYSICAL FITNESS IN RECREATIONAL ATHLETES

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### ABSTRACT

Many studies show the positive effects of physical activity. This research focuses on adult recreational athletes, women and men, and the impact of estimated muscle mass as a morphological parameter of physical fitness across functional power thresholds. The recreational athletes are divided into two groups, control and experimental, and follow the same program, but in the experimental group, an intervention and adjustment of the program is performed, based on the results obtained during the individual measurements, in the control group the program remains unchanged. The results show that the estimated muscle mass itself is an important predictor, but it is not statistically significant for the final improvement in the functional power threshold. The intervention on the training program by the kinesiologist knowing the parameters of the body composition plays a key role in increasing the physical fitness of the recreational athletes.

**Keywords:** physical fitness, estimated muscle mass, recreational athletes

## DIFFERENCES IN THE INTERCORRELATIONS OF PSYCHOLOGICAL CHARACTERISTICS IN KARATE COMPETITORS AND REPRESENTATIVES

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### ABSTRACT

This research was conducted on a purposive sample of 32 respondents, 16 karate competitors and 16 karate national team members, men, seniors (according to WKF) from the Republic of North Macedonia. The main objective of this research was to determine the differences in the interrelations between the psychological characteristics of karate competitors and members of the karate national team. A total of 13 variables of psychological characteristics were used in the research: one variable for assessing general intellectual abilities, three variables for assessing specific intellectual abilities, six variables for assessing emotional characteristics, and three variables for assessing motivational dispositions. To determine the differences in the mutual relationships, first the intercorrelation matrices of the competitors and the national team members were calculated, then the Fisher transformed matrices were calculated, i.e.  $r_1$  and  $r_2$  - the correlation coefficients for each group,  $Z$ -statistics that measure the difference between the two correlation values and  $p$ -value - which determines whether the difference in the correlation is statistically significant. The results of the  $Z$ -test obtained in the study show statistically significant differences only in 5 pairs of variables from the two intercorrelation matrices.

**Keywords:** psychological characteristics, karate competitors, karate national team members, descriptive statistics,  $Z$ -test

## KARAKTERISTIKE SREDNJOŠKOLACA OBA POLA U PROSTORU MOTORIKE PO KRITERIJUMU BAVLJENJA SPORTOM

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### SAŽETAK

Ovim istraživačkim radom nastojao se dobiti uvid u kvalitativne razlike između motoričkih sposobnosti srednjoškolaca sportista, koji imaju različit obim kretnih aktivnosti i mladih koji su kretno neaktivni ili nisu uključeni u sportske ili rekreativne aktivnosti minimalno četiri puta sedmično. Populacija iz koje je definisano ovo istraživanje su učenici svih razreda srednje škole. Istraživanje je dovelo do zaključka da kod učenika koji se ne bave sportom strukture izolovanih komponenti su mešovitog karaktera, pa se tim izolovanim komponentama može objasniti znatno manji deo zajedničke varijanse. Kod učenika sportista sa povećanim intenzitetom svakodnevnih kretnih aktivnosti uočeno je da imaju veći procenat objašnjene zajedničke varijanse. Što ukazuje na bolju razvijenost bazičnih motoričkih sposobnosti u korist kretno aktivnijih srednjoškolaca.

**Ključne reči:** motoričke sposobnosti, učenici sportisti, rekreativci i nesportisti

## CHARACTERISTICS OF SECONDARY SCHOOL PEOPLE OF BOTH SEXES IN THEFIELD OF MOTORICS ACCORDING TO THE CRITERION OF ENGAGEMENT IN SPORTS

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### SUMMARY

With this research work, he tried to gain insight into the qualitative differences in motor skills between high school athletes, who have different volumes of physical activity, and young people who are physically inactive or are not involved in sports or recreational activities at least four times a week. The population from which this research is defined are students of all grades of high school. The research led to the conclusion that in students who do not engage in sports, the structure of isolated components is of a mixed nature, so these isolated components can explain a significantly smaller part of the common variant. In student athletes with increased intensity of daily movement activities, it was observed that they have a higher percentage of common variant explanations. Which indicates a better development of basic motor skills in favor of physically active high school students.

**Key words:** motor skills, student athletes, recreational athletes and non-athletes

## PREHRANA I PROCES STARENJA

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### SAŽETAK

S obzirom na sve veći postotak osoba starijih od 65 godina u ukupnom stanovništvu, starenje je jedan od najvećih zdravstvenih, socijalnih i ekonomskih izazova 21. vijeka. Prema kriterijima Svjetske zdravstvene organizacije hronološka dob od 65 godina prihvaćena je kao dobna granica u definiciji starije osobe i dijeli se na: raniju starost 65 - 74 godine, srednju starost 75 - 84 i duboku starost iznad 85 godina. Kod čovjeka se u svakoj životnoj dobi javljaju određene uočljive promjene. Tako su i karakteristike organizma starijih osoba specifične i bitno drugačije. Starenje se može opisati kao proces u kojem su povećane biohemijske i patofiziološke promjene zbog kojih se javljaju brojne hronične promjene kako na pojedinim organima, tako i na cijelom organizmu. Pravilna prehrana ima važnu ulogu u očuvanju zdravlja i smanjenju rizika za razvoj hroničnih bolesti u starijoj dobi. Poseban problem predstavlja održavanje pravilne prehrane kod starijih osoba. Cij ovog istraživanja je pregledom naučne literature ukazati na bitan uticaj prehrane na proces starenja i zdravlje osoba starije životne dobi te se procjenom nutritivnog statusa starije populacije osvrnuti na problem neprepoznate malnutricije starijih neinstitutionaliziranih osoba. Osnova istraživanja je validirani alat „DETERMINE checklist“ za procjenu nutritivnog rizika neinstitutionaliziranih osoba starijih od 70 godina. U istraživanju je sudjelovalo 38 ispitanika, od čega su 20 ispitanika pripadnici muškog spola, a 18 ispitanika pripadnice ženskog spola što ukazuje na prilično podjednaku zastupljenost. Jedini kriterij uključenja bila je dob veća od 70 godina. Svi ispitanici dobrovoljno su pristali na sudjelovanje u istraživanju. **Glavne riječi:** starije osobe, proces starenja, prehrana, nutritivni status, kvaliteta života, malnutricija.

## NUTRITION AND THE AGING PROCESS

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### SUMMARY

Given the growing percentage of people over 65 in the total population, aging is one of the biggest health, social and economic challenges of the 21st century. According to the criteria of the World Health Organization, the chronological age of 65 years is accepted as the age limit in the definition of an elderly person and is divided into: early age 65 - 74 years, middle age 75 - 84 and deep old age over 85 years. Certain noticeable changes occur in humans at every age. Thus, the characteristics of the organism of the elderly are specific and significantly different. Aging can be described as a process in which biochemical and pathophysiological changes are increased, due to which numerous chronic changes occur both in individual organs and in the whole organism. Proper nutrition plays an important role in maintaining health and reducing the risk of developing chronic diseases in old age. Maintaining a proper diet in the elderly is a special problem. The aim of this research is to review the scientific literature to point out the important influence of nutrition on the aging process and the health of elderly people, and to look at the problem of unrecognized malnutrition in elderly non-institutionalized people by assessing the nutritional status of the elderly population. The basis of the research is the validated tool "DETERMINE checklist" for assessing the nutritional risk of non-institutionalized persons over 70 years of age. 38 respondents participated in the research, of which 20 respondents were male, and 18 respondents were female, which indicates a fairly equal representation. The only inclusion criterion was age greater than 70 years. All respondents voluntarily agreed to participate in the research.

**Key words:** elderly, aging process, nutrition, nutritional status, quality of life, malnutrition.

## UTICAJ EDUKACIJE I TRENINGA U POBOLJŠANJU KOMPETENCIJA ZAVODSKIH SLUŽBENIKA U ODGOVORU NA VISOKORIZIČNE SITUACIJE U ZAVODU ZA IZVRŠENJE KRIVIČNIH SANKCIJA BOSNE I HERCEGOVINE

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### SAŽETAK

Analizom trenda koji prate cjelokupno društvo, dolazimo do spoznaje da je došlo do značajnih promjena u načinu postupanja prema osobama lišenim slobode. Sistem izvršenja krivičnih sankcija doživio je dramatične transformacije. Demokratizacijom u oblasti izvršenja krivičnih sankcija u Bosni i Hercegovini urađeno je i pridruživanje trendovima razvijenih demokratskih država u ovoj oblasti. Ovaj cilj se može ostvariti isključivo kroz edukaciju i obuku zavodskih službenika. Provedeno je istraživanje koje na 75 ispitanika zaposlenih u Zavodu za izvršenje krivičnih sankcija, pritvora i drugih mjera u BiH. Rezultati provedene ankete jasno pokazuju da su zaposleni u Zavodu svjesni važnosti obuke za njihov uspješan rad i da samo kvalitetnom obukom mogu poboljšati svoje radne rezultate. Menadžmentu je indikacija za izbor neophodne tema za obuku, planiranje i provodjenje u praksi. Dosadašnja obuka, kao dobra, ali je pokazala je da je dala pozitivne rezultate kada su stečena znanja i vještine primijenjeni u praksi. Rezultati istraživanja su pokazali da su zaposleni svjesni ove činjenice i važnosti njihovog posla. Istraživanje je potvrdilo čvrstu vezu između dobro organizirane i provedene obuke zatvorskih službenika te njihovih kompetencija u adekvatnom reagovanju na vanredne i incidentne situacije u zatvoru.

**Ključne riječi:** ovlaštene zavodski službenik, pritvorenik, osuđenik, zatvorenik, osumnjičeni, osoba lišena slobode



## THE EFFECT OF EDUCATION AND TRAINING IN IMPROVING THE COMPETENCES OF INSTITUTE OFFICERS IN RESPONSE TO HIGH-RISK SITUATIONS IN THE INSTITUTE FOR THE EXECUTION OF CRIMINAL SANCTIONS OF BOSNIA AND HERZEGOVINA

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### ABSTRACT

By analyzing the trends that follow the entire society, we come to the realization that there have been significant changes in the way persons deprived of their liberty are treated. The system of execution of criminal sanctions has undergone dramatic transformations. Democratization in the area of enforcement of criminal sanctions in Bosnia and Herzegovina also joined the trends of developed democratic states in this area. This goal can be achieved exclusively through the education and training of institutional officers. A survey was conducted on 75 respondents employed in the Institute for the Execution of Criminal Sanctions, Detention and Other Measures in Bosnia and Herzegovina. The results of the conducted survey clearly show that the employees of the Institute are aware of the importance of training for their successful work and that they can improve their work results only with quality training. For management, it is an indication for the selection of necessary topics for training, planning and implementation in practice. The previous training was good, but it showed that it gave positive results when the acquired knowledge and skills were applied in practice. The research results showed that employees are aware of this fact and the importance of their work. The research confirmed the strong connection between the well-organized and conducted training of prison officers and their competences in adequately responding to emergency and incident situations in the prison.

