E-BOOK OF ABSTRACTS

1st Student Interdisciplinary Symposium – HumanUpgrade

15th May 2025

Conference organizers:

Faculty of Kinesiology Osijek

Croatian Hypertension League

Student Science Section, Faculty of Kinesiology Osijek

Student section FizIOS, Faculty of Medicine Osijek

Student hypertension section, Faculty of Medicine Zagreb

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ADDRESS OF THE ORGANIZER

Faculty of Kinesiology Osijek

Drinska ulica 16a, 31 000 Osijek

Phone: 031 559 310 Email: ured@kifos.hr

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GENERAL INFORMATION

Congress venue

1st Student Interdisciplinary Symposium – HumanUpgrade will be held in hybrid form:

- on-line via MS Teams platform
- Faculty of Kinesiology Osijek, Drinska ulica 16a, 31 000 Osijek

Congress language

The official language of the meeting is English and Croatian.

Main topics:

- Kinesiology
- Medicine
- Lifestyle
- Technology

SCIENTIFIC PROGRAMME OVERVIEW

Speakers:

Academician Bojan Jelaković (Department of Nephrology, Hypertension, Dialysis and Transplantation, University Hospital Center Zagreb; Faculty of Medicine Zagreb; Croatian Hypertension League), **Professor Ivan Pećin** (Department of Internal Medicine, Unit for Metabolic Diseases, University Hospital Center Zagreb; Faculty of Medicine Zagreb; Croatian Hypertension League), **Toni Maričić, bacc. physioth.** (Bizovacke Toplice Rehabilitation Hospital), **Atila Salaj, univ. mag. cin.** (Athletic club Slavonija – Žito; Faculty of Kinesiology Osijek), **Marin Županović** (Athletic club Slavonija – Žito)

Poster sessions

Posters will be presented in a 3-minute talk/oral presentation on according to a schedule. Presenting authors of posters are obliged to present the main findings of their work in a 3-minute talk/on-line presentation, according to a schedule. Poster presentations are important scientific contributions, therefore a prize for the best poster presentations are established. The selection will be based on scientific merit and clarity of presentation as judged by a high-ranking board made up of three members. The awards will be announced during the closing ceremony.

PROGRAMME

08.00-09.00 **Registration of the participants**

09.00-09.30 OPENING CEREMONY

09.30-09.50 **INVITED LECTURERS**

Atila Salaj, Technology in sports

09.50-10.10 INVITED LECTURERS

Marin Županović, Experience of technology transfer in sports

10.10-10.30 INVITED LECTURERS

Toni Maričić, Retrospective of the clinical application of robotic rehabilitation at the Bizovačke Toplice health resort

10.30-10.50 INVITED LECTURERS

Ivan Pećin, Does the man have a new best friend?

10.50-11.10 INVITED LECTURERS

Bojan Jelaković, Stories from ancient times before AI walked the earth.

11.10-11.30 **Coffee and refreshments**

11.30 -12.10 **POSTER PRESENTATIONS I** **(3-min oral presentations)**

Poster presentations according to schedule

Chairs: Anita Matić, Hrvoje Ajman, Mijo Ćurić,

PP1. DIFFERENCES IN MOTOR AND FUNCTIONAL ABILITIES OF PRESCHOOL CHILDREN IN RELATION TO PARTICIPATION IN ORGANIZED SPORTS PROGRAMS
Magdalena Brkić, Nina Milović, Sara Šunda, Mirela Šunda

PP2. THE IMPACT OF KNEE INJURY ON THE CONTRACTILE PROPERTIES OF THE VASTUS LATERALIS MUSCLE IN ATHLETES
David Curač, Klara Findrik, Petar Šušnjara

PP3. DOES FITNESS MODERATE THE ASSOCIATION OF SCREEN TIME AND NON-COMMUNICABLE DISEASE RISK FACTORS IN ADOLESCENTS?
Maja Lagator, Marjeta Mišigoj-Duraković, Maroje Sorić

PP4. THE EFFECT OF PHYSICAL ACTIVITY ON THE MENTAL HEALTH OF RETIREES
Ena Ivanković, Rebeka Stojković, Petar Šušnjara

PP5. VALIDATION OF A TIME-EFFICIENT METHOD FOR CALCULATING CHANGE-OF-DIRECTION DEFICIT IN YOUTH SOCCER PLAYERS: PRELIMINARY FINDINGS
Lucija Faj, Marko Šmrkić, Dušan Stoiljković, Nikola Bajić, Jelena Aleksić

PP6. FREQUENCY OF ENERGY DRINK CONSUMPTION AMONG RECREATIONAL FITNESS ENTHUSIASTS
Vinko Romić, Klara Findrik, Petar Šušnjara

PP7. GRAFTING SOLUTIONS: RECONSTRUCTION OF A DISTAL PHALANX DEFECT FOLLOWING ENCHONDROMA EXCISION VIA AUTOSPONGIOPLASTY
Dennis Sebešić, Vanessa Milošić, Marko Sablić, Josip Grbavac, Marko Zelenić

PP8. ENHANCING DIAGNOSTIC AND SURGICAL PLANNING: THE ROLE OF AI AND XR TECHNOLOGIES IN MODERN MEDICINE
Patrik Kokić, Irena Galić, Marija Habijan

PP9. PHYSIOTHERAPY STUDENT EDUCATION: STRATEGIES FOR PREVENTING SPORTS INJURIES
Dunja Igrec, Petar Gregurić, Nikolina Lazić, Anita Matić

PP10. STEMI COMPLICATED BY REINFARCTION AFTER MECHANICAL VALVE AND STENT IMPLANTATION
Lucija Kadleček, Ivana Brlić, Valentina Kećkeš, Barbara Kokić, Igor Lekšan

