Pohybové ústrojí

Pokroky ve výzkumu, diagnostice a terapii

The 27th Prague-Lublin Symposium

Locomotor Apparatus Adaptation VI – Interdisciplinary Aspects

September 26–27, 2025
Vincent Pol University, Lublin, Choiny 2 Street, Lublin, Poland

Vydává
Společnost pro pojivové tkáně ČLS J. E. Purkyně z.s.
Ortopedicko-protetická společnost ČLS J. E. Purkyně z.s.
Ambulantní centrum pro vady pohybového aparátu, s.r.o.

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Louisa, 27, roztroušená skleróza

S Exopulse Mollii Suit už zase tančím.

60 minut terapie každý druhý den může zásadně uvolit spastické a napjaté svaly, aktivovat svaly ochablé a zmírnit chronickou bolest. A to nejen u Louisy s roztroušenou sklerózou, ale i dalších lidí trpících obdobnými problémy po cévní mozkové příhodě, při dětské mozkové obrně a jiných neurologických onemocněních.
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Louisa ve videu:

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Pohybové ústrojí. Pokroky ve výzkumu, diagnostice a terapii.

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LOCOMOTOR SYSTEM

Advances in Research, Diagnostics and Therapy

Published by The Society for Connective Tissues, Czech Medical Association of J. E. Purkyně, Prague, Society for Prosthetics and Orthotics, Czech Medical Association of J. E. Purkyně, Prague, Czech Republic and Centre for Defects of Locomotor Apparatus Prague, Czech Republic.

Call for papers

Support this journal by sending in your best and most interesting papers. The issue of the journal is published during whole year after proof acceptation of the reviewers. In occasion of the symposia (twice a year) is published the supplement.

Submitted papers: Locomotor System will review for publication manuscripts engaged in diagnostics and interdisciplinary treatment of genetic and metabolic skeletal disorders, limb anomalies, secondary osteoporosis, osteo/spondyloarthritis and another disorders that negatively influence development and quality of locomotor apparatus during human life. Both papers on progress in research of connective tissue diagnostics, medical and surgical therapy of multiple congenital abnormalities of skeleton mainly in the fields of paediatric orthopaedic surgery and plastic surgery, orthotics and prosthetics treatment, and papers dealing with biomechanics, clinical anthropology and paleopathology are appreciated.

The journal has an interdisciplinary character which gives possibilities for complex approach to the problems of locomotor system. The journal belongs to clinical, preclinical and theoretical medical branches which connect various up-to-date results and discoveries concerned with locomotor system. You can find the volumes of Locomotor System journal at http://www.pojivo.cz/cz/pohybove-ustroji/ since 1997 (free of charge). Since 2013 only electronic edition of the journal is available. That is why we recommend to all subscribers and those interested apply at http://www.pojivo.cz/en/newsletter, enter personal data, titles and e-mail address where the journal will be mailed.

Abstracts of presented papers are excerpted in EMBASE/Excerpta Medica (from the year 1994) and in the Bibliographia medica Čechoslovaca (from the year 2010). We prefer the manuscripts to be prepared according to Uniform Requirements for Manuscripts Submitted to Biomedical Journals (Vancouver Declaration, Brit med J 1988; 296, p. 401–405).

Vincent Pol University of Lublin & Medical University of Lublin
& Society For Connective Tissues CMA J.E. Purkynje & Society for Prosthetics and Orthotics CMA J.E. Purkynje
& Czech Medical Association J.E. Purkynje & Medical University of Lublin & Vincent Pol University in Lublin

invite you to

THE 27TH PRAGUE-LUBLIN SYMPOSIUM

Locomotor Apparatus Adaptation VI – Interdisciplinary Aspects

The Symposium will be held under the auspices
of the president of the Czech Medical Association (CMA) J.E. Purkynje

Professor Štěpán Svačina, MD, DSc.

&

the honorary president of the Society for Connective Tissues CMA J.E. Purkynje

Professor Josef Hyánek, MD, DSc.

The Symposium will be held at the
Vincent Pol University, Lublin, Choiny 2 Street, Lublin, Poland,
on Friday and Saturday, September 26–27, 2025

This event belongs to education actions integrated into the life training system of physicians according to professional statute No. 16 of the General Medical Council.