**Keywords:** Authorized prison officer, detainee, convict, prisoner, suspect, person deprived of liberty.

## ON SUPERVISION IN APPLIED SPORT PSYCHOLOGY – CHALLENGES AND DIRECTIONS

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### **ABSTRACT**

Supervisors act as gatekeepers to a profession by ensuring that people are competent and safe to work in a specific profession. Supervisors work closely with supervisees to resolve problems, raise competence levels, and discuss alternatives when needed. There are different theoretical models of supervision in sport psychology: developmental models, social role models, and learning models. On a practical level, only some countries seem to have clear guidelines for supervision and supervisor training established (UK, Australia, USA). In Serbia, sport psychology is still on the rise, and a clear supervision process is lacking. In this paper, a project on supervision in applied sport psychology is presented alongside an applied sport psychology course programme conducted at the Center for Sport Psychology. Five trainees, previously graduated in psychology, first participated in ten piece educational course on applied sport psychology. Course provided basic theoretical knowledge and initial supervisory experience in main areas of applied sport psychology. After completing the course, trainees had one year of on-demand supervision. After course completion and after a one-year period of supervision is finished, some issues come up to conclusion as main areas to be covered in future programs of supervision. These issues are about knowing different sports, dealing with personal anxiety and confidence in professional competence as a sport psychologist, measuring professional efficacy, and borders in professional relationship with sports clients.

**Key words:** supervision, sport psychology, trainee, applied training

## PROCJENA POUZDANOSTI I VALJANOSTI TESTA FUNKCIONALNOSTI KOD ODRASLIH OSOBA S DOWN SINDROMOM

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### SAŽETAK

Down sindrom (DS) najčešće je kromosomsko stanje povezano s intelektualnim teškoćama i smanjenim funkcionalnim fitnessom. Funkcionalni fitness odnosi se na sposobnost obavljanja svakodnevnih aktivnosti uz minimalan umor, a kod osoba s DS često je smanjen zbog ograničenja u snazi, fleksibilnosti i mobilnosti. Cilj ovog istraživanja bio je procijeniti pouzdanost i valjanost testa 8-foot get-up-and-go (8FUG) u populaciji odraslih osoba s DS. U istraživanju je sudjelovalo 28 odraslih osoba s DS (11 muškaraca i 17 žena) u dobi od 18 do 46 godina. Testiranje je obuhvatilo mjerenje tjelesne mase, visine i procjenu funkcionalnosti pomoću 8FUG testa. Analiza podataka pokazala je visoku pouzdanost testa (Cronbach  $\alpha = 0,98$ ; IIC = 0,96), dok analiza varijance (ANOVA) nije utvrdila značajne razlike između pokušaja, što potvrđuje stabilnost rezultata. Nadalje, utvrđena je pozitivna korelacija između tjelesne mase i vremena izvođenja testa, pri čemu su osobe s višom tjelesnom masom imale lošije rezultate (sporije izvođenje testa). Ovi nalazi potvrđuju da je 8FUG test pouzdan alat za procjenu funkcionalnog fitnessa kod osoba s DS te naglašavaju važnost kontrole tjelesne mase u održavanju njihove mobilnosti i samostalnosti. Daljnja istraživanja trebaju dodatno ispitati njegovu primjenjivost u različitim podskupinama ove populacije. Implementacija ciljanih programa tjelesne aktivnosti mogla bi poboljšati funkcionalne sposobnosti osoba s DS.

**Ključne riječi:** Down sindrom, tjelesni fitnes, pouzdanost, valjanost

## ASSESSMENT OF THE RELIABILITY AND VALIDITY OF THE FUNCTIONALITY TEST IN ADULTS WITH DOWN SYNDROME

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### ABSTARCT

Down syndrome (DS) is the most common chromosomal condition associated with intellectual disabilities and reduced functional fitness. Functional fitness refers to the ability to perform daily activities with minimal fatigue, and in individuals with DS, it is often diminished due to limitations in strength, flexibility, and mobility. The aim of this study was to assess the reliability and validity of the 8-foot get-up-and-go (8FUG) test in a population of adults with DS. The study included 28 adults with DS (11 men and 17 women) aged 18 to 46 years. Testing involved measurements of body mass, height, and assessment of functional abilities using the 8FUG test. Data analysis showed high test reliability (Cronbach  $\alpha = 0.98$ ; IIC = 0.96), while analysis of variance (ANOVA) found no significant differences between attempts, confirming result stability. Furthermore, a positive correlation was found between body mass and test execution time, with individuals of higher body mass showing poorer results (slower test execution). These findings confirm that the 8FUG test is a reliable tool for assessing functional fitness in individuals with DS and highlight the importance of body mass control in maintaining their mobility and independence. Further research should examine its applicability in various subgroups of this population. Implementation of targeted physical activity programs could improve the functional abilities of individuals with DS.

**Keywords:** Down syndrome, physical fitness, reliability, validity

## NORMATIVE VALUES FOR 4X10 M SHUTTLE-RUN FITNESS TEST AMONG MACEDONIAN CHILDREN AND ADOLESCENTS

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### ABSTRACT

This study aimed to establish normative values for the 4x10 m shuttle-run fitness test in Macedonian children and adolescents and to assess their motor fitness levels in comparison with peers from other countries. The study included 15,314 participants, divided into nine age groups and by gender. Measurements of height, weight, body mass index (BMI), and shuttle-run performance were taken, with data processed using the LMS method. Results showed that boys outperformed girls across all age groups ( $p < 0.001$ ), with their improvement over time being more pronounced. Performance increased with age for both sexes, but boys demonstrated a steeper progression. International comparisons indicated that Macedonian children exhibited lower motor fitness levels than their peers. Linear regression analysis revealed that the predictive values for the 4x10 m shuttle-run test were similar for both genders. These normative values enable accurate assessment of motor fitness based on age and gender, which is essential for tracking individual progress and implementing appropriate preventive and intervention strategies. Additionally, the data allow for international comparisons of physical fitness trends.

**Keywords:** 4x10 m shuttle-run test; children; speed-agility; percentile curve

## THE CORRELATION BETWEEN BODY MASS INDEX, ADIPOSE TISSUE MASS, AND PHYSICAL FITNESS LEVELS IN PEDIATRIC POPULATIONS

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### ABSTRACT

Childhood obesity is a global concern with implications for health-related physical fitness (HRPF). This study examines the association between Body Mass Index (BMI), fat mass (FM), and HRPF in 2,197 children aged 6–10 years in Skopje, North Macedonia. It highlights the impact of excess adiposity on fitness components and underscores the need for targeted interventions. Anthropometric and body composition data were collected using bioelectrical impedance analysis (BIA) and BMI calculations. HRPF was assessed via six EUROFIT battery tests measuring flexibility, muscular strength, agility, and cardiorespiratory fitness. Statistical analyses included one-way ANOVA, linear regression, and logistic regression to explore relationships between BMI, FM, and fitness performance. Higher BMI and FM were associated with decreased performance in weight-bearing tasks (e.g., shuttle run and standing broad jump) but positively correlated with handgrip strength. Boys generally outperformed girls in most fitness tests, except flexibility. Logistic regression revealed increased obesity risk in children within the lowest fitness quartiles, emphasizing FM's role as a predictor of physical fitness. BMI and FM are significant determinants of HRPF, with implications for childhood obesity management. Findings advocate for evidence-based interventions to improve fitness and reduce obesity-related risks, supporting public health initiatives to enhance physical activity among children.

**Keywords:** obesity; physical fitness; adiposity.

## POKRETNOST IGRA U FUNKCIJI INTEGRALNOG RAZVOJA DECE PREDŠKOLSKOG UZRASTA

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### APSTRAKT

Novе tendencije vaspitno-obrazovnog rada u predškolskim ustanovama holistički posmatraju dete, uvažavajući saznanje da su različiti aspekti razvoja deteta u međusobnoj interakciji i da se ne mogu grubo razdvojiti. U radu sa decom specifičnim aktivnostima treba podsticati i delovati na sve segmente dečjeg razvoja (motorički, intelektualni, moralni, socijalni), budući da se oni međusobno prepliću i uslovljavaju.

Percepcija dece, na osnovu nove paradigme obrazovanja o ranom učenju i polazišta predškolskog programa, počiva na postulatima da su deca jedinstvena i holistička ljudska bića. „Deca su bića igre” glavni je moto osnova programa Godine uzleta. Igra otvara prostor za razvijanje kompetencija kod dece predškolskog uzrasta u kontekstu holističkog pristupa budući da ona podstiče ukupan razvoj dece. U ovom novom pristupu, igra se definiše kao dominantna praksa za decu. Kroz igru, deca grade odnose i učestvuju u procesu usvajanja i transformacije kulture. Naglašava se da je igra oblik izražavanja i najznačajniji stvaralački potencijal ljudskih bića. U nacionalnoj naučnoj literaturi R. Srbije, prema Kamenovu, igra je osnovna, dominantna aktivnost deteta.

Pokret je sastavni deo ishoda holistički primenjenog znanja, umeća i stavova o fizičkoj aktivnosti, odnosno vrednostima za ceo život. Dete kroz pokret i pokretnu igru na inherentan način se odnosi prema svetu, stvara, proširuje i obrađuje sopstvena iskustva, konstruiše znanja i time oblikuje sopstveni identitet i svet, razvija svoj potencijal za otvorenost, fleksibilnost i kreativnost kao osnovu za sveobuhvatno učenje i razvoj.

U kontekstu pokreta kao imanentnog biološkog svojstva, fokus rada je na teorijskoj eksplikaciji značaja pokretne igre za integralni razvoj predškolske dece.

**Ključne reči:** predškolsko dete, pokret, igra, psihomotorni razvoj

## MOBILE GAME IN THE FUNCTION OF INTEGRAL DEVELOPMENT OF PRESCHOOL CHILDREN

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### ABSTRACT

New tendencies of educational work in preschool institutions look at the child holistically, respecting the knowledge that different aspects of the child's development interact with each other and cannot be roughly separated. When working with children, specific activities should encourage and act on all segments of children's development (motor, intellectual, moral, social), since they intertwine and condition each other.