PP11. POSTERIOR CRUCIATE LIGAMENT INJURY IN A PROFESSIONAL SOCCER PLAYER MANAGED CONSERVATIVELY: A CASE REPORT
Lovro Marinčić

12.10-12.15 Break

12.15-13.00 POSTER PRESENTATIONS II (3-min oral presentations)

Poster presentations according to schedule

Chairs: Ines Drenjančević, Nikolina Kolobarić, Marija Heffer

P12. COMPREHENSIVE TREATMENT OF A PATIENT WITH CARDIOVASCULAR DISEASE AND HEART FAILURE
Marko Margetić; Dorotea Lošić; Marko Pisačić; Tia Poštić; Lana Maričić

P13. BLINDED BY PRESSURE – MALIGNANT HYPERTENSION
Ante Ivić, Lucija Kadleček, Zvonimir Kolarević, Jelena Metikoš,Marija Jelić Vuković

P14. TYPICAL PRESENTATION OF ACUTE EXACERBATION OF KNEE OSTEOARTHRITIS IN AN ELDERLY PATIENT: A CASE REPORT
Helena Horvat, Tea Pandurić

P15. COLITIS INDUCED BY COMBINED THERAPY WITH IPILIMUMAB AND NIVOLUMAB IN A PATIENT WITH METASTATIC MELANOMA
Katarina Jelečević, Luka Radić, Petra Jurković, Karla Trampus, Darija Šnajder-Mujkić

P16. PHYSICAL ACTIVITY AND MENTAL HEALTH OF FIRST-YEAR STUDENTS AT THE UNIVERSITY OF OSIJEK: A CROSS-SECTIONAL STUDY
Barbara Kokić, Lucija Kadleček, Ana Prica, Stipe Vidović, Petar Šušnjara

P17. The Hidden Danger: When Hypertrophic Cardiomyopathy Leads to Pulmonary Embolism
Lucija Kresić, Petra Zemljak, Sara Banjeglav, Barbara Kokić, Željka Breškić Ćurić

P18. POSTOPERATIVE PROGRESSION OF THE CERVICAL KYPHOSIS: A CASE REPORT
Petra Jurković, Milutin Vukadinović, Vjenceslav Vrtarić, Katarina Jelečević

P19. STEEL PRECISION VS. SKILLED HANDS: COMPARING ROBOTIC AND CONVENTIONAL TOTAL KNEE ARTHROPLASTY OUTCOMES – A SYSTEMATIC LITERATURE REVIEW
Tomislava Tretinjak, Antonio Kokot, Marta Bolješić, Nenad Čekić, Marko Sablić

P20. WILL BIONIC LIMBS OUTPERFORM BIOLOGICAL ONES?
Zvonimir Kolarević, Marija Heffer

13.00-13.05 Award ceremony for the best posters presentation

The End

PP1. DIFFERENCES IN MOTOR AND FUNCTIONAL ABILITIES OF PRESCHOOL CHILDREN IN RELATION TO PARTICIPATION IN ORGANIZED SPORTS PROGRAMS

Magdalena Brkić[1], Nina Milović[1], Sara Šunda[1], Mirela Šunda[1*]

[1]*Department of Kinesiology, University of Osijek, Osijek*

Introduction: Physical activity during early childhood is critical for establishing the basis for healthy growth and development. In recent years, there has been a noticeable increase in sedentary behaviors among children, while participation in structured movement activities has been declining. Previous studies suggest that early engagement in organized sports can have a positive impact on motor development, physical fitness, and functional capacity. The objective of this study was to examine whether there are statistically significant differences in motor and functional abilities among preschool children depending on their participation in a structured sports program. The hypothesis was that children regularly involved in such programs would demonstrate better physical performance than their peers who do not participate in organized activities.

Materials and methods: The research included 30 children, average age six. Participants were divided into two equal groups: 15 children attending a structured sports program regularly, and 15 children not engaged in any organized physical activity. The assessment included three standardized tests: the standing long jump (SDM) for explosive strength, the 4x10 meter shuttle run (T40) for agility, and the 20-meter progressive shuttle run (BEEP test) for cardiorespiratory endurance.

Results: Children who participated in the structured sports program achieved better results in all three tests. Statistically significant differences were found in the standing long jump and the BEEP test ($p<0.01$), indicating superior explosive strength and endurance in the experimental group. Although the T40 test showed better results among active children, the differences in agility were not statistically significant.

Conclusion: The hypothesis that structured sports programs positively affect motor and functional abilities in preschool children was confirmed. Participation in organized physical activity contributes to the development of explosive strength and endurance, highlighting the importance of integrating such programs into early childhood education as a foundation for a healthy and active lifestyle.

KEYWORDS: physical activity, preschool, physical literacy, PREFIT batery, motor skills

PP2. THE IMPACT OF KNEE INJURY ON THE CONTRACTILE PROPERTIES OF THE VASTUS LATERALIS MUSCLE IN ATHLETES

David Curač[1], Klara Findrik[1], Petar Šušnjara[1]

[1] Faculty of Kinesiology, University of Osijek, Croatia

INTRODUCTION: Football requires a high level of physical conditioning, but it also carries a high risk of injury, particularly to the lower extremities. Knee injuries, such as anterior cruciate ligament (ACL) ruptures, can significantly affect muscle function Tensiomyography (TMG) non-invasively assesses the contractile properties of muscles by applying controlled electrical stimulation under isometric conditions.The aim of this study was to determine the differences in the contractile properties of the vastus lateralis muscle between a group of football players with a previous ACL injury and a group without such injury.