Partners of the symposium

PROGRAMME

FRIDAY, SEPTEMBER 26, 2025

8.00–9.00 REGISTRATION OF PARTICIPANTS

9.00 OPENING OF THE CONFERENCE

WELCOME SPEECHES

Assoc. Professor Henryk Stefanek, MA
President of Vincent Pol University, Lublin, Poland

Professor Tomasz Karski, MD, PhD
Honorary member of the Society for Connective Tissues CMA J.E. Purkynje and the CMA J.E. Purkynje
Vincent Pol University, Lublin, Poland

Professor Ivo Marik, MD, PhD
President of the Society for Connective Tissues, CMA J.E. Purkynje
Faculty of Health Care Studies, West Bohemia University, Pilsen, Czech Republic
Centre for Defects of Locomotor Apparatus, Prague, Czech Republic

9.30–13.00 | MORNING SESSIONS

9.30 | SESSION I: RARE BONE DISEASES – diagnostics, comprehensive treatment

Osteogenesis imperfecta – interdisciplinary approach in Czech Republic

Chairmen: Mařík Ivo, Kraus Josef, Hudáková Olga

Osteogenesis imperfecta – overview, craniospinal abnormalities and neurologic complications (30 min)

Kraus Josef[1], Mařík Ivo[2,3]

[1] *Department of Child Neurology, 2nd Medical Faculty, Charles University and University Hospital Praha-Motol, Czech Repuhlic*
josef.kraus@lfmotol.cuni.cz

[2] *Centre for Defects of Locomotor Apparatus I.l.c., Prague, Czech Republic*

[3] *Faculty of Health Care Studies, West Bohemia University, Pilsen, Czech Republic*
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Osteogenesis imperfecta – molecular genetic diagnosis (20 min)

Krulišová Veronika[1], Zemková Daniela[2,3], Mařík Ivo[3,4], Michalovská Renáta[1], Paszeková Helena[1]

[1] *GHC Genetics, Prague, Czech Republic*

[2] *Dept. of Paediatrics, Charles University, University Hospital Motol, Prague, Czech Republic*

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[4] *Faculty of Health Care Studies, West Bohemia University, Pilsen, Czech Republic*

krulisova@ghcgenetics.cz

10.20–10.40 COFFEE BREAK

Congenital disorders of connective tissues – genes and collagens (20 min)

Braun Martin[1], Zemková Daniela[2,3]

[1] *Department of Composites and Carbon Materials, Institute of Rock Structure and Mechanics, Czech Academy of Sciences, Prague, Czech Republic*

[2] *Dept. of Paediatrics, Charles University, University Hospital Motol, Prague, Czech Republic*

[3] *Centre for Defects of Locomotor Apparatus l.l.c.,, Prague, Czech Republic*

braun@irsm.cas.cz

Osteogenesis imperfecta. A story of a woman with severe form of disease (20 min)

Hudáková Olga[2], Zemková Daniela[1,2], Krulišová Veronika[3], Mařík Ivo[2,4]

[1] *Dept. of Paediatrics, Charles University, University Hospital Motol, Prague, Czech Republic*

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dezem@email.cz

WNT1 osteogenesis imperfecta (20 min)

Mařík Ivo[1,2], Maříková Alena[1], Daniela Zemková[1,3], Šumník Zdeněk[3], Souček Ondřej[3], Krulišová Veronika[4]

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DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

11.40 | SESSION II: CEREBRAL PALSY

Chairmen: Kraus Josef, Metera Krzysztof, Karski Tomasz

Cerebral Palsy – overiew of etiopathogenesis, clinics, comprehensive treatment (30 min)

Kraus Josef
Department of Child Neurology, 2nd Faculty of Medicine and Motol University Hospital, Prague, Czech Republic
josef.kraus@lfmotol.cuni.cz

Kinesiotherapy to develop motor skills or kinesiotherapy to develop daily activities in a child with cerebral palsy? Are these the only directions for improvement? (20 min)

Metera Krzysztof, MD, PhD
Faculty of Health Sciences
Vincent Pol University, Lublin , Poland
metera.wssp@gmail.com