The perception of children, based on the new paradigm of early learning education and the starting point of the preschool program, rests on the postulates that children are unique and holistic human beings. "Children are beings of play" is the main motto of the Years of Ascension program. The game opens up space for the development of competencies in preschool children in the context of a holistic approach, since it encourages the overall development of children. In this new approach, play is defined as the dominant practice for children. Through play, children build relationships and participate in the process of adopting and transforming culture. It is emphasized that play is a form of expression and the most significant creative potential of human beings. In the national scientific literature of the Republic of Serbia, according to Kamenov, play is the basic, dominant activity of a child.

Movement is an integral part of the outcome of holistically applied knowledge, skills and attitudes about physical activity, that is, values for the whole life. Through movement and mobile play, the child relates to the world in an inherent way, creates, expands and processes his own experiences, constructs knowledge and thus shapes his own identity and the world, develops his potential for openness, flexibility and creativity as a basis for comprehensive learning and development.

In the context of movement as an immanent biological property, the focus of the paper is on the theoretical explanation of the importance of movement play for the integral development of preschool children.

**Key words:** preschool child, movement, play, psychomotor development

## FAKTORSKA STRUKTURA MOTORIČKIH SPOSOBNOSTI KOD DŽUDISTA

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### ABSTRAKT

Redovno bavljenje džudoom u dužem vremenskom periodu utiče na optimalan razvoj sportiste, poboljšava strukturu njegovog psihosomatskog statusa, utiče na morfološke karakteristike i motoričke sposobnosti sportista. Ovo istraživanje je sprovedeno na namernom uzorku ispitanika sa osnovnim ciljem utvrditi faktorsku strukturu motoričkih sposobnosti džudista. Primenom faktorske analiza, ortogonalne i Varimaks-solucije i Gutman-Kajzerovim kriterijumom, utvrđena je faktorska struktura motoričkih testova kod džudiste.

**Ključne reči;** džudo, faktorska struktura, motoričke sposobnosti.

## FACTOR STRUCTURE OF MOTOR ABILITIES IN JUDO PLAYERS

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### ABSTRACT

Regular practice of judo for a long period of time affects the optimal development of the athlete, improves the structure of his psychosomatic status, affects the morphological characteristics and motor skills of athletes. This research was conducted on a deliberate sample of subjects with the main goal of determining the factor structure of judoka's motor abilities. By applying factor analysis, orthogonal and Varimax solutions and the Gutman-Kaiser criterion, the factor structure of motor tests of judo was determined.



## UČINKOVITOST OBUKE NEPLIVAČA KOD DJECE: RAZLIKE PO GEOGRAFSKIM PODRUČJIMA I MEĐU SPOLOVIMA

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### SAŽETAK

Obuka neplivača kod djece predstavlja temeljni dio njihovog psihofizičkog razvoja, koji ne samo što poboljšava njihove motoričke sposobnosti već i smanjuje rizik utapanja. Obuka neplivača na priobalnim područjima i na otocima predstavlja izazov zbog ograničenog pristupa resursima i stručnim kineziološkim kadrovima, što može rezultirati razlikama u usvajanju plivačkih motoričkih znanja između djece iz različitih geografskih područja i spolova. Glavni cilj ovog istraživanja bio je usporediti usvojenu razinu plivačkih motoričkih znanja kod 105 djece nakon obuke neplivača iz priobalnog i otočnog područja Splitsko-dalmatinske županije te među spolovima. Svi ispitanici prošli su tečaj obuke neplivača u trajanju od 3 tjedna te finalno mjerenje usvojenih plivačkih motoričkih znanja. Za analizu podataka korišteni su kontigencijska tablica i Hi-kvadrat test. Rezultati ovog istraživanja pokazali su da su djeca iz priobalnog područja bolje savladala plivačko motoričko znanje, kao i da su dječaci ostvarili bolje rezultate, no nisu postojale spolne razlike. Ovo istraživanje pruža vrijedan uvid u razlike u usvajanju plivačkih motoričkih znanja između djece iz različitih geografskih područja, što može pomoći u prilagodbi metoda rada obuke neplivača. Važno je istaknuti da antropološki status može značajno utjecati na fizičku aktivnost i učinkovitost programa kao što je plivanje. Buduća istraživanja trebala bi se usmjeriti na dugoročne učinke ovakvih programa, uključujući praćenje stečenih motoričkih znanja te istraživanje utjecaja dodatnih faktora poput dostupnosti resursa za obuku plivanja i cjelokupnog antropološkog statusa na usvajanje plivačkih motoričkih znanja kod djece. Time bi se moglo poboljšati razumijevanje kako različiti faktori utječu na učinkovitost programa obuke plivanja i kako ih prilagoditi individualnim potrebama neplivača.

**Ključne riječi:** djeca, motoričke sposobnosti, plivanje, obuka neplivača

## EFFECTIVENESS OF NON-SWIMMER TRAINING IN CHILDREN: DIFFERENCES BY GEOGRAPHICAL AREAS AND BETWEEN GENDER

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### ABSTRACT

Non-swimmer training in children is a fundamental part of their psychophysical development, which not only improves their motor skills but also reduces the risk of drowning. Training non-swimmers in coastal areas and on islands is challenging due to limited access to resources and professional kinesiology staff, which can result in differences in the acquisition of swimming motor skills between children from different geographical areas and genders. The main aim of this study was to compare the acquired level of swimming motor skills in 105 children after training non-swimmers from the coastal and island areas of Split-Dalmatia County and between genders. All subjects underwent a 3-week non-swimmer training course and a final measurement of acquired swimming motor skills. Contingency tables and Chi-square tests were used to analyze the data. The results of this study showed that children from coastal areas mastered swimming motor skills better, and that boys achieved better results, but there were no gender differences. This study provides valuable insight into differences in the acquisition of swimming motor skills between children from different geographical areas, which may help in adapting the methods of training non-swimmers. It is important to emphasize that anthropological status can significantly affect physical activity and the effectiveness of programs such as swimming. Future research should focus on the long-term effects of such programs, including monitoring the acquired motor skills and investigating the influence of additional factors such as the availability of swimming training resources and overall anthropological status on the acquisition of swimming motor skills in children. This could improve the understanding of how different factors affect the effectiveness of swimming training programs and how to adapt them to the individual needs of non-swimmers.

**Keywords:** children, motor skills, swimming, training non-swimmers

## INFLUENCE OF NUTRITION ON THE DEVELOPMENT OF MOTOR EFFICIENCY IN PRESCHOOL CHILDREN

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### ABSTRACT

Motor problems in preschool children have many negative consequences. Given the negative impact of motor problems on quality of life, early identification of the causes is crucial. One of the causes of motor problems can also be nutritional status. The aim of our study was to investigate the influence of nutrition on the development of motor efficiency in preschool children. The nutritional variable is represented by Body Mass Index (BMI) and Waist-to-Height Ratio (WHtR), and the MOT4-6 test was used for the motor efficiency (MQ) variable. The sample consists of 58 children aged 4.6 to 6.11 years. Research findings: Overweight children have lower motor efficiency; both nutritional measures are moderately negatively correlated with motor efficiency ( $r > 0.04$ ) and are statistically significant at the 0.01 level; the calculation of the difference between empirical and theoretical frequencies indicates a relationship between the MQ-BMI and MQ-WHtR variables; the differences are statistically significant at the 0.05 level.

**Key words:** motor efficiency, preschool child, nutrition status, MOT4-6

## KOMPARATIVNA ANALIZA IMUNOLOŠKOG STATUSA FUDBALERA RAZLIČITIH NIVOVA TAKMIČENJA

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### SAŽETAK

Cilj ovog istraživanja bio je da se ispita imunološki status fudbalera različitih takmičarskih nivoa u Bosni i Hercegovini putem analize ključnih hematoloških biomarkera. Uzorak je obuhvatio 59 fudbalera iz prve, treće i pete lige, čiji su imunološki parametri analizirani na osnovu medicinskih kartona i laboratorijskih nalaza. Mjereni su apsolutni brojevi leukocita, limfocita, monocita, neutrofila, eozinofila i bazofila. Rezultati nisu pokazali statistički značajne razlike između fudbalera različitih liga, iako su uočene određene varijacije u pojedinim biomarkerima. Ovi nalazi sugerišu da nivo takmičenja sam po sebi ne predstavlja ključni faktor u određivanju imunoloških odgovora sportista u stabilnim fiziološkim uslovima. Zaključuje se da je potrebno sprovesti dodatna istraživanja koja bi obuhvatila različite faze trenažnog ciklusa kako bi se bolje razumio uticaj trenažnog opterećenja i periodizacije treninga na imunološki status fudbalera.

**Ključne riječi:** imunološki status, fudbal, leukociti, hematološki biomarkeri, nivo takmičenja

## COMPARATIVE ANALYSIS OF THE IMMUNOLOGICAL STATUS OF FOOTBALLERS AT DIFFERENT LEVELS OF COMPETITION

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### ABSTRACT

The aim of this study was to examine the immune status of football players at different competition levels in Bosnia and Herzegovina through the analysis of key hematological biomarkers. The sample included 59 football players from the first, third, and fifth leagues, whose immune parameters were analyzed based on medical records and laboratory findings. The measured parameters included absolute counts of leukocytes, lymphocytes, monocytes, neutrophils, eosinophils, and basophils. The results did not show statistically significant differences between players from different leagues, although certain variations in individual biomarkers were observed. These findings suggest that the competition level itself is not a key factor in determining the immune responses of athletes under stable physiological conditions. It is concluded that further research is needed, covering different phases of the training cycle, to better understand the impact of training load and periodization on the immune status of football players.

**Keywords:** immune status, football, leukocytes, hematological biomarkers, competition level

## PREDŠKOLSKO VASPITANJE U FUNKCIJI RAZVOJA DJECE

**Olivera Krivokapić**

*JU OŠ Ratko Žarić, Nikšić, Crna Gora*

### SAŽETAK

Predškolsko vaspitanje predstavlja ključni period u razvoju djeteta, jer postavlja temelje za kognitivni, socio-emocionalni i fizički razvoj. Kvalitetni predškolski programi omogućavaju djeci sticanje osnovnih vještina i kompetencija koje su neophodne za kasniji uspjeh u školi i društvu. Ovaj rad analizira uticaj predškolskog vaspitanja na razvoj djece kroz različite aspekte, uključujući emocionalni razvoj, usvajanje osnovnih znanja i vještina, razvoj motorike i socijalizaciju. Takođe, istražuje se uloga vaspitača i roditelja u ovom procesu. Poseban akcenat stavljen je na savremene pristupe u predškolskom obrazovanju, značaj igre kao osnovnog metoda učenja i važnost inkluzivnog vaspitanja.