MATERIALS AND METHODS: The study included 10 participants, divided into two groups: those with a history of ACL injury and those without. The following TMG variables were measured: contraction time (Tc), delay time (Td), sustain time (Ts), relaxation time (Tr), and displacement (Dm). The Kolmogorov-Smirnov test showed that all variables were normally distributed ($p > 0.05$), and an independent samples t-test was used to determine differences between the groups.

RESULTS: The results of the independent samples t-test revealed no statistically significant differences ($p > 0.05$) between athletes with a previous knee injury and those without in any of the measured variables.

CONCLUSION: The lack of significant differences may be due to compensatory activation of other quadriceps muscles, which could mask isolated changes in vastus lateralis function. This compensation may allow for preservation of functional performance despite underlying muscle imbalances. While differences in individual muscle properties may exist, overall function may remain unaffected due to the cooperative action of the quadriceps muscle group.

KEYWORDS: football, tensiomyography (TMG), anterior cruciate ligament (ACL)

PP3. DOES FITNESS MODERATE THE ASSOCIATION OF SCREEN TIME AND NON-COMMUNICABLE DISEASE RISK FACTORS IN ADOLESCENTS?

Maja Lagator[1], Marjeta Mišigoj-Duraković[1], Maroje Sorić[1,2*]

[1] Faculty of Kinesiology, University of Zagreb, Croatia

[2] Faculty of Sport, University of Ljubljana, Slovenia

INTRODUCTION: Current guidelines recommend adolescents have at least 60 min of moderate-to-vigorous physical activity per day, no more than 2h screen time per day and sleep for 8-10h per night. High screen time has repeatedly been associated with reduced physical activity, excess body weight and cardiometabolic problems1. The aim was to investigate whether cardiorespiratory fitness moderates high screen time.

MATERIALS AND METHODS: This summary is based on data collected during the second year out of the four-year observational CRO-PALS study conducted among high school students. A total of 808 adolescents (407 boys and 401 girls) aged 16-17 were included in this analysis. SHAPES questionnaire was used to collect physical activity (PA), sleep and screen time (ST)2 while cardiorespiratory fitness was measured by 20m shuttle run test. BMI, waist circumference and blood pressure (BP) were measured using standardized procedures. Boys and girls were stratified by cardiorespiratory fitness and logistic regression was performed to assess associations of screen time with risk factors.

RESULTS: Logistic regression showed no statistically significant associations between high screen time (4th quartile) and elevated BP, overweight, abdominal obesity, PA levels or total sleep time, as all confidence intervals included 1. Also, none of the examined health outcomes were significantly associated with screen time in either fit or unfit adolescents, regardless of sex.

CONCLUSION: Although high screen time has been previously associated with negative health outcomes, this study did not find statistically significant associations between ST and non-communicable disease risk factors. Furthermore, fitness did not moderate these associations.

KEYWORDS: youth, physical activity, high blood pressure, sleep, technology

PP4. THE EFFECT OF PHYSICAL ACTIVITY ON THE MENTAL HEALTH OF RETIREES

Ena Ivanković[1], Rebeka Stojković[1], Petar Šušnjara[1*]

[1]Faculty of Kinesiology, University of Osijek, Osijek

INTRODUCTION: Aging brings numerous changes that can negatively impact mental health, including the onset of anxiety, dementia, and sleep disorders. Retirees are particularly vulnerable to these changes due to reduced social interaction and decreased physical activity.

MATERIALS AND METHODS: This research was conducted at a nursing home in Osijek and involved retirees aged 65 and older. It lasted for three weeks, with participants engaging in aerobic exercise sessions three times a week, each lasting 30 to 45 minutes. Every session included general preparatory exercises, low-intensity aerobics, and stretching. The aim of the study was to assess the impact of regular physical activity on the mental health and sleep quality of the participants. The DASS-21 questionnaire, which measures levels of depression, anxiety, and stress, was used to assess mental health, while the Pittsburgh Sleep Quality Index (PSQI) was employed to evaluate sleep quality.

RESULTS: Results showed that, after three weeks of regular physical activity, participants reported a reduction in anxiety and stress levels. Many also noticed improvements in sleep quality, including duration and subjective evaluation of sleep quality. These findings support the hypotheses that physical activity has a positive effect on both mental health and sleep quality in retirees.

CONCLUSION: The study concludes that regular physical activity can significantly improve retirees' mental health when conducted consistently, reduce anxiety symptoms, and enhance sleep quality, although it cannot address all negative factors. The research highlights the need for increased inclusion of physical activity in the daily lives of older adults to improve their quality of life.

KEYWORDS: anxiety, elderly age, mental health disorders, physical activity

PP5. VALIDATION OF A TIME-EFFICIENT METHOD FOR CALCULATING CHANGE-OF-DIRECTION DEFICIT IN YOUTH SOCCER PLAYERS: PRELIMINARY FINDINGS

Lucija Faj[1], Marko Šmrkić[2], Dušan Stoiljković[2], Nikola Bajić[2], Jelena Aleksić[2]*

[1] Faculty of Kinesiology, Josip Juraj Strossmayer University of Osijek, Croatia
[2] University of Belgrade - Faculty of Sport and Physical Education, Belgrade, Serbia

INTRODUCTION: The change-of-direction deficit (CoD deficit) isolates change-of-direction ability independently from linear sprint speed (Dos'Santos et al., 2019). Traditionally, it is calculated by subtracting a separately performed 10-m sprint time from the 505 test time. A time-efficient alternative could involve using the approach-phase 10-m sprint split. Since pivoting demands may influence sprint strategy, this preliminary study compared CoD deficits based on separate versus approach sprints, and examined potential pivot side effects. Findings are interpreted cautiously in light of recent observations (Živković et al., 2024).