The influence of mixed reality on the adaptation of the locomotor system in children with movement disorders – overview (20 min)

Kraus Josef[1], Šorfová Monika[2], Psotta Rudolf[2], Bureš Marek[3]
[1] *Department of Child Neurology, 2nd Faculty of Medicine and Motol University Hospital, Prague, Czech Republic*
[2] *College of Physical Education and Sports PALESTRA, l.l.c., Prague, Czech Republic*
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DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

13.20–14.00 | LUNCH

14.00–17.30 | AFTERNOON SESSIONS

14.00 | SESSION III: ORTHOPAEDICS

Chairmen: Karski Jacek, Mařík Ivo, Kraus Josef

The Latest Trends in Surgical Treatment of the Spastic Upper Limb (20 min)

Wójcik-Duda Anna, Karski Jacek
Paediatric Orthopaedic and Rehabilitation Department of Medical University of Lublin, Poland
Anna.Wojcik-Duda@umlub.edu.pl

The role of ultrasound examination in screening for developmental hip dysplasia – 33 years of history (20 min)

Karski Jacek[1], Okoński Marek[1], Karski Tomasz[2]
[1] *Paediatric Orthopaedic and Rehabilitation Department of Medical University of Lublin, Poland*
[2] *Vincent Pol University, Lublin, , Poland*
jkarski@vp.pl

Tibial derotational osteotomy for Idiopathic Tibial Torsion. Literature review, possibilities in paediatric musculoskeletal imaging (20 min)

Karski Jacek[1], Karska Klaudia[2]
[1] *Paediatric Orthopaedic and Rehabilitation Department of Medical University of Lublin, Poland*
[2] *Department of Paediatric Radiology of Medical University of Lublin, Poland*
jkarski@vp.pl

Diseases and Injuries of the Musculoskeletal System in Children Caused by the Carelessness and Thoughtlessness of Parents and Caregivers (20 min)

Okoński Marek[1], Karski Jacek[1], Okońska Patrycja[2]
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[2] *Independent Unit of Emergency and Specialised Emergency Services of Medical University of Lublin, Poland*
marokonski@wp.pl

DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

15.30–16.00 | COFFEE BREAK

16.00 | SESSION IV: PALEOPATOLOGY / VARIA

Chairmen: Hudáková Olga, Mařík Ivo, Karski Jacek

Syphylis and Leprosy (film documentary, 40 min)

Smrčka Václav[1,2], Zapletal Vít[3], Musilová Zdenka[4]

[1] *ESME l.l.c, Praha, Czech Republic*

[2] *Institute of History of Medicine and Foreign Languages of the First Faculty of Medicine, Charles University in Prague, Czech Republic*

[3] *Municipal Library of Prague, Czech Republic*

[4] *Municipality of the Town, Letovice, Czech Republic*

sedlcany1@seznam.cz

TAR syndrome – current approach to diagnosis and treatment (15 min)

Kaczmarek Inez[1], Jurczak Aleksandra[1], Perełka Oliwia[1], Zając Julia[1], Skoczylas Michał[2]

[1] *Student Scientific Circle of Clinical Anatomy, Faculty of Medicine, The John Paul II Catholic University of Lublin, Poland*

[2] *Department of Basic Medical Sciences, Institute of Medical Sciences, The John Paul II Catholic University of Lublin, Poland*

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Orthopedic experience of therapy by DMSO – short descriptions (10 min)

Karski Tomasz, Karski Jacek

Vincent Pol University, Lublin, Poland

Medical University, Lublin, Poland

tmkarski@gmail.com, jkarski@vp.pl

Is there any influence of a gold wedding ring on rheumatic hand ostoarthritis? Case report (20 min)

Mařík Ivo[1,2], Maříková Alena[1], Myslivec Radek[2,3]

[1] *Centre for Defects of Locomotor Apparatus l.l.c., Prague, Czech Republic*

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[3] *Ortopaedic and Traumatic Department, Hospital Příbram, Czech Republic*

DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

18.00 | DINNER

SATURDAY, SEPTEMBER 27, 2025

8.30–9.00 | REGISTRATION OF PARTICIPANTS

9.00–13.00 | MORNING SESSIONS

9.00 | SESSION V: DISCONGRUENT OSTEONEURAL GROWTH RELATIONS

Chairmen: van Loon Piet, Karski Tomasz, Mařík Ivo

Health issues by hypokinesia, sitting and living in a digital world of children in "overcivilized" societies (30 min)

P.J.M. van Loon[1], A.M. Soeterbroek[2], Grotenhuis J.A.[3] and T.H. Smit[4]

[1] *Orthopedic surgeon, Proktovar, Hengelo, the Netherlands*

[2] *Analyst, Chairman Posture Network Netherlands*

[3] *Em. prof. neurosurgery Radboud University Nijmegen, the Netherlands*

[4] *Professor Tissue Engineering, Mechanobiology of development and disease, Amsterdam UMC, the Netherlands*

pvanloon@planet.nl

Children – So-Called Idiopathic Scoliosis. Adults – Back pain syndrome. Causes. Symptoms. Therapy. Prophylaxis (30 min)

Karski Tomasz[1], Karski Jacek[2]

[1] *Vincent Pol University, Lublin, Poland*

[2] *Paediatric Orthopaedic and Rehabilitation Department of Medical University of Lublin, Poland*

tmkarski@gmail.com, jkarski@vp.pl, www.ortopedia.karski.lublin.pl

DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

10.00–10.30 | COFFEE BREAK

10.30 | SESSION VI. BIOMECHANICS/ PATHOBIOMECHANICS

Chairmen: Karski Jacek, Matej Daniel, Krawczyk Petr

Scapulohumeral rhythm improves glenohumeral stability (20 min)

Daniel Matej

Department of Mechanics, Biomechanics and Mechatronics,
Faculty of Mechanical Engineering, Czech Technical University in Prague, Prague, Czech Republic
matej.daniel@fs.cvut.cz

New podology problems – „Ankle Joint and Knee Distortion Syndrome" by people using small cars (20 min)

Karski Jacek[1], Karski Tomasz[2]

[1] *Paediatric Orthopaedic and Rehabilitation Department of Medical University of Lublin, Poland*
[2] *Vincent Pol University, Lublin, Poland*
jkarski@vp.pl, tmkarski@gmail.com, www.ortopedia.karski.lublin.pl

Instability and pain problems in the knee as a result of incorrect sitting position. Case reports (20 min)

Karski Tomasz[1], Karski Jacek[2]

[1] *Vincent Pol University, Lublin*
[2] *Paediatric Orthopaedic and Rehabilitation Department of Medical University of Lublin, Poland*
tmkarski@gmail.com, jkarski@vp.pl, www.ortopedia.karski.lublin.pl

Insights into the current developmental trends of the medial longitudinal arch of the foot (20 min)

Novák Jakub[1], Novák Jan[1], Vážná Anna[1], Sedlak Petr[1,2]

[1] *Department of Anthropology and Human Genetics, Faculty of Science, Charles University, Prague, Czech Republic*
[2] *Division of Child Health Promotion, Department of Hygiene, Third Faculty of Medicine, Charles University, Prague, Czech Republic*
novakjakub3@natur.cuni.cz

DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

12.00–13.00 | LUNCH

13.00–17.00 | AFTERNOON SESSIONS

13.00 | SESSION VII: ORTHOPAEDICS & ORTHOPAEDIC PROSTHETICS

Chairmen: Krawczyk Petr, Karski Jacek, Mařík Ivo

Orthopaedic Insoles in Diabetic Patients. A Review (20 min)

Svoboda Michal, MD, PhD
PROTEOR CZ l.l.c., Ostrava, Czech Republic
MichalSvoboda2011@email.cz

Lower limb prosthetics (30 min)

Krawczyk Petr, MD, PhD
PROTEOR CZ l.l.c. Ostrava, Czech Republic
Department of Rehabilitation and Physical Medicine, University Hospital Ostrava, Czech Republic
petr.krawczyk@seznam.cz

Prosthetics and ortho-prosthetics of lower limbs in children with Congenital Lower Limb Defects (40 min)