**Ključne riječi:** predškolsko vaspitanje, rani razvoj, socijalizacija, kognitivni razvoj, igra u učenju

## PRESCHOOL EDUCATION IN THE FUNCTION OF CHILD DEVELOPMENT

**Olivera Krivokapić**

*JU Elementary School Ratko Žarić, Nikšić, Montenegro*

### ABSTRACT

Preschool education represents a crucial period in a child's development, as it lays the foundation for cognitive, socio-emotional, and physical growth. Quality preschool programs enable children to acquire essential skills and competencies necessary for later success in school and society. This paper analyzes the impact of preschool education on child development through various aspects, including emotional development, the acquisition of basic knowledge and skills, motor skills development, and socialization. It also explores the role of educators and parents in this process. Special emphasis is placed on modern approaches in preschool education, the importance of play as the primary method of learning, and the significance of inclusive education.

**Keywords:** preschool education, early development, socialization, cognitive development, play in learning

## ISHRANA, NUTRITIVNA TERAPIJA I DIJETETIKA U SPORTU

**Olivera Krivokapić**

*JU OŠ Ratko Žarić, Nikšić, Crna Gora*

### SAŽETAK

Ishrana sportista ključni je faktor za postizanje optimalnih rezultata i održavanje zdravlja. Nutritivna terapija pruža personalizovane smjernice ishrane radi poboljšanja performansi i oporavka, dok dijetetika proučava principe pravilne prehrane u kontekstu sporta. Ovaj rad analizira osnovne principe sportske ishrane, značaj makro i mikronutrijenata, specifične dijetetske strategije i njihov uticaj na sportske performanse. Prikazana su najnovija istraživanja o ulozi personalizovane ishrane u različitim sportovima, uz pregled ključnih naučnih radova koji podržavaju različite nutritivne pristupe u sportu.

**Ključne reči:** sportska ishrana, nutritivna terapija, makronutrijenti, mikronutrijenti, hidracija

## NUTRITION, NUTRITIONAL THERAPY, AND DIETETICS IN SPORTS

**Olivera Krivokapić**

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### ABSTRACT

Athlete nutrition is a key factor for achieving optimal performance and maintaining health. Nutritional therapy provides personalized dietary guidelines to enhance performance and recovery, while dietetics studies the principles of proper nutrition in the context of sports. This paper analyzes the fundamental principles of sports nutrition, the importance of macro and micronutrients, specific dietary strategies, and their impact on athletic performance. The latest research on the role of personalized nutrition in different sports is presented, along with a review of key scientific papers that support various nutritional approaches in sports.

**Keywords:** sports nutrition, nutritional therapy, macronutrients, micronutrients, hydration.

## EFEKTI PROGRAMA ODBOJKE NA PROMJENE MORFOLOŠKIH KARAKTERISTIKA MLADIH ODBOJKAŠICA

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### SAŽETAK

Istraživanje je provedeno na uzorku koji je činilo 50 ispitanica – mladih odbojkašica uzrasne dobi 10-12 godina s ciljem utvrđivanja efekata šestomjesečnog programiranog rada na transformaciju (promjene) morfoloških karakteristika mladih odbojkašica koje redovno treniraju u OK „Modriča – Novoprom“ iz Modriče. U istraživanju je primijenjen set od 12 varijabli za procjenu morfoloških karakteristika mjerene prema uputama Internacionalnog biološkog programa (IBP). Mjerenje morfoloških varijabli izvršeno je u dvije vremenske tačke, prije realizacije eksperimentalnog programa (inicijalno) i poslije realizacije eksperimentalnog programa (finalno).

U cilju utvrđivanja efekata šestomjesečnog eksperimentalnog programa rada na transformaciju (promjene) morfoloških karakteristika mladih odbojkašica primijenjen je komponentni model faktorske analize gdje je prva glavna komponenta matrica korelacija razlika analizirana u ortogonalnoj i kosoj (oblimin) soluciji.

Dobiveni rezultati faktorske analize pokazuju da je pod uticajem šestomjesečnog programa rada došlo do značajnih promjena morfoloških karakteristika kod tretiranog uzorka ispitanica. Iako su na oba mjerenja izolovane po tri latentne dimenzije, procenat objašnjene varijanse veći je na finalnom mjerenju (80.730) u odnosu na inicijalno mjerenje (73.692). Promjene morfoloških karakteristika se ogledaju u promjeni nekih numeričkih pokazatelja i pozicioniranju nekih varijabli u strukturi izolovanih faktora a najznačajnije su izražene kod mjera dimenzionalnosti i potkožnog masnog tkiva.

Dobiveni rezultati istraživanja ukazuju da dobro osmišljen i definisan eksperimentalni program rada može efikasno doprinjeti željenim promjenama morfoloških karakteristika u pravcu rasta i razvoja mladih odbojkašica.

**Ključne riječi:** faktorska analiza, mlade odbojkašice, eksperimentalni program, transformacija

## EFFECTS OF VOLLEYBALL PROGRAM ON CHANGES IN MORPHOLOGICAL CHARACTERISTICS OF YOUNG VOLLEYBALL PLAYERS

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### ABSTRACT

The research was conducted on a sample of 50 participants – young female volleyball players aged 10-12 years, with the aim of determining the effects of a six-month programmed training regimen on the transformation (changes) of morphological characteristics in young female volleyball players who regularly train at the OK "Modriča – Novoprom" volleyball club in Modriča. The study used a set of 12 variables to assess morphological characteristics, measured according to the guidelines of the International Biological Program (IBP). The measurement of morphological variables was carried out at two time points: before the implementation of the experimental program (initial) and after the completion of the experimental program (final).

To determine the effects of the six-month experimental training program on the transformation (changes) of the morphological characteristics of the young volleyball players, a component model of factor analysis was applied, where the first principal component of the correlation matrix of the differences was analyzed using both orthogonal and oblique (oblimin) solutions.

The results obtained from the factor analysis show that the six-month training program led to significant changes in the morphological characteristics of the sample of participants. Although three latent dimensions were isolated in both measurements, the percentage of explained variance was higher in the final measurement (80.730) compared to the initial measurement (73.692). The changes in the morphological characteristics are reflected in the change of certain numerical indicators and the repositioning of some variables within the structure of the isolated factors, with the most significant changes observed in the measures of dimensionality and subcutaneous fat tissue.

The results of the study suggest that a well-designed and defined experimental training program can effectively contribute to the desired changes in morphological characteristics in the direction of growth and development in young female volleyball players.

**Keywords:** factor analysis, young female volleyball players, experimental program, transformation



## ANALIZA KVANTITATIVNIH PROMJENA MORFOLOŠKIH KARAKTERISTIKA MLADIH ODBOJKAŠICA POD UTICAJEM EKSPERIMENTALNOG PROGRAMA

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### SAŽETAK

Istraživanje je provedeno na uzorku 50 ispitanica - djevojčica JU OŠ „Sveti Sava“ i JU OŠ „Sutjeska“ iz Modriče, starosne dobi od 10 do 12 godina koje treniraju odbojku u OK „Modriča – Novoprom“ iz Modriče s ciljem utvrđivanja parcijalnih i globalnih kvantitativnih promjena primijenjenih morfoloških karakteristika nastalih pod uticajem posebno definisanog programa odbojke u trajanju šest mjeseci.

U istraživanju je primijenjen set od 12 varijabli za procjenu morfoloških karakteristika mjerenih prema uputama Internacionalnog Biološkog programa (IBP).

Za utvrđivanje parcijalnih kvantitativnih promjena (razlika) primijenjenih morfoloških karakteristika primijenjeni su rezultati analize T testa a za utvrđivanje kvantitativnih promjena (razlika) morfoloških karakteristika na globalnom nivou primijenjena je kanonička diskriminativna analiza.

Rezultati T testa i kanoničke diskriminativne analize pokazuju da je pod uticajem programiranog rada odbojke u trajanju šest mjeseci došlo do statistički značajnih parcijalnih i globalnih promjena (razlika) u prostoru morfoloških karakteristika koji se mogu pripisati uticaju primijenjenog programa odbojke ali se ne smiju zanemariti promjene biološkog rasta i razvoja ispitanica koje su karakteristične za uzrasnu dob 10 – 12 godina.

Dobiveni rezultati mogu biti od koristi trenerima mlađih selekcija odbojkašica u odbojkaškim lubovima i školama odbojke, te profesorima tjelesnog odgoja u kvalitetnom programiranju trenažnog i nastavnog procesa sa mlađim uzrasnim kategorijama djevojčica.

**Ključne riječi:** globalne i parcijalne promjene, program rada, kanonička diskriminativna analiza, T test, učeni.

## ANALYSIS OF QUANTITATIVE CHANGES IN THE MORPHOLOGICAL CHARACTERISTICS OF YOUNG VOLLEYBALL GIRLS UNDER THE INFLUENCE OF THE EXPERIMENTAL PROGRAM

**Osmo Bajrić<sup>1</sup>, Sara Obradović<sup>2</sup>, Tatjana Drvenica<sup>3</sup>, Senad Bajrić<sup>1</sup>, Oliver Krička<sup>1</sup>**

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### ABSTRACT

The research was conducted on a sample of 50 participants – girls from JU OŠ "Sveti Sava" and JU OŠ "Sutjeska" from Modriča, aged 10 to 12 years, who train volleyball at OK "Modriča – NovoProm" from Modriča, with the aim of determining the partial and global quantitative changes in applied morphological characteristics resulting from a specially defined six-month volleyball program.

A set of 12 variables was applied to assess the morphological characteristics, measured according to the guidelines of the International Biological Program (IBP).

To determine the partial quantitative changes (differences) in the applied morphological characteristics, T-test analysis results were used, and for the determination of the global quantitative changes (differences) in morphological characteristics, canonical discriminant analysis was applied.

The results of the T-test and canonical discriminant analysis show that under the influence of the six-month programmed volleyball training, statistically significant partial and global changes (differences) occurred in the morphological characteristics space. These changes can be attributed to the applied volleyball program; however, changes in biological growth and development specific to the age group of 10-12 years should not be neglected.

The results obtained can be useful for coaches of younger volleyball teams in volleyball clubs and schools, as well as for physical education teachers in quality programming of training and teaching processes for younger age groups of girls.

**Keywords:** global and partial changes, training program, canonical discriminant analysis, T-test, students.

## STAVOVI NASTAVNIKA O SPECIFIČNOSTI RELACIJE RAZVOJNO PRIMJERENE PRAKSE I SPORTSKI NADARENIH UČENIKA UNUTAR INDIVIDUALNOG KURIKULUMA

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### SAŽETAK

Istraživanje je provedeno na uzorku od 102 ispitanika (učitelja/nastavnika) zaposlenih u osnovnim školama Zeničko-dobojskog kantona Federacije Bosne i Hercegovine.