MATERIALS AND METHODS: Ten male U17 soccer players (age: 16.8 ± 0.4 years; body mass: 67.1 ± 7.5 kg; body height: 176.6 ± 5.8 cm) from the Second Belgrade League with an average training experience of 8.7 ± 1.7 years participated in the study. Each player completed two 10-m sprints and two 505 tests per pivot side, randomized in order. Percentage change of direction (CoD) efficiency was calculated using the formula: (10-m time / 505 time) × 100. A two-way repeated-measures ANOVA (Sprint Type × Pivot Side), paired t-tests, and Pearson correlations were conducted to analyze the data.

RESULTS: The type of sprint showed a significant main effect ($p < 0.05$, partial $\eta^2 \approx 0.40$); pivot side and interaction were not significant. Approach-based CoD efficiency was significantly greater than values based on isolated approaches: 76 (2) versus 74 (2) for the left pivot ($p = 0.041$, $d = 0.75$) and 78 (4) versus 74 (2) for the right pivot ($p = 0.026$, $d = 0.84$). Correlations were weak ($r = 0.22$–0.18).

CONCLUSION: Using approach-phase splits alters CoD deficit calculations and introduces systematic bias. These findings are preliminary; future studies with larger, more diverse samples are underway.

KEYWORDS: 505 test, CoD deficit, sprint, testing protocol, youth athletes

PP6. FREQUENCY OF ENERGY DRINK CONSUMPTION AMONG RECREATIONAL FITNESS ENTHUSIASTS

Vinko Romić[1], Klara Findrik[1], Petar Šušnjara[1]*

[1]*Faculty of Kinesiology, University of Osijek, Osijek*

INTRODUCTION: Energy drinks are becoming increasingly popular among recreational athletes due to their potential ergogenic effects, primarily thanks to caffeine as the main active ingredient. Caffeine can temporarily improve focus, alertness, and physical endurance, but the recommended daily intake for adults is up to 400 mg. Excessive intake may cause side effects such as nervousness, insomnia, elevated heart rate, and the development of tolerance, while chronic consumption leads to resistance and reduced effectiveness. The aim of this study was to examine caffeine beverage consumption habits among recreational fitness enthusiasts, their motives, and perceptions of the impact on sports progress.

MATERIALS AND METHODS: The study included 41 participants aged 18 to 25, all actively engaged in fitness. A validated questionnaire was completed via an online form. Data were analyzed regarding age, training frequency, coffee and energy drink consumption habits, caffeine intake, reasons for consumption, and perception of the impact on sports progress.

RESULTS: Most participants train 3-4 times per week, and 75.61% consume coffee. The average caffeine intake from coffee is 639.51 mg per week, while intake from energy drinks is negligible (0.0 mg/week). The main reason for consumption is increased energy, while none of the participants believe that these drinks significantly contribute to sports progress.

CONCLUSION: The results show that recreational fitness enthusiasts mainly consume caffeine through coffee, while energy drink consumption is minimal and the perceived impact on progress is very low. It is also necessary to investigate how different sources and doses of caffeine affect performance, motivation and recovery in a wider population of fitness participants.

KEYWORDS: caffeine, energy drinks, coffee, fitness, sports progress

PP7. GRAFTING SOLUTIONS: RECONSTRUCTION OF A DISTAL PHALANX DEFECT FOLLOWING ENCHONDROMA EXCISION VIA AUTOSPONGIOPLASTY

Dennis Sebešić[1], Vanessa Milošić[1], Marko Sablić[1], Josip Grbavac[2], Marko Zelenić[3*]

[1] Department of Anatomy and Neuroscience, Medical Faculty Osijek
[2] Department of Internal medicine, County Hospital Vinkovci
[3]Department of Orthopaedics, Clinic for Orthopaedics and Traumatology, Clinical Hospital Centre Osijek

INTRODUCTION: Enchondromatic lesions involving the distal phalanx pose diagnostic challenges due to overlapping radiological features with more aggressive pathologies. While the majority are benign, differentiating between benign and malignant entities is important for appropriate management. Enchondromas, a subset of benign cartilaginous neoplasms, frequently manifest in the small bones of the hands and feet. Often asymptomatic, they carry the potential to induce structural compromise if not treated in a timely manner.

REVIEW: We present the case of a 25-year-old male with a lesion in the distal phalanx of the right hallux. Radiographic imaging revealed a radiolucent tumour with an uncertain aetiology. “En bloc” resection of the tumour was performed, followed by cortico-spongious graft harvesting from a segment of the tibia. The autologous graft was subsequently placed into the osseous defect in a single-stage procedure, ensuring optimal integration and biomechanical stability. While the intraoperative findings suggested a benign aetiology, radiological uncertainty necessitated histopathological confirmation via biopsy. The histological examination corroborated the diagnosis of an enchondroma. The patient tolerated the procedure well and exhibited an uneventful postoperative course, with progressive radiographic evidence of graft incorporation and functional restoration.

CONCLUSION: Diagnostic ambiguity associated with imaging interpretation coupled with the necessity for structural reconstruction adds complexity to the management of phalangeal enchondromas. We underscore the importance of precise diagnostics, interdisciplinary collaboration, and an early surgical strategy to optimize patient outcome. Autospongioplasty remains a highly effective technique for the restoration of osseous integrity, ensuring both patient satisfaction and early recovery.

KEYWORDS: Bone grafting; Enchondroma; Fingers; Orthopedics

PP8. ENHANCING DIAGNOSTIC AND SURGICAL PLANNING: THE ROLE OF AI AND XR TECHNOLOGIES IN MODERN MEDICINE

Patrik Kokić[1], Irena Galić[1], Marija Habijan[1*]

[1]*J. J. Strossmayer University of Osijek, Faculty of Electrical Engineering, Computer Science and Information Technology Osijek, Croatia*

INTRODUCTION: Advances in artificial intelligence (AI) and extended reality (XR) are transforming diagnostics and surgical planning. AI enables automated image segmentation, while XR offers immersive 3D visualization. This review presents the use of AI and XR in diagnosing placenta accreta and planning neurovascular procedures, highlighting their benefits for clinical decision-making and patient-specific planning.