Mařík Ivo[1,2], Krawczyk Petr[3,4], Maříková Alena[1], Svoboda Michal[3], Myslivec Radek[1,5]

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DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

15.00–15.30 | COFFEE BREAK

15.30 | SESSION VIII: VARIA

Chairmen: Hudáková Olga, Mařík Ivo

The Genetics of Obesity (videofilm, 30 min)

Macek Milan Jr.
President of the Czech Society of Medical Genetics and Genomics (www.slg.cz)
Department of Biology and Medical Genetics of Charles University Prague, Czech Republic
2nd School of Medicine andMotol University Hospital; Prague, Czech Republic
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16.30 CLOSING OF THE SYMPOSIUM AND PLANNING THE 28TH INTERNATIONAL SYMPOSIUM

Ivo Mařík & Petr Krawczyk & Tomasz Karski & Jacek Karski

ORGANIZERS OF THE SYMPOSIUM

Assoc. prof. Henryk Stefanek, MA
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&
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&
Martin Braun, RNDr., PhD
Department of Composites and Carbon Materials, Institute of Rock Structure and Mechanics.
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Participants will receive the Programme and Certificate of Attendance
Abstracts of lectures will be published in Supplement 2 of the journal Locomotor System, vol. 32, 2025 (electronic version, ISSN 2336-4777, http://www.pojivo.cz/cz/pohybove-ustroji/)
More recent information about the Symposium will be available on the websites:
www.pojivo.cz & www.ortoprotetika.cz
NOTE: the organizers are preparing a symposium in both in-person and online formats.

Welcome speech to

The 27th Prague–Lublin Symposium – Locomotor Apparatus Adaptation VI – Interdisciplinary Aspects

Dear Participants of the 27th Prague-Lublin Symposium, in Lublin, at the Vincent Pol University – on September 26th–27th, 2025

Like many years – from 1998 till now – during the 27th Prague – Lublin Symposium we – the orthopedic surgeons, rehabilitation doctors, pediatricians, general doctors, general surgeons, medical sisters and physiotherapist gather to discuss the orthopedic, rehabilitation and general medicine problems – how to help the suffering people. Till now the Symposia was held mostly in the Czech Republic, in various cities – mostly in Prague – but also in other countries – like in Greece (2011), in Russia (2013) and in Poland – 2012 – in Sarbinowo in Sophia Bryza Rehabilitation Center, in 2014 – in Lublin in the Military Hospital, in 2016 in Zwierzyniec – Roztocze district in the south eastern part of Poland. Now again - we are gathered in Lublin in the Vincent Pol University. All these our scientific meetings are possible thanks to the fascinated activity of Prof. Ivo Marik and His Co-Organizers, friends.

This time, we discussed the details of the program for the upcoming symposium in Lublin during our personal meeting with Professor Ivo Marik in Sarbinowo from July 21 to 26, 2025. He arrived in Sarbinowo with members of his family – Alena, Jitka, Jana, Hana, and his sweet 3.5-year-old granddaughter Dotinka (Dorotea) / Dorotka, whom I told not to stand on her right leg all the time because it causes scoliosis. In personal conversations, we discussed everything related to the symposium, how to present our lectures – both in person and online – and other details of the symposium. There was also a telephone discussion with Associate Professor Henryk Stefanek, Rector of Vincent Pol University, the main organizer of the 27th Prague-Lublin Symposium.

I wish all participants a pleasant stay in Lublin, enjoyable meetings with friends, enrichment from the latest scientific findings presented by leading experts, and fruitful discussions on the lectures during the symposium and in the corridors. I believe in establishing professional cooperation and personal contacts. Good luck to everyone.

Prof. Tomasz Karski MD, PhD

Former Head of the Pediatric Orthopedic and
Rehabilitation Department of the Medical University of Lublin (1995–2009)
Currently – Professor Lecturer at the Vincent Pol University of Lublin / Poland
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Welcome Speech to

The 27th Prague–Lublin Symposium – Locomotor Apparatus Adaptation VI – Interdisciplinary Aspects

Lublin, Vincent Pol University, September 26, 2025

Ladies and Gentlemen, dear colleagues,

I would like to cordially welcome you all to the 27th Prague-Lublin Symposium, which is being held under the auspices of the President of the Czech Medical Association J. E. Purkyně (CMA JEP), **Professor Štěpán Svačina, DrSc.** and the Honorary President of the Society for Connective Tissues (SCT) CMA JEP **Professor Josef Hyánek, DrSc.**, well-known personalities of Czech medicine.