Osnovni cilj istraživanja je utvrđivanje stavova-mišljenja i eventualnih razlika ispitanika o specifičnosti relacije razvojno primjerene prakse i sportski nadarenih učenika koji prelaze iz razredne u predmetnu nastavu unutar individualnog kurikuluma s obzirom na spol, radni status, dob i stepen obrazovanja ispitanika.

U istraživanju je primijenjen anketni upitnik petostepene Likertove skale u kojem je svaka tvrdnja označena sa 5 odgovora (1-uopšte se ne slažem, 2-ne slažem se, 3-nemam mišljenje/neutralan sam, 4-slažem se, 5-potpuno se slažem). Anketni list je obuhvatao opšte podatke o ispitanicima (spol, radno mjesto/poziciju, starosnu dob, stepen obrazovanja) i 5 indikatora razvojno primjerene prakse sa skalom pokazatelja razvojno primjerene prakse podržavanja učenikove nadarenosti.

Za sve indikatore stavova nastavnika o specifičnosti relacija relacije razvojno primjerene prakse i nadarenih učenika u sportu koji prelaze iz razredne u predmetnu nastavu unutar individualnog kurikuluma izračunati su i utvrđeni osnovni deskriptivni statistički parametri (aritmetička sredina -AS i standardna devijacija -St. Dev.). Za utvrđivanje statističke značajnosti razlika između grupa ispitanika primijenjeni su rezultati t-testa i analiza varijanse različitih grupa sa LSD Post Hoc testovima poređenja.

Aritmetička sredina (AS) svih indikatora od 3,92 pokazuje da se učitelji/nastavnici veoma dobro slažu s tvrdnjama o razvojno primjerenoj praksi. Vrijednost standardne devijacije (SD) od 0,82 ukazuje da je rasipanje oko aritmetičke sredine veoma slabo, što potvrđuje i koeficijent varijabilnosti (CV) od 20,92% a time i veoma dobru homogenost dobivenih rezultata za ovaj uzorak ispitanika.

Rezultati T testa i analiza varijanse sa LSD Post Hoc testovima poređenja ukazuju da nema statistički značajne razlike u stavovima ispitanika o specifičnosti relacija razvojno primjerene prakse i nadarenih učenika u sportu koji prelaze iz razredne u predmetnu nastavu unutar individualnog kurikuluma s obzirom na spol, starosnu dob i stepen obrazovanja ispitanika. Razlika je utvrđena jedino kod ispitanika s obzirom na radni status. Generalno, može se zaključiti da učitelji/nastavnici imaju ujednačene stavove o specifičnosti relacije razvojno primjerene prakse i nadarenih učenika u sportu koji prelaze iz razredne u predmetnu nastavu unutar individualnog kurikuluma.

Značaj dobivenih rezultata je u tome što se na taj način može obezbijediti kontinuirani i kvalitetni razvoj nadarenih učenika u sportu koji prelaze iz razredne u predmetnu nastavu.

**Ključne riječi:** analiza varijanse, t – test, LSD Post Hoc testovi poređenja, stavovi, ispitanici, sportska nadarenost

## TEACHERS' VIEWS ON THE SPECIFICITY OF THE RELATIONSHIP BETWEEN DEVELOPMENTALLY APPROPRIATE PRACTICE AND SPORTS-TALENTED STUDENTS WITHIN THE INDIVIDUAL CURRICULUM

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### ABSTRACT

The research was conducted on a sample of 102 respondents (teachers) employed in primary schools in the Zenica-Doboj Canton of the Federation of Bosnia and Herzegovina.

The main objective of the research is to determine the attitudes and opinions and possible differences of the respondents on the specifics of the relationship between developmentally appropriate practice and gifted students who move from classroom to subject teaching within the individual curriculum, considering the gender, employment status, age and level of education of the respondents.

The research used a five-point Likert scale questionnaire in which each statement was marked with 5 answers (1-I completely disagree, 2-I disagree, 3-I have no opinion/I am neutral, 4-I agree, 5-I completely agree). The questionnaire included general data on the respondents (gender, workplace/position, age, level of education) and 5 indicators of developmentally appropriate practice with a scale of indicators of developmentally appropriate practice in supporting students' giftedness.

For all indicators of teachers' attitudes about the specificity of the relationship between developmentally appropriate practice and gifted students in sports who move from classroom to subject teaching within the individual curriculum, basic descriptive statistical parameters (arithmetic mean -AS and standard deviation -St. Dev.) were calculated and determined. To determine the statistical significance of differences between groups of respondents, the results of the t-test and analysis of variance of different groups with LSD Post Hoc comparison tests were applied.

The arithmetic mean (AS) of all indicators of 3.92 shows that teachers/educators agree very well with the statements about developmentally appropriate practice. The standard deviation (SD) value of 0.82 indicates that the dispersion around the arithmetic mean is very weak, which is confirmed by the coefficient of variability (CV) of 20.92% and thus the very good homogeneity of the results obtained for this sample of respondents.

The results of the T test and analysis of variance with LSD Post Hoc comparison tests indicate that there is no statistically significant difference in the attitudes of the respondents about the specificity of the relationship between developmentally appropriate practice and gifted students in sports who move from classroom to subject teaching within the individual curriculum with regard to gender, age and level of education of the respondents. The difference was determined only among the respondents with regard to employment status. In general, it can be concluded that teachers/educators have uniform attitudes about the specificity of the relationship between developmentally appropriate practice and gifted students in sports who move from classroom to subject teaching within the individual curriculum.

The significance of the results obtained is that in this way, continuous and quality development of gifted students in sports who move from classroom to subject teaching can be ensured.

**Key words:** analysis of variance, t-test, LSD Post Hoc comparison tests, attitudes, respondents, sports talent, students

## RAZLIKE U KOORDINACIJI I AGILNOSTI FUDBALERA U ODNOSU NA IGRAČKE POZICIJE

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### SAŽETAK

U ovom istraživanju obuhvaćen je uzorak od 62 entiteta muškog spola, seniorske kategorije fudbalera koji se takmiče u rangu Prve lige Federacije BiH iz klubova FK „Budućnost“ iz Banovića, NK Bratstvo“ iz Gračanice i OFK „Gradina“ iz Srebrenika. Istraživani su subprostori bazično-motoričkih sposobnosti koji se smatraju fundamentalnim i bitnim za realizaciju složenih zahtjeva, a to su koordinacija i agilnost. Cilj istraživanja je da se utvrde razlike u koordinaciji i agilnosti fudbalera u odnosu na pozicije igrača. Podjela igrača po kategorijama izvršena je na 11 pozicija tako da je: Kategorija 1 – pozicija golman, Kategorija 2 – pozicija lijevi bek, Kategorija 3 – pozicija lijevi štoper, Kategorija 4 – pozicija desni štoper, Kategorija 5 – pozicija desni bek, Kategorija 6 – pozicija zadnji vezni, Kategorija 7 – pozicija centralni vezni, Kategorija 8 – pozicija prednji vezni, Kategorija 9 – pozicija lijevo krilo, Kategorija 10 – pozicija desno krilo i Kategorija 11 – pozicija napadači. Analiza varijanse pokazala je da postoje statistički značajne razlike u koordinaciji, gdje najlošije rezultate ispoljavaju igrači na poziciji 1 (golmani), a najbolje igrači na poziciji 7 (centralni vezni). Takođe kod agilnosti opet imamo najlošije rezultate igrača na poziciji 1 (golmani) dok su najbolji bili igrači na poziciji 8 (prednji vezni).

**Ključne riječi:** Fudbaleri, igračke pozicije, koordinacija, agilnost.

## DIFFERENCES IN COORDINATION AND AGILITY OF FOOTBALLERS IN RELATION TO PLAYER POSITIONS

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### ABSTRACT

This research includes a sample of 62 male entities, senior category football players who compete in the First League of the Federation of BiH from the clubs FK "Budućnost" from Banovići, NK Bratstvo from Gračanica and OFK "Gradina" from Srebrenik. The subspaces of basic motor abilities that are considered fundamental and essential for the realization of complex requirements, namely coordination and agility, were investigated. The goal of the research is to determine the differences in the coordination and agility of soccer players in relation to the positions of the players. The division of players into 11 positions is as follows: Category 1 – goalkeeper position, Category 2 – left back position, Category 3 – left stopper position, Category 4 – right stopper position, Category 5 – right back position, Category 6 – rear midfielder position, Category 7 – central midfielder position, Category 8 – front midfielder position, Category 9 – left wing position, Category 10 – right wing position and Category 11 – position attackers. The variance analysis showed that there are statistically significant differences in coordination, where the worst results are shown by players in position 1 (goalkeepers), and the best by players in position 7 (central midfielders). Also in terms of agility, we again have the worst results of players in position 1 (goalkeepers), while the best were players in position 8 (forward midfielders).

**Keywords:** Football players, playing positions, coordination, agility.

## ANTROPOMETRIJSKE KARAKTERISTIKE FUDBALERA OSAM PRVOPLASIRANIH EKIPA POSLJEDNJEG EVROPSKOG PRVENSTVA – EURO 2024

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### SAŽETAK

Sistem praćenja morfoloških karakteristika opisan je u Međunarodnom biološkom programu (Weiner & Lourie, 1969) i detaljno je razrađen. Postavlja se pitanje koji je opravdan broj upotrebe instrumenata za procjenu morfološkog statusa u sportu. Bez obzira na uzrasnu dob ispitanika osnovne morfološke dimenzije tjelesna visina i tjelesna masa tijela trebale bi biti u opštoj upotrebi a ujedno su osnova za izračunavanje indeksa tjelesne mase, odnosno odnosa tjelesne mase (kg) i kvadrata tjelesne visine, kao mjera procjene pretilosti (Mišigoj-Duraković, 2008).

Standardna antropometrija (tjelesna visina i tjelesna masa) fudbalera preuzeta je sa Web stranice EURO 2024. Indeks tjelesne mase izračunat je na osnovu odnosa tjelesne mase izražene u kg i kvadrata tjelesne visine izražene u metrima.

Skup varijabli primijenjen u ovom radu čine dvije antropometrijske mjere, tjelesna visina i tjelesna težina te izračunati indeks tjelesne mase.

Osnovni cilj ovog rada odnosi se na prikaz vrijednosti navedenih morfoloških odlika fudbalera osam prvoplasiranih ekipa na posljednjem Evropskom prvenstvu u fudbalu održanom u Njemačkoj - EURO 2024.

Na završnom turniru Evropskog prvenstva u fudbalu učestvovalo je 24 evropskih selekcija koje su se kroz sistem kvalifikacija kvalifikovale na završni turnir kojem je domaćin bila Njemačka.