REVIEW: Deep learning methods, especially the U-Net architecture, are commonly used in medical image segmentation (MRI, CT) due to their ability to accurately detect complex anatomical structures such as the placenta and neurovascular pathways. These segmented images are integrated into XR platforms for 3D visualization of patient-specific anatomy. In practice, augmented reality (AR) headsets allow visualization during ultrasound exams and support planning for neurovascular procedures, improving real-time interaction with patient data. Combining AI-based segmentation with XR visualization improves diagnostic accuracy, reduces planning time, and enhances spatial awareness. In cases of placenta accreta, it enables more accurate assessment of placental invasion and its relation to surrounding tissues, leading to improved clinical decisions. In neurovascular interventions, XR improves catheter placement precision and supports better procedural outcomes, minimizing risks and enhancing safety. However, challenges remain, such as the need for high-quality annotated datasets, high costs of XR equipment, and user training requirements, which limit wider adoption.

CONCLUSION: AI and XR significantly enhance medical practice by improving visualization, spatial understanding, and decision-making. They support more accurate diagnoses, faster planning, and increased procedural precision, contributing to better patient outcomes. Future work should focus on optimizing these systems for wider clinical use and integration into education and training environments for professionals.

KEYWORDS: artificial intelligence, extended reality, medical imaging, placenta accreta, surgical planning

PP9. PHYSIOTHERAPY STUDENT EDUCATION: STRATEGIES FOR PREVENTING SPORTS INJURIES

Dunja Igrec[1], Petar Gregurić[1], Nikolina Lazić[1], Anita Matić[1*]

[1]*Faculty of Dental Medicine and Health Osijek, University J.J. Strossmayer Osijek, Croatia*

INTRODUCTION: For many people leading an active lifestyle, sports are a key part of daily life. Due to their high prevalence, sports injuries are a focus of various medical fields working to maintain physical health and prevent injuries. As physiotherapy plays a crucial role, this study aimed to assess physiotherapy students' knowledge of sports injury prevention.

MATERIALS AND METHODS: This study included 70 physiotherapy students from the Faculty of Dental Medicine and Health in Osijek. All participants completed an anonymous online questionnaire, specifically developed for the purposes of this research, which comprised 23 questions. The data were presented as absolute and relative frequencies (%), with differences between variables assessed using the χ^2 test.

RESULTS: Data obtained from the anonymous questionnaire revealed that 58 students prioritize regular physical activity and adequate warm-up as crucial for preventing sports injuries. Moreover, 54 participants consider aerobic exercise the most effective preventive approach. When assessing risk factors, 65 students identified an athlete's fitness level as the leading internal risk, while the same number emphasized the importance of sport-specific external factors. All participants concur that injuries occur more frequently in contact sports than in non-contact ones, and 63 believe male athletes are at higher risk of injury.

CONCLUSION: The results indicate that physiotherapy students clearly recognize regular physical activity, proper warm-up routines, and aerobic exercises as essential components of effective sports injury prevention. They also demonstrate an understanding of the significant role played by internal factors, such as an athlete's fitness level, and external factors tied to the specific demands of each sport.

KEYWORDS: physiotherapy, prevention, sport injuries

PP10. STEMI COMPLICATED BY REINFARCTION AFTER MECHANICAL VALVE AND STENT IMPLANTATION

Lucija Kadleček[1]; Ivana Brlić[1]; Valentina Kećkeš[1]; Barbara Kokić[1]; Igor Lekšan[1,2*]

[1]*Faculty of Medicine, J. J. Strossmayer University of Osijek, Croatia*
[2]*Department of Cardiac Surgery, University Hospital Centre Osijek, Osijek, Croatia*

Introduction: Acute mitral regurgitation is a medical and surgical emergency. Severe decompensated heart failure occurs due to the systolic return of blood from the LV to the LA. It can occur due to rupture of the papillary muscle, a rare and potentially fatal complication of infarction.

Case report: A hypertensive patient (M, 65) came to the ER because of chest pain and dyspnea for the past two days. ECG showed diffuse ST depression with elevation in aVR. Upon arrival at the cardiology department, he was tachydyspnoic, orthopnoic and sweating, SpO2 is 80%. The echocardiogram showed pulmonary edema, reduced systolic function of the LV, mitral insufficiency and dilatation of the v. cava inferior with congestion. The estimated ejection fraction was 35%. The patient was referred for coronary angiography as part of a STEMI. PCI LAD and CX were done, PCI RCA was planned for later. The whole time, the patient was extremely hemodynamically unstable. An urgent echocardiogram was indicated, which showed a rupture of the papillary chordae tendineae for the posterior cuspis, with consequent severe mitral insufficiency. An emergency operation was performed, a mechanical mitral valve and bypass were implanted. A few days later, blood tests showed a large increase in troponin and a newly formed negative T wave (V3-V6). Emergency coronary angiography showed pLAD in-stent thrombus, so PCI LAD was done.

Conclusion: If stents and mechanical mitral valve are implanted at the same time, triple anticoagulation therapy (warfarin, clopidogrel, acetylsalicylic acid) is necessary in the beginning. After four weeks, double anticoagulation therapy (warfarin, clopidogrel), and after one year the patient remains on lifelong warfarin therapy.