I am glad to welcome here the main organizer **Associate Professor Henryk Stefanek, MA** (President of the Vincent Pol University in Lublin, Poland) and co-organizers **Professor Emeritus Tomasz Karski, MD, PhD** (Vincent Pol University in Lublin, Poland), **Assistent Professor Jacek Karski, MD, PhD**, (Medical University of Lublin, Poland) and honorary guests orthopedist **Dr. med. Piet Van Loon** (Proktovar, Hengelo, The Netherlands) and biomechanist **Professor Matej Daniel, PhD** (Department of Mechanics, Biomechanics and Mechatronics, Faculty of Mechanical Engineering, Czech Technical University in Prague).

I cordially welcome my medical colleagues – experts in orthopaedics, neurology, orthopaedic anthropology, orthotics and prosthetics and specialists in biomechanics, physiotherapy, students of Vincent Pol University, Lublin (Poland) and Faculty of Health Care Studies, students of West Bohemia University, Pilsen (Czech Republic) and other participants interested in neuromusculoskeletal disorders from different perspectives who follow us online.

My sincere thanks to my close colleagues, symposium coordinators **Peter Krawczyk, MD, PhD** (Ortopedic Prosthetist, Vice President of the Society for Connective Tissues of the Czech Medical Society J. E. Purkyně /CMA JEP/ and Chairman of the Orthotic-Prosthetic Society of the CMA JEP), **RNDr. Martin Braun, PhD** (researcher, biochemist, scientific secretary of SCT CMA JEP) and **Professor Václav Smrčka, MD, PhD** (plastic surgeon and paleopathologist, honorary member of SCT CMA JEP).

I would like to thank **the organizing team of the Vincent Pol University in Lublin, Poland**, without whose perfect organization the symposium could not have taken place both in person and online. Last but not least, I would like to thank the **exhibiting companies**.

Nowadays, new discoveries are made mainly at the interface of disciplines. The interdisciplinary approach to the diagnosis and comprehensive treatment of skeletal deformities (both congenital and acquired) has been adopted as a major school of thought that recognizes new relationships regarding the etiology, pathogenesis, and even causal therapy of some genetic skeletal diseases.

Artificial intelligence (AI) is increasingly changing the medical field. AI is already finding applications in X-ray imaging, orthopaedics, orthotic prosthetics, biomechanics and other fields. AI technologies offer opportunities to improve diagnosis, surgery planning, patient outcomes, rehabilitation processes, etc.

I believe that today's and tomorrow's scientific lectures will expand our knowledge for the benefit of affected patients. I wish you to enjoy the new scientific information, and I hope you will establish new friendships that will help us to organize an interdisciplinary and international scientific approach to knowledge.

Allow me to present you some **commemorative PHOTOGRAPHS** from **The 26th Prague-Lublin Symposium**, held at the Medical House in Prague on 15–16 November 2024.