**Ključne riječi:** evropsko prvenstvo, fudbal, reprezentacije

## ANTHROPOMETRIC CHARACTERISTICS OF FOOTBALL PLAYERS OF EIGHT FIRST-PLACED TEAMS OF THE LAST EUROPEAN CHAMPIONSHIP – EURO 2024

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### ABSTRACT

The system for monitoring morphological characteristics is described in the International Biological Program (Weiner & Lourie, 1969) and is elaborated in detail. The question arises as to what is the justified number of instruments used to assess the morphological status in sports. Regardless of the age of the examinee, the basic morphological dimensions body height and body mass should be in general use and are also the basis for calculating the body mass index, i.e. the ratio of body mass (kg) to the square of body height, as a measure of obesity assessment (Mišigoj-Duraković, 2008).

The standard anthropometry (body height and body mass) of football players was taken from the EURO 2024 website. The body mass index was calculated based on the ratio of body mass expressed in kg and the square of body height expressed in meters.

The set of variables applied in this paper consists of two anthropometric measures, body height and body weight, and the calculated body mass index.

The main goal of this work is to present the value of the mentioned morphological characteristics of football players of the eight first-placed teams at the last European football championship held in Germany - EURO 2024.

The final tournament of the European Football Championship was attended by 24 European teams that qualified through the qualification system for the final tournament hosted by Germany.

**Keywords:** European Championship, football, national teams

## PLIOMETRIJSKI METOD U PRAKSI

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### APSTRAKT

Pliometrijski trening je neizostavan metod treninga vrhunskih sportista već više od pola veka. U radu su predstavljene smernice kako bi se ovakav visoko intenzivni trening sproveo valjano. Predstavljena su sumarna opterećenja u odnosu na intenzitet vežbi i period treninga u sezoni. Pauze između pojedinačnih ponavljanja su najčešće u trajanju od 15 sekundi, dok je za odmor između serija potrebno 2 do 4 minuta. Odmor između pojedinačnih treninga je najčešće u trajanju od 48 – 72 sata. Jedan od parametara jačine potrebnih za započinjanje pliometrijskog treninga je čučanj sa dvostrukom masom svoga tela za donje ekstremitete, odnosno 1.5 put od mase svoga tela potiskom sa ravne klupe za gornji deo tela.

**Ključne reči:** pliometrijski metod, trening

## PLYOMETRIC METHOD IN PRACTICE

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### ABSTRACT

Plyometric training has been an indispensable training method for top athletes for more than half a century. The paper presents guidelines for the proper implementation of such highly intensive training. Summary loads are presented in relation to the intensity of the exercises and the training period in the season. Breaks between individual repetitions are most often 15 seconds long, while rest between series requires 2 to 4 minutes. Rest between individual training sessions is usually 48-72 hours long. One of the strength parameters needed to start plyometric training is a squat exercise with double body weight for the lower extremities, that is, 1.5 times your body weight with a flat bench press for the upper body.

**Key words:** plyometric method, training



## PRILOG ZAGREVANJU U SPORTU

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### APSTRAKT

Zagrevanje se susreće u svim oblicima fizičkog vežbanja – rekreativnog, školskog, medicinskog i sportskog u kom možda ima i najsistemizovaniju ulogu (zagrevanje za različite tipove sportova, treninga, igrača, utakmica). Istraživače u oblasti sporta posebno interesuje kako i na koji način obezbediti potreban stepen zagrejanosti i koje sve preaktivnosti preduzeti kako bi organizam funkcionisao što efikasnije tokom intenzivnijih aktivnosti koje slede u glavnom delu takmičenja odnosno treninga. Takođe, adekvatnim zagrevanjem doprinosi se preventivnom karakteru zagrevanja (smanjuje se mogućnost povrede) a sve individualizovano ka pojedinom sportu, ka pojedincu i ka pojedinačnoj aktivnosti u sklopu dugoročnog procesa treninga. U praksi se mogu videti mnoge greške i pogrešni postupci koji na žalost mogu biti veoma bolni. U radu su prikazani i definisani osnovni pojmovi koji se odnose na tretiranu problematiku a odnose se na: fiziološke osnove zagrevanja, aktivno i pasivno zagrevanje, opšte i lokalno zagrevanje i postaktivacijsku potencijaciju.

**Ključne reči:** sportisti, zagrevanje, postaktivacijska potencijacija

## CONTRIBUTION TO WARM-UP IN SPORTS

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### ABSTRACT

Warming up occurs in all forms of physical exercise - recreational, school, medical and sports, in which it may have the most systematized role (warming up for different types of sports, training, players, matches). Researchers in the field of sports are particularly interested in how and in what way to ensure the required level of warming up and what pre-activities to undertake so that the body functions as efficiently as possible during the more intense activities that follow in the main part of the competition, i.e. training. Also, an adequate warm-up contributes to the preventive character of the warm-up (reduces the possibility of injury), and everything is individualized to a particular sport, to an individual and to an individual activity as part of the long-term training process. In practice, one can see many mistakes and wrong actions, which unfortunately can be very painful. The paper presents and defines the basic terms that relate to the treated problem and refer to: physiological bases of warm up, active and passive warm up, general and local warm up and post-activation potentiation.

**Key words:** athletes, warm-up, post-activation potentiation

## EFEKTI POKRETNE IGRE NA RAZVOJ MOTORIČKIH SPOSOBNOSTI DJECE PREDŠKOLSKOG UZRASTA

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### APSTRAKT

Kroz ovaj rad se želi pokazati da i roditelji i vaspitači prepoznaju značaj pokretnih igara za motorički razvoj predškolske djece, ali takođe ukazuje na različite percepcije i razmimoilaženja u vezi sa izazovima i praktičnim aspektima primene ovih aktivnosti u obrazovnom okruženju. Anketa je sprovedena na uzoku od 20 roditelja djece predškolskog starijeg uzrasta u vrtićima u Banja Luci. U istraživanju s koristila tehnika anketiranja a kao istraživački instrument anketni upitnik. Podaci koji su dobijeni anketnim upitnikom izraženi su na nominalnoj o ordinarnoj skali, zato su u obradi podataka korišćene deskriptivne i komparativne tehnike statističke analize. Rezultati istraživanja potvrđuju značaj igara u razvoju motoričkih sposobnosti, što dodatno potkrepljuju visoki procenti vaspitača koji naglašavaju njihovu važnost u unapređenju koordinacije i krupne motorike. Međutim, istraživanje je ukazalo i na niz prepreka koje otežavaju njihovu implementaciju, uključujući nedostatak prostora, opreme i adekvatne podrške predškolskih ustanova. Takođe, identifikovani su problemi vezani za koncentraciju djece, što može uticati na efikasnost sprovođenja igara. Analiza percepcije roditelja i vaspitača otkrila je oblasti konsenzusa i razmimoilaženja. Obje grupe saglasne su u pogledu značaja pokretnih igara za motorički razvoj djece, njihovog obrazovnog potencijala i pozitivnog uticaja na cjelokupni razvoj djeteta. Međutim, uočene su razlike u stavovima prema preprekama u implementaciji igara, nivou angažovanosti roditelja i percepciji podrške predškolskih ustanova. Dok vaspitači ističu potrebu za dodatnim stručnim usavršavanjem i sistemskom podrškom u sprovođenju igara, roditelji se u manjoj mjeri fokusiraju na ovaj aspekt.

**Ključna riječi:** pokretna igra, motoričke sposobnosti, predškolski uzrast.

## THE EFFECTS OF MOVEMENT GAMES ON THE DEVELOPMENT OF MOTOR SKILLS IN PRESCHOOL CHILDREN

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### ABSTRACT

This paper aims to demonstrate that both parents and educators recognize the importance of movement games for the motor development of preschool children. However, it also highlights different perceptions and disagreements regarding the challenges and practical aspects of implementing these activities in an educational setting.

The survey was conducted on a sample of 20 parents of older preschool children attending kindergartens in Banja Luka. The research employed a survey technique, with a questionnaire used as the research instrument. The data obtained from the questionnaire were expressed on nominal and ordinal scales, and descriptive and comparative statistical analysis techniques were used for data processing.

The research results confirm the significance of games in developing motor skills, further supported by the high percentage of educators emphasizing their importance in improving coordination and gross motor skills. However, the study also identified several obstacles hindering their implementation, including a lack of space, equipment, and adequate support from preschool institutions. Additionally, issues related to children's concentration were identified, which may affect the effectiveness of game implementation.

The analysis of parental and educator perceptions revealed areas of consensus and disagreement. Both groups agreed on the importance of movement games for children's motor development, their educational potential, and their positive impact on overall child development. However, differences were observed in their views on the obstacles to game implementation, the level of parental involvement, and the perception of support from preschool institutions. While educators emphasize the need for additional professional training and systemic support in conducting games, parents tend to focus less on this aspect.

**Keywords:** movement games, motor skills, preschool age.

## АНАЛИЗА УСЛОВА ЗА ИЗВОЂЕЊЕ НАСТАВЕ ФИЗИЧКОГ ВАСПИТАЊА У ПРЕДШКОЛСКИМ УСТАНОВАМА СА АСПЕКТА САНИТАРНО-ХИГИЈЕНСКИХ И ТЕХНИЧКО-ГРАЂЕВИНСКИХ СТАНДАРДА

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### АПСТРАКТ

Кроз овај рад се жели показати у којој су мјери адекватни услови за извођење наставе физичког васпитања са аспекта санитарно-хигијенских и техничко-грађевинских стандарда. Простор је један од најбитнијих фактора унапређења квалитета рада. Његово уређење, величина и распоред просторија у установама за предшколско васпитање и образовање дјецe, дефинисано је оквирно, Правилником о условима за почетак рада предшколске установе. Овим правилником се ближе утврђују услови које треба да испуни јавна и приватна предшколска установа за почетак рада и обављање дјелатности у области предшколског васпитања и образовања.

Истраживањем је обухваћено 93 родитеља дјецe и 107 васпитача који су запослени у предшколским установама. Испитаници су бирани методом случајног узорка без обзира на пол. Циљ истраживања је да се сагледа значај и утицај материјално-техничких и санитарно - хигијенских аспеката у објектима предшколског узраста за вријеме одржавања физичког васпитно образовног процеса, односно на који начин ови аспекти утичу на сам квалитет одржавања физичке културе у овим установама јесу услови одржавања часа физичког образовања и васпитања у предшколским установама са санитарно-хигијенских и грађевинско-техничких аспеката предшколских установа на подручју Града Бања Лука. Просторно-материјално окружење вртића снажно утиче на изградњу дјечијих капацитета за учење. Ограниченост или одсуство вањских подстицаја, знатно лимитира број искустава и утисака који производе нове везе у мозгу. Стога се простор вртића не сматра само мјестом боравка дјецe док су родитељи одсутни већ простором који има моћ да шаље сигнале и учествује у динамичном процесу развоја дјечије интелигенције. Када говоримо о Граду Бања Лука и предшколским установама у Бањој Луци, са аспекта грађевинско – техничких и санитарно – хигијенских услова у погледу обављања васпитно образовног процеса физичке културе дјецe у њима, можемо закључити да се ове установе увелико придржавају стандарда и прописа који су предвиђени у законима, правилницима и другим уредбама које регулишу ову област.