Keywords: anticoagulant drugs, mitral regurgitation, stent

PP11. POSTERIOR CRUCIATE LIGAMENT INJURY IN A PROFESSIONAL SOCCER PLAYER MANAGED CONSERVATIVELY: A CASE REPORT

Lovro Marinčić[1]

[1] Osijek-Baranja County Health Center, Osijek, Croatia

INTRODUCTION: Posterior cruciate ligament (PCL) injuries are less common than anterior cruciate ligament (ACL) injuries but may significantly impact athletic performance. This case report evaluates the effectiveness of conservative management in a professional soccer player with a high-grade PCL injury. We hypothesized that non-operative treatment can support functional recovery in select elite athletes.

MATERIALS AND METHODS: A 21-year-old male soccer player sustained a high-grade PCL injury from a direct tibial impact while the knee was flexed. MRI showed PCL elongation, joint effusion, and soft tissue swelling, while the ACL remained intact. Conservative treatment included dynamic bracing and early isometric quadriceps strengthening. Rehabilitation was closely monitored and progressively adjusted.

RESULTS: Initial rehabilitation showed improvement in muscle activation and joint stability. Clinical evaluations noted enhanced knee control, allowing transition to strength training and proprioceptive exercises. The patient demonstrated functional progress without surgical intervention.

CONCLUSION: This case supports the hypothesis that conservative treatment may enable recovery from high-grade PCL injuries in professional athletes. Continued structured rehabilitation and monitoring are key to successful outcomes.

KEYWORDS: conservative treatment, knee injury, posterior cruciate ligament, rehabilitation, soccer

PP12. COMPREHENSIVE TREATMENT OF A PATIENT WITH CARDIOVASCULAR DISEASE AND HEART FAILURE

Marko Margetić[1]; Dorotea Lošić[1]; Marko Pisačić[1]; Tia Poštić[1]; Lana Maričić[1,2*]

[1]Faculty of Medicine Osijek, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia
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INTRODUCTION: A 40-year-old man with high cardiovascular risk, obesity, a family history of heart disease, and a previous major cardiovascular event is presented. This case describes therapeutic interventions to optimize his cardiovascular health, including pharmacological treatments and weight management.

CASE REPORT: The patient, born in 1984, is obese, a smoker, and has a positive family history of early cardiovascular death. The patient's measured lipoprotein(a) of 151 mg/dl is an independent risk factor for developing cardiovascular disease. In 2017, he had an anterior-septal STEMI, which required a stent in the left anterior descending artery. Despite this, he missed regular check-ups, and an echocardiogram in 2020 showed an ejection fraction of 39%. In 2022, the core therapy for heart failure was introduced: , sacubitril/valsartan, SGLT2 inhibitors, eplerenone with a beta blocker, and drugs for further cardiovascular risk control, including PCSK9 inhibitors, statins. PCSK9 inhibitors, a new class of drugs, lower LDL and are expected to revolutionize the management of atherosclerotic disease risk. Follow-up in 2023 showed that LDL had decreased to 1.68 mmol/L in the first half, 1.37 mmol/L by the end of 2023, and 0.77 mmol/L in 2024. In order to make the treatment comprehensive, obesity treatment was initiated, and GLP-1 (liraglutide) was introduced.

CONCLUSION: This case highlights the complex interaction between hereditary and acquired cardiovascular risk factors. Regular monitoring, with the use of evidence-based therapy and control of cardiovascular risk factors, shows the success of the treatment; the patient maintained NYHA functional class II for five years, avoiding re-hospitalization and successfully controlling cardiovascular risk factors.

KEYWORDS: heart failure, PCSK9 inhibitors, STEMI

PP13. BLINDED BY PRESSURE – MALIGNANT HYPERTENSION

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INTRODUCTION: Malignant hypertension is a rare and life-threatening condition that can present with acute end-organ damage, including hypertensive retinopathy, encephalopathy, and renal dysfunction. Early detection and intervention are critical to prevent irreversible complications, especially in young adults without prior medical history.

CASE REPORT: A 30-year-old male secondary school teacher presented after an ophthalmologic exam revealed bilateral optic disc edema, blurred vision in the right eye, and peripapillary hemorrhages, which are consistent with Grade IV hypertensive retinopathy. He had experienced progressive visual disturbances in the right eye and a left frontal headache over the past two months.

On admission, his blood pressure was markedly elevated at 270/160 mmHg. The patient denied any history of hypertension. Laboratory tests showed acute kidney injury (creatinine 138–174 µmol/L), mild proteinuria, and hyperhomocysteinemia (19 µmol/L). Echocardiography demonstrated concentric left ventricular hypertrophy with preserved systolic function and diastolic dysfunction.

Neuroimaging ruled out acute pathology but revealed post-ischemic gliotic lesions. An ophthalmologic exam confirmed bilateral retinal nerve fiber layer thickening. Additional findings included a hepatic hemangioma on abdominal ultrasound. Renal Doppler imaging showed no evidence of renal artery stenosis. Fabry disease was considered due to cardiac thickening and renal involvement.

CONCLUSION: This case illustrates a rare presentation of malignant hypertension with multi-organ involvement in a young, previously healthy individual. It highlights the importance of routine blood pressure screening even in younger populations and underscores the need for a multidisciplinary approach to evaluate potential underlying causes, such as secondary hypertension or rare genetic conditions.

KEYWORDS: malignant hypertension, multiorgan involvement, retinopathy

PP14. TYPICAL PRESENTATION OF ACUTE EXACERBATION OF KNEE OSTEOARTHRITIS IN AN ELDERLY PATIENT: A CASE REPORT

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INTRODUCTION: Knee osteoarthritis (OA) is the leading cause of lower-limb disability in elderly patients. Characterized by activity-related pain, stiffness, and functional limitation, it significantly impairs quality of life. Acute exacerbations with worsening pain, muscle weakness, and balance disturbances are common, requiring comprehensive management approaches, including assistive devices and targeted rehabilitation plans.