Professor Ivo Mařík, MD, PhD, FABI

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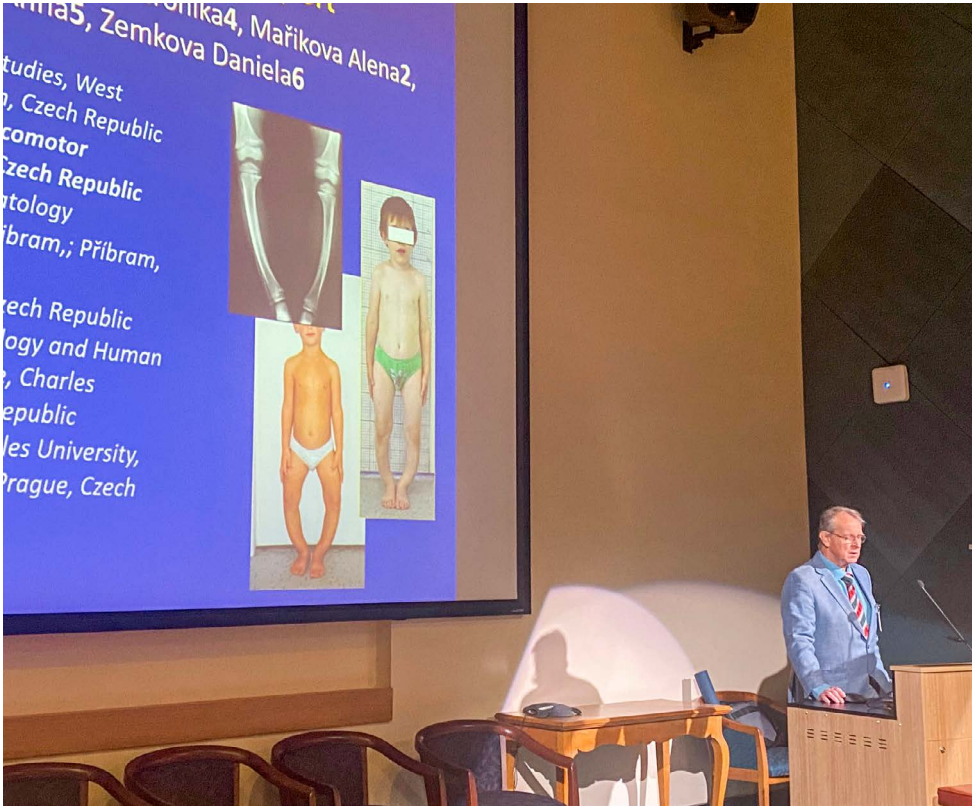
Chief-Editor of the journal Locomotor System – Advances in research, diagnosis and therapy

The 26th Prague-Lublin Symposium, November 16, 2024 Medical House, Sokolská 31, Prague 2, Czech Republic. RNDr. Martin Braun, PhD presented scientific biographies of Professor Hans Zwipp (75 years anniversary) and Dr. Piet van Loon (70 years anniversary). These colleagues were awarded by *Honorary Membership of the Czech Medical Association (CMA) J.E. Purkyne*. The awards were presented by Prof. Štěpán Svačina, MD, DSc., President of the CMA J.E. Purkyne.

The 26th Prague-Lublin Symposium, November 15–16, 2024 Medical House, Sokolská 31, Prague 2, Czech Republic. Most of the speakers at The 26th Prague-Lublin Symposium.

Professor Mařík presented the scientific biography of Associate Professor Dr. Michael Bellemore (71st anniversary). He was also awarded honorary membership of the CMA J.E. Purkyně, but was not present. Therefore, Professor Mařík accepted the award on behalf of Michael Bellemore.

Sydney, 21 November 2024: From left: Professor Michael Bellemore, his wife Jennifer, Alena Mariková, MD and Professor Ivo Marik.



Thursday, 28 November 2024: Professor Dr. Ivo Marik: International Guest Speaker at Ortho Dept, The Children´s Hospital at Westmead, *Lorimer Dodds Lecture Theatre*. Lecture Title: Comprehensive Treatment of Hypophosphataemic Rickets. After lecture, Prof. Dr. Marik informed the participants that Prof. Dr. Michael Bellemore was one of the initiators of the Prague-Sydney symposium in 1999 that was held in the same lecture theatre, and presented him with a diploma of honorary membership of the CMA J. E. Purkyně.


DIPLOMA

SOCIETAS MEDICORUM BOHEMORUM J.E.PURKYNĚ

HONORI SIBI DUCIT
DOMINUM
Michael Bellemore
SINGULARIA EIUS MERITA IN ARTEM MEDICAM
NEC NON IN HUMANITATEM PROVEHENDAM
MAGNI AESTIMANS
SODALIUM HONORIS CAUSA CREATORUM
NUMERO ADSCRIBERE

J·E·P

Diploma of Honorary Membership of the Czech Medical Association J.E. Purkyne awarded to Professor Bellemore.

From left: Ivo Marik, Alena Mariková, Michael Bellemore, and Jeremy Bellemore Jr. (orthopedic surgeon).