**Кључне речи:** предшколске установе, родитељи, васпитачи, анализа, услови, санитарно-хигијенски фактор, техничко-грађевински фактор

## ANALYSIS OF CONDITIONS FOR CONDUCTING PHYSICAL EDUCATION CLASSES IN PRESCHOOL INSTITUTIONS FROM THE ASPECT OF SANITARY-HYGIENIC AND TECHNICAL-CONSTRUCTION STANDARDS

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### ABSTRACT

This paper aims to examine the adequacy of conditions for conducting physical education classes in preschool institutions from the perspective of sanitary-hygienic and technical-construction standards. The physical environment is one of the most critical factors in improving the quality of work. Its arrangement, size, and room layout in preschool education institutions are broadly defined by the Regulation on Conditions for the Establishment of a Preschool Institution. This regulation specifies the requirements that both public and private preschool institutions must meet to begin operations and carry out activities in the field of preschool education.

The study included 93 parents of children and 107 preschool educators employed in preschool institutions. The respondents were selected using a random sampling method regardless of gender. The research aims to assess the importance and impact of material-technical and sanitary-hygienic aspects of preschool facilities during the implementation of physical education and training programs. Specifically, it seeks to determine how these aspects influence the quality of physical education in these institutions. The study examines the conditions for conducting physical education classes in preschool institutions in Banja Luka from sanitary-hygienic and construction-technical perspectives.

The spatial and material environment of kindergartens significantly influences the development of children's learning capacities. Limited or absent external stimuli considerably restrict the number of experiences and impressions that form new neural connections in the brain. Therefore, a kindergarten should not be perceived merely as a place where children stay while their parents are absent, but as an environment that has the power to send signals and actively participate in the dynamic process of children's intellectual development.

Regarding the city of Banja Luka and its preschool institutions, from the perspective of construction-technical and sanitary-hygienic conditions for conducting physical education classes, it can be concluded that these institutions largely adhere to the standards and regulations prescribed by laws, rules, and other decrees governing this field.

**Keywords:** Preschool institutions, parents, educators, analysis, sanitary-hygienic factor, technical-construction factor.

## ZDRAVA PSIHA I KOMUNIKACIJA UNUTAR MENADŽMENTA KOMPANIJE I PR SEKTORA MARKETINGA

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### SAŽETAK

Zdravo komuniciranje unutar svih odnosa, kao i u odnosima u firmama predstavlja proces prilagođavanja i konstantnog učenja različitih strategija za pravilno komuniciranje, razumijevanje i djelovanje. Stepenn razumijevanja i shvatanja između ljudi utiče na poslovne rezultate kao i na stanje psihe jer su ljudi bića kojima je prirodno okruženje podrška i rad u timovima. Uspostavljanje komunikacionog sistema između svih zaposlenih jeste posljedica zdravih načina razmišljanja i zdravog ponašanja individua.

Zdravlje nije samo odsustvo bolesti nego stepenn bio-psiho-fizio-socijalnog blagostanja koje je relativno ali bitno je da bude balansirano. Balans nije lako postići ali je moguće napredovati svakodnevno kao individua koja onda utiče i na sistem u kojem radi.

Cilj rada jeste prikazati prepoznavanje toskičnih načina komuniciranja u kompanijama kao što su manipulativni i pasivno-agresivni obrasci kao i prikazati načine prevazilaženja u cilju zdravlja i donošenja pravilnih odluka. Cilj je razmotriti strategije za prepoznavanje ovakve komunikacije i okrenuti se obrazovanju, pravilnoj komunikaciji, etičkim vrijednosima unutar kompanijskih timova kao emocionalnoj inteligenciji u cilju psiho-fizičkog zdravlja pojedinaca i grupa u poslovnim sistemima.

Timovi menadžmenta kao i PR sektora u unutrašnjoj komunikaciji kao i u komunikaciji sa javnostima trebali bi posjedovati znanja o važnosti psiho-fizičkog zdravlja pojedinaca i grupa u poslovnim sistemima.

**Ključne riječi:** poslovni sistemi, menadžment, PR, marketing sektor, zdravlje i zdrava komunikacija, psiho-fizičko zdravlje

## HEALTHY PSYCHE AND COMMUNICATION WITHIN COMPANY MANAGEMENT AND THE PR SECTOR OF MARKETING

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### ABSTRACT

Healthy communication in all relationships, including those within companies, is a process of adaptation and continuous learning of different strategies for proper communication, understanding, and action. The level of comprehension and mutual understanding among people affects business outcomes as well as mental well-being, as humans are inherently social beings who thrive in supportive team environments. Establishing an effective communication system among all employees is a result of healthy thinking patterns and behaviors of individuals.

Health is not merely the absence of illness but a degree of bio-psycho-physio-social well-being that, while relative, must remain balanced. Achieving balance is not easy, but individuals can make daily progress, which in turn influences the system in which they work.

The aim of this paper is to identify toxic communication patterns in companies, such as manipulative and passive-aggressive behaviors, and to present ways to overcome them for the sake of health and sound decision-making. The goal is to explore strategies for recognizing such communication and to focus on education, ethical values within company teams, and emotional intelligence to promote the psycho-physical well-being of individuals and groups within business systems.

Management teams, as well as the PR sector, in both internal communication and public relations, should possess knowledge of the importance of the psycho-physical health of individuals and groups within business environments.

**Keywords:** business systems, management, PR, marketing sector, health and healthy communication, psycho-physical well-being

## IGRA I SPORT

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### SAŽETAK

Igra i sport predstavljaju dva bliska, ali različita fenomena koja su od suštinske važnosti za ljudski razvoj. Igra se pojavljuje spontano i omogućava razvoj motoričkih, kognitivnih i socijalnih vještina, dok sport podrazumijeva organiziranu i strukturiranu aktivnost sa jasno definiranim pravilima i ciljevima. Iako se razlikuju u nivou organizacije i kompetitivnosti, sport se nerijetko razvija iz igre, pri čemu se kroz igru usvajaju osnovne vještine potrebne za sportsku aktivnost. Društveni i pedagoški aspekti igre i sporta imaju važnu ulogu u obrazovanju, socijalizaciji i oblikovanju ličnosti. U savremenom društvu, granice između igre i sporta postaju sve fleksibilnije, naročito s razvojem rekreativnog sporta i digitalnih igara. Igra ostaje temelj sportskog razvoja, dok sport nudi discipliniraniji okvir za usmjeravanje fizičkih i mentalnih sposobnosti, čime doprinosi individualnom i kolektivnom napretku.

**Ključne riječi:** igra, sport, razvoj, takmičenje, fizička aktivnost, socijalizacija, pedagogija, psihologija, rekreacija, digitalne igre

## GAMES AND SPORTS

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### ABSTRACT

Play and sport are two closely related but distinct phenomena essential for human development. Play emerges spontaneously, fostering motor, cognitive, and social skills, while sport is an organized and structured activity with clearly defined rules and objectives. Despite their differences in organization and competitiveness, sport often develops from play, as play serves as a foundation for acquiring essential athletic skills. The social and pedagogical aspects of play and sport play a crucial role in education, socialization, and personality development. In modern society, the boundaries between play and sport are increasingly fluid, especially with the rise of recreational sports and digital gaming. While play remains the basis for athletic growth, sport provides a more disciplined framework for directing physical and mental abilities, ultimately contributing to both individual and collective progress.

**Keywords:** play, sport, development, competition, physical activity, socialization, pedagogy, psychology, recreation, digital games

## ANALIZA SERVISA I NJEGOVOG PRIJEMA U MEČEVIMA STONOTENISERA JUNIORA I JUNIORKI

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## ANALYSIS OF SERVE AND RECEIVE IN MATCHES OF JUNIOR TABLE TENNIS PLAYERS

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### SAŽETAK

Cilj rada je utvđivanje postojanje razlika u određenim karakteristikama servisa i njegovog prijema u mečevima stonotenisera i stonoteniserki uzrasta 16-18 godina. Istraživanjem je obuhvaćeno 8 mečeva, 31 set, 563 poena u konkurenciji juniora i 8 mečeva, 29 setova, 548 poena u konkurenciji juniorki koji se nalaze u prvih 60 na rang listi Evropske stonoteniske federacije (ETTU). Nalazi našeg istraživanja su dokazali da postoji statistički signifikantne razlike između juniora i juniorki u primeni različitih vrsta servisa i prijema servisa. Juniori u odnosu na juniorke su za 7,1% više servirali dugačak servis, dok su juniorke za 5,7% više primenjivale poludugačak servis. Ustanovljeno je da se ove dve kategorije igrača razlikuju i u broju primene različitih udaraca tokom prijema servisa. Juniori su više napadački nastrojeni, i prilikom prijema više primenjuju flip i spin udarce, dok su juniorke više opredeljena za pasivnije vraćanje servisa te su više koristile pimpl i blok udarce.

**Ključne reči:** stoni tenis, razlike, početni udarac, vraćanje servisa, mlađe uzrasne kategorije

### ABSTRACT

The aim of this study is to determine the existence of differences in certain characteristics of serve and serve reception in matches of junior table tennis players aged 16–18. The research included 8 matches, 31 sets, and 563 points in the junior category, as well as 8 matches, 29 sets, and 548 points in the junior girls' category, with players ranked in the top 60 of the European Table Tennis Union (ETTU) rankings. Our findings confirmed the existence of statistically significant differences between male and female junior players in the use of different types of serves and serve receptions. Compared to female juniors, male juniors used long serves 7.1% more often, while female juniors used half-long serves 5.7% more frequently. It was also established that these two categories of players differ in the number of different strokes used when receiving serves. Male juniors are more attack-oriented and use flip and spin strokes more often when receiving serves, whereas female juniors tend to return serves more passively, relying more on push and block strokes.