REVIEW: We present the case of a 67-year-old female patient with no previous history of knee pain who developed an acute exacerbation of OA in the right knee. She reported a sudden onset of severe pain, swelling, a reduced range of motion (ROM), with an antalgic gait without systemic symptoms. A clinical examination confirmed joint effusion, localized warmth, tenderness and a reduced ROM. Radiographic finding confirmed degenerative changes: a reduction of the medial joint line and osteophyte formation. Management included nonsteroidal anti-inflammatory medication in an anti-inflammatory dose, physical therapy (cryotherapy, TENS, magnetotherapy, quadriceps strengthening exercises), and gait training with an assistive device. A single forearm crutch was prescribed for use in the contralateral hand to relieve pressure on the affected knee and improve gait stability. After four weeks of therapy, the patient showed a reduction in pain on the Visual Analogue Scale (VAS) from an initial 10 to 6, improved joint mobility, and better functional independence.

CONCLUSION: In cases of acute knee OA exacerbations, a comprehensive management combining physical therapy, pharmacologic treatment, and early use of a walking aid can significantly reduce symptoms, support joint unloading, and enhance mobility, allowing faster functional recovery.

KEYWORDS: acute exacerbation, knee, osteoarthritis, rehabilitation

PP15. COLITIS INDUCED BY COMBINED THERAPY WITH IPILIMUMAB AND NIVOLUMAB IN A PATIENT WITH METASTATIC MELANOMA

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INTRODUCTION: The combination therapy of CTLA-4 and PD-1 inhibitors has shown significantly greater progress in controlling metastatic melanoma compared to monotherapies. The aim is to present complications caused by the mentioned combined therapy.

CASE REPORT: A 70-year-old female patient presented to the emergency department with abdominal pain. She has a history of recurrent nodular melanoma. Upon examination in the emergency department, she was diagnosed with an ileus, and a median laparotomy with small bowel resection was performed. Further examinations revealed that the tumor tissue corresponded to a melanoma metastasis in the small intestine. Due to the recurrence of melanoma, the patient was introduced to a combination therapy of Ipilimumab and Nivolumab. After the third cycle, she reported following symptoms: diarrhea, fever. Additional medications were introduced, after which her condition improved. After completing the fourth cycle, she was sent for PET/CT, which revealed intense glucose analog uptake in parts of the colon and rectum (SUV max up to 35.4). The occurrence of colitis is explained as a side effect of therapy. Therefore, this combination therapy is recommended for younger patients in better overall health.

CONCLUSION: Although immunotherapy with checkpoint inhibitors shows significant efficacy in prolonging the lives of cancer patients, the outcome of therapy is also associated with a significant increase in severe side effects. Uncontrolled immune reactions can cause inflammation of intestinal mucosa and the development of colitis. Nevertheless, these side effects can be managed with immunomodulatory drugs such as corticosteroids and antihistamines. Furthermore, with the future development of biomarkers for predicting immunotherapy outcomes, a more integrated approach to patient subgroups can be achieved.

KEYWORDS: colitis, combined therapy, checkpoint inhibitors, metastatic melanoma

PP16. PHYSICAL ACTIVITY AND MENTAL HEALTH OF FIRST-YEAR STUDENTS AT THE UNIVERSITY OF OSIJEK: A CROSS-SECTIONAL STUDY

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INTRODUCTION: Physical activity (PA) plays a crucial role in maintaining overall well-being, including mental health. This study aims to investigate the relationship between physical activity and negative affective emotions among students at the University of Osijek.

MATERIALS AND METHODS: This cross-sectional study was conducted in June 2023. All participants were in their first year of study. The International Physical Activity Questionnaire (IPAQ) was used to assess physical activity levels, and the Depression, Anxiety, and Stress Scale 21 (DASS-21) was used to assess mental health. Ethical approval was obtained from the Faculty of Medicine in Osijek.

RESULTS: The study involved 437 students (194 male, 243 female) with a median age of 19 years. According to the IPAQ, 44% were classified as high, 49% as moderate, and 7% as low PA. Depression, anxiety, and stress symptoms were prevalent among 45%, 58%, and 38% of students, respectively. Among them, 13%, 24%, and 12% had expressed severe to extremely severe levels of depression, anxiety, and stress symptoms, respectively. Spearman test revealed statistically significant correlation between intense PA and depression (P<0.001), anxiety (P<0.001), and stress (P<0.001) scores. Multilinear regression analysis revealed that an increase in intense PA leads to a decrease in depression (β =-0.46, P<0.001), anxiety (β =-0.39, P <0.001), and stress (β =-0.53, P<0.001) levels.

CONCLUSION: High levels of depression, anxiety, and stress were observed among students of the University of Osijek. Intense PA contributed to the reduction of observed negative affective emotions.

KEYWORDS: DASS-21, IPAQ, mental health, physical activity

PP17. THE HIDDEN DANGER: WHEN HYPERTROPHIC CARDIOMYOPATHY LEADS TO PULMONARY EMBOLISM

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INTRODUCTION: Thromboembolic events are significant complications of hypertrophic cardiomyopathy (HCM) that can lead to severe adverse effects that are consequently related to death. Risk factors of thromboembolism such as atrial fibrilation (AF), greater age, left atrial enlargement, diastolic dysfunction and vascular diseases have been confirmed in patients with HCM.

CASE REPORT: Patient is a 47-year-old woman who presented to the Emergency Department with hypertension (260/130 mmHg) and tachycardia, although she felt generally well. Laboratory results revealed hyperglycemia and a mildly increased troponin. Electrocardiogram and ultrasound confirmed significant concentric left ventricular hypertrophy. Computed tomography angiography identified a partial saddle embolus in the distal segments of both main pulmonary arteries, extending to nearly all branches, consistent with pulmonary embolism (PE). Color Doppler ultrasound detected deep vein thrombosis (DVT) in the right leg. Coronary angiography excluded coronary artery disease, while additional workup ruled out cardiac amyloidosis. Despite recommendations for further evaluation, including genetic testing, the patient declined and did not attend follow-up appointments. Treatment included diet therapy, diabetes medications, warfarin for PE and DVT, statins, and three antihypertensive agents.