**Keywords:** table tennis, differences, serve, serve reception, younger age categories



## THE IMPACT OF SINGLE BOUTS OF EXERCISE ON MEMORY PUZZLE GAME PERFORMANCE IN CHILDREN

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### ABSTRACT

Physical activity is well-known for its positive effects on general health and cognitive abilities, especially in enhancing executive functions (EFs) like working memory (WM), inhibitory control, and cognitive flexibility. This research aimed to add to this field of study by examining how moderate to vigorous exercise impacts a possible visual WM assessment in preschoolers through a novel methodology. The sample included 90 children (32 girls) aged five, randomly divided into a treatment and a control group. The treatment group participated in organized physical activities before taking on a memory-matching puzzle game on a tablet. In contrast, the control group completed the task without engaging in prior exercise. The experiment spanned four sessions over one month. Data analysis employed linear mixed-effects modeling (LMM). Findings showed that memory scores differed among participants, but neither group assignment nor the interaction between Sex and Group notably predicted performance. The main effect of Sex approached significance in follow-up analysis. Moreover, a significant main effect of time was observed, indicating improved scores across the repeated measurement sessions. However, exercise did not play an important role in influencing memory performance. The minimal sensitivity of the puzzle game may have contributed to these inconclusive results. These findings align with previous studies that report varied impacts of physical activity on WM in children. Although acute aerobic exercise is often associated with enhancements in attention, the effects on WM remain unclear. Methodological issues might have affected the results, including task sensitivity, sample characteristics, and unaccounted confounding variables.

**Keywords:** preschool children, aerobic exercise, executive functions, working memory

## RAZLIKE U INDEKSU TELESNE MASE KOD DECE MLAĐEG ŠKOLSKOG UZRASTA – POLAZNIKA ŠKOLICE SPORTA

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## DIFFERENCES IN THE BODY MASS INDEX IN CHILDREN OF YOUNGER SCHOOL AGE - SPORT'S SCHOOL ATTENDANTS

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### SAŽETAK

Cilj ovog istraživanja je bio da se ispita eventualno postojanje razlika u indeksu telesne mase kod dece mlađeg školskog uzrasta polaznika škole sporta, na samom početku njihovog pohađanja programa. U istraživanju je učestvovalo 93 učenika, oba pola, od čega je 42 dečaka (45,2%) i 51 devojčica (54,8%). Za potrebe ovog istraživanja primenjeno je antropometrijsko merenje, odnosno merenje telesne visine (TV) i telesne mase (TM), na osnovu kojih se izračunavao indeks telesne mase (ITM). Svi prikupljeni podaci obrađeni su postupcima deskriptivne i komparativne statistike. Iz prostora deskriptivne statistike određena je aritmetička sredina, standardna devijacija, maksimalne i minimalne vrednosti, dok je iz prostora komparativne statistike korišćen t test nezavisnih uzoraka. Nalazi ovog istraživanja ukazali su na to da prevalenca gojaznosti na mlađem školskom uzrastu iznosi 19,4%, a da rizik od gojaznosti ima još 16,1% učenika. Dečaci i devojčice se nisu značajno razlikovali u indeksu telesne mase. Stariji učenici u proseku imaju veći indeks telesne mase od mlađih učenika, ali se gojaznost nije ustanovila kao zastupljenija u nekoj od ispitivanih uzrasnih grupa.

**Ključne reči:** gojaznost, mlađi školski uzrast, školica sporta, pol, starost.

### ABSTRACT

The goal of this research was to examine the possible existence of differences in the body mass index in children of younger school age attending the Sports School, at the very beginning of their attendance at the program. 93 students of both sexes participated in the research, of which 42 were boys (45.2%) and 51 were girls (54.8%). For the purposes of this research, anthropometric measurement was applied, i.e. measurement of body height (HW) and body mass (BW), based on which the body mass index (BMI) was calculated. All collected data were processed using descriptive and comparative statistics. The arithmetic mean, standard deviation, maximum and minimum values were determined from the field of descriptive statistics, while the t test of independent samples was used from the field of comparative statistics. The findings of this research indicated that the prevalence of obesity at younger school age is 19.4%, and that another 16.1% of students are at risk of obesity. Boys and girls did not differ significantly in body mass index. On average, older students have a higher body mass index than younger students, but obesity was not found to be more common in any of the examined age groups.

**Key words:** obesity, younger school age, sports school, gender, age

## SPORTSKO TAKMIČENJE

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**SAŽETAK**

Sportska takmičenja imaju ključnu ulogu u promociji sporta, timskog duha i fer-pleja. Bilo da se radi i individualnim ili timskim sportovima, takmičenja omogućavaju sportistima da pokažu svoje vještine, dok navijačima pružaju uzbuđenje i zajednički doživljaj.

Kroz istoriju, najveća takmičenja poput Olimpijskih igara, Svjetskog prvenstva u fudbalu, Lige šampiona i Tour de France razvila su se u globalne spektakle koji privlače milijarde gledalaca širom svijeta. Osim zabave, ova takmičenja imaju ogroman ekonomski i društveni uticaj, podstičući razvoj sporta, turizma i sponzorstava.

Način organizacije sportskih takmičenja, bilo kroz grupnu fazu i nokaut rundu ili ligaški sistem, osigurava pravednost i takmičarsku dinamiku. Sistem eliminacije i finalnih utakmica stvara vrhunac uzbuđenja, gdje se odlučuje pobjednik.

U budućnosti, sa razvojem tehnologije i globalizacije, sportska takmičenja će postati još pristupačnija za publiku širom svijeta, dodatno jačajući sport kao jedan od najvažnijih elemenata kulture i društva.

**Ključne riječi:** sport, takmičenje, tehnologija

## SPORTS COMPETITION

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**ABSTRACT**

Sports competitions play a key role in the promotion of sports, team spirit and fair play. Whether it's individual or team sports, competitions allow athletes to show their skills, while providing fans with excitement and a shared experience.

Throughout history, the biggest competitions such as the Olympic Games, the World Cup, the Champions League and the Tour de France have developed into global spectacles that attract billions of viewers around the world. In addition to entertainment, these competitions have a huge economic and social impact, encouraging the development of sports, tourism and sponsorships.

The way sports competitions are organized, whether through the group stage and knockout round or the league system, ensures fairness and competitive dynamics. The system of elimination and final matches creates a climax of excitement, where the winner is decided.

In the future, with the development of technology and globalization, sports competitions will become even more accessible to audiences around the world, further strengthening sports as one of the most important elements of culture and society.

**Keywords:** sport, competition, technology

## SPORTSKA TEHNIKA

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### SAŽETAK:

Tehnika je ključni faktor uspjeha u svakom sportu, bez obzira da li se radi o pojedinačnom ili timskom sportu. Temelj svakog uspješnog sportaša je sposobnost izvođenja pokreta na način koji je učinkovit, precizan i energetski optimiziran. Razumijevanje biomehanike omogućuje bolje usmjeravanje treninga, jer omogućuje sportašima da izbjegnju neučinkovite pokrete koji troše nepotrebnu energiju i da poboljšaju preciznost svakog pokreta. Sportska tehnika nije samo skup pokreta, već proces koji se neprestano usavršava kroz treninge, analize i konstantno učenje. Kroz pravilnu primjenu ovih metoda, sportaši mogu postići visoke performanse i dugoročni uspjeh u svojoj disciplini.

**Ključne riječi:** sportaši, trening, biomehanika

## SPORTS TECHNIQUE

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### ABSTRACT

Technique is a key factor in success in any sport, regardless of whether it is an individual or team sport. The foundation of every successful athlete is the ability to perform movements in a way that is efficient, precise and energy-optimized. Understanding biomechanics allows for better training direction, as it allows athletes to avoid inefficient movements that waste unnecessary energy and to improve the precision of each movement. Sports technique is not just a set of movements, but a process that is constantly improved through training, analysis and constant learning. Through the proper application of these methods, athletes can achieve high performance and long-term success in their discipline.

**Keywords:** athletes, training, biomechanics

## EFEKTI PROGRAMA ŠKOLE SPORT NA MOTORIČKE VJEŠTINE DJEČAKA PREDŠKOLSKOG UZRASTA

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### SAŽETAK

Posljednjih godina sve više raste značaj fizičke aktivnosti i vježbanja u ranom razvoju djece. Cilj ovog istraživanja bio je utvrditi efekte programa baziranih na sportskim školama na motoričke sposobnosti kod dječaka predškolskog uzrasta. Uzorak učesnika za istraživanje činilo je 74 dječaka predškolskog uzrasta (6,03 ± 0,45 godina). Djeca eksperimentalne grupe su bila angažovana u programu 6 mjeseci, tri puta sedmično, dok je kontrolna grupa pratila svoje uobičajene aktivnosti u vrtiću.

Test bruto motorike: Razvoj – drugo izdanje (TGMD-2) je bio alat za procjenu razvijenosti motoričkih sposobnosti koje zahtjeva tehnike posmatranja. ANCOVA je pokazala da postoje razlike u svim analiziranim varijablama:

Ukupan rezultat za lokomotorne vještine ( $p=0,01$ ), ukupan rezultat za manipulativne vještine ( $p=0,01$ ) i ukupan rezultat za sve TGMD-2 testove ( $p=0,01$ ). Može se zaključiti da je bilo pozitivnih efekata programa sportske škole na razvoj motorike vještine kod dječaka predškolskog uzrasta nakon 6 mjeseci eksperimentalnog programa.

Kako su motoričke vještine ključni aspekt dječijeg razvoja i igraju izuzetno važnu ulogu u njihovom fizičkom, emocionalnom i kognitivnom razvoju, njihovom procjena je izuzetno važna.

**Gljučne riječi:** djeca, fizička aktivnost, evaluacija, TGMD-2

## THE EFFECTS OF SPORT SCHOOL PROGRAM ON MOTOR SKILLS BOYS IN PRESCHOOL CHILDREN

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### ABSTRACT

In recent years, the importance of physical activity and exercise in early childhood development has gained significant attention. The aim of this research was to determine the effects of program based on sport schools on motor skills in preschool children. The sample of participants for the research consisted of 56 girls and 74 boys of preschool age (6.03 ± 0.45 years).

Children in the experimental group were engaged in 6 months of program, three times per week, while control group followed their usual activities in kindergarten. The Test of Gross Motor Development - Second Edition (TGMD-2) was a tool for assessing the development of motor skills that requires observational techniques.

ANCOVA showed that there were differences in all analyzed variables: Total score for locomotor skills ( $p=0.01$ ), Total score for manipulative skills ( $p=0.01$ ) and Total score for all TGMD-2 tests ( $p=0.01$ ). It can be concluded that there were positive effects of sport school program on the development of motor skills in preschool children after 6 months experimental program.

As motor skills are a key aspect of children's development and play an extremely important role in their physical, emotional and cognitive development, their assessment is extremely important.

**Key words:** kids, physical activity, evaluation, TGMD-2