CONCLUSION: As shown by this case report HCM is associated with an increased risk of thromboembolic events, including PE, due to structural, hemodynamic and arrhythmic factors that promote blood stasis and clot formation. This case report highlights the importance of recognizing risk factors early and suggest life-long anticoagulant therapy in high-risk individuals.

KEYWORDS: cardiomyopathy, hypertrophic, pulmonary embolism

PP18. POSTOPERATIVE PROGRESSION OF THE CERVICAL KYPHOSIS: A CASE REPORT

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INTRODUCTION: If the cervical spine loses its lordotic shape and starts to curve forward, it is an abnormal condition referred to as kyphosis. *Here, we present a patient with a segmental cervical kyphosis.*

CASE REPORT: A 70-year-old woman arrives to the emergency room claiming that for the past 2 to 3 weeks she has been experiencing paresthesia in the tips of her fingers on both hands, which spread proximally over time. She has difficulty walking and retains urine. She comes to the emergency room because she bent over and couldn't move her arms or legs at all. An X-ray of the cervical spine was performed, which showed lordosis with C4-C6 segmental kyphosis, along with a dorsal herniation of the disc at the specified level and dorsal osteophytes that significantly protrude into the spinal canal. A diagnosis of myelopathy and spastic tetraparesis was made and she underwent emergency surgery. After the operation, she moves all extremities on demand with muscle weakness, reports mild paresthesia of the toes. On the postoperative magnet, we can see the progress of the segmental kyphosis, which is a consequence of the laminectomy performed during the operation. There has been an improvement in sensation, but the hypotrophy and hypotonia of the musculature are present so the tension of the paravertebral musculature has increased.

DISCUSSION/CONCLUSION: This case showcases how a kyphosis progresses after the surgery. The patient was later referred to a physician to strengthen the neck muscles to stabilize the spine as well as reduce the pressure on the spinal cord.

KEYWORDS: cerebrospinal fluid, kyphosis, laminectomy, paresthesia, spine

P19. STEEL PRECISION VS. SKILLED HANDS: COMPARING ROBOTIC AND CONVENTIONAL TOTAL KNEE ARTHROPLASTY OUTCOMES – A SYSTEMATIC LITERATURE REVIEW

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INTRODUCTION: There are two possible approaches to total knee arthroplasty (TKA): conventional total knee arthroplasty (cTKA) and robotic-assisted total knee arthroplasty (rTKA). It's unclear which approach is preferable considering outcomes. This review aims to summarize findings focusing on the comparison of outcomes / recovery following TKA.

REVIEW: A systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. A literature search was performed in April 2025, using PubMed and the Cochrane Library. Out of 1210 records, 17 articles met inclusion criteria. Data referring to total 1931 surgeries was analyzed. It's found that the rTKA is more efficient in restoring the joint's mechanical axis, although the operation duration of rTKA was significantly longer ($p < 0,001$). Due to precise prosthesis alignment, rTKA should be favored in cases of severely deformed knees. Trials with shorter follow-up periods confirmed the inflammatory markers were significantly lower first 7 days after the rTKA – potentially having positive impact on earlier mobilization and range of motion. Also, patients older than 65 years recovered their nutritional status faster after the rTKA. On the other hand, studies with longer follow-up periods (13 ± 5 years) found no difference regarding the functional outcome scores, aseptic loosening, overall survivorship, and complications. This goes into favor for cTKA, considering the additional time and expense associated with rTKA.

CONCLUSION: This review aimed to gather the information on TKA outcomes and simplify the comparison between two approaches. When choosing an optimal approach, focus should be on patient-specific characteristics such as age or type of trauma, since both methods have equally successful overall outcomes.

KEYWORDS: arthroplasty, knee, remote operation robotics, replacement, total knee replacement

P20. WILL BIONIC LIMBS OUTPERFORM BIOLOGICAL ONES?

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INTRODUCTION: Prosthetic limbs have greatly improved lives, enabling daily activities and athletic participation. For athletes, they support an active lifestyle. However, advances in sports technology raise concerns about fairness. Here it will be explored explores whether such innovations may give Paralympic athletes an unfair edge over their able-bodied Olympic counterparts.

REVIEW: Prosthetics have existed for over 3000 years, from Egyptian wooden toes to medieval knights' artificial limbs. A major milestone in modern sports prosthetics was the development of energy-storing designs like the Flex-Foot—a carbon-fibre prosthesis incorporating a heel to simulate natural ankle motion. It offers an energy return of approximately 84% per step, though this remains lower than the human ankle-foot complex, which can return up to 241% of energy, including contributions from active muscle work. The use of Flex-Foot sparked debate, especially with Oscar Pistorius, who used the heel-less "Cheetah" version in both the 2012 Olympics and Paralympics. Studies found that Cheetahs used 25% less energy than biological legs, offered a return three times higher than natural limbs, and reduced energy loss during running. This gave Pistorius a lower physiological workload and mechanical advantage. However, a 2009 study found prosthetics generated 9% less ground force and no swing-time advantage. Sprint final analyses confirmed no speed edge. Pistorius claimed his success came from training, not tech, and noted others with similar blades couldn't match his times.

CONCLUSION:Pistorius' case shows how prosthetics empower athletes but raises questions about fairness, access, and the nature of sport. Balancing innovation with equality remains a challenge.

KEY WORDS: prosthetics,energy, prosthetic limbs, technological developments