ABSTRACT

OSTEOGENESIS IMPERFECTA – OVERVIEW, CRANIOSPINAL ABNORMALITIES AND NEUROLOGIC COMPLICATIONS

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Key words: osteogenesis imperfecta, craniospinal abnormalities, neurologic complications, basilar invagination

Osteogenesis imperfecta (OI, also called brittle bone disease) is a rare, inherited connective tissue disorder characterized by bone fragility and deformity. It mostly affects the skeletal system and has an incidence of 1/15,000 to 1/20,000 in infants. It is characterized by features such as easy fractures, joint laxity, hypodontia, blue sclera, and hearing loss. Additionally, OI may impact various organs including the eyes, ears, heart, and skin. Clinical severity of symptoms ranges from multiple fractures in utero and perinatal lethality to near-normal stature in adulthood and low fracture incidence. Rare pathogenic or likely pathogenic genetic variants can be identified in most patients with autosomal dominant (AD) OI and in some patients with autosomal recessive (AR) forms of OI or X-linked osteoporosis.

Nicolas de Malebranche (*1638) is considered the first person to attempt to describe the clinical features of OI. Dr. Jean Lobstein (*1777) was the first to describe what is now called AD type I OI in 1833; Dr. Willem Vrolik (*1801) used the term "osteogenesis imperfecta" in 1849; for AR type II.

A tentative **postnatal diagnosis** should be made in patients presenting with characteristic combination of clinical and x-ray findings. X-ray is the main imaging modality for postnatal diagnosis and can detect fractures, generalized osteopenia, long-bone bowing, undertubulation and metaphyseal flaring, thin ribs, vertebral compressions, narrow thoracic apex, and Wormian bones (additional bones in skull sutures).

The **diagnosis** can be confirmed with DNA testing (specifies type) and skin biopsy. A prenatal diagnosis is possible using transvaginal ultrasound as early as 14 weeks gestation. A chorionic biopsy under ultrasound guidance combined with DNA sequencing can diagnosis osteogenesis imperfecta from 14 weeks gestation, but the test is invasive and may increase the risk of premature delivery or injury to infant. The differential diagnosis varies by age at presentation. Multiple skeletal disorders may present with similar features such as early onset osteoporosis, nonaccidental trauma, or hypophosphatasia.

Types. Sillence classification of types I–IV, which account for 85%–90% of osteogenesis imperfecta and result from mutations in the collagen gene: type I – mild, nondeforming, most common type –

positive family history is associated with majority of osteogenesis imperfecta type I cases; type II – perinatally lethal; type III – most severe nonlethal type, progressively deforming; type IV – broad range of phenotypes, moderately-to-severely deforming. Additional types V–XV (without mutation in collagen gene) are: most types moderately-to-severely deforming; types VII–IX have severe-to-lethal disease severity; types X, XI, and XV are progressively deforming.

Associated conditions are: a) Bruck syndrome (characterized by severe osteogenesis imperfecta and congenital joint contractures, short stature, scoliosis, and pterygia); b) rhizomelia (shortening of proximal segment of the limbs); c) tooth agenesis.

Etiology. 85%–90% of cases are due to mutations in COL1A1 or COL1A2 genes encoding collagen type which affect quantity or quality of collagen produced. Type I is caused by production of heterozygous null COL1A1 alleles (quantitative defect); b) next types II–IV caused by sporadic mutations usually involving glycine substitutions (qualitative/structural defect); c) other gene mutations that cause osteogenesis imperfecta include: type V – IFITM5 gene; type VI – SERPINF1 gene; type VII – CRTAP gene; type VIII – LEPRE gene; type IX – PPIB gene; type X – SERPINH1 gene; type XI – FKBP10 gene; type XII – SP7 gene; type XIII – BMP1 gene; type XIV – TMEM38B gene; type XV – WNT1 gene. However, the understanding of OI has evolved, and currently, there are at least 23 recognized types (type I to XXII), with new types being identified as more patients with OI are discovered.

Recurrent fractures and vertebral compression fractures are chief concern of **history**. They may present as: vertebral osteopenia, back pain, scoliosis, kyphosis. OI may present at any stage of life. Often presents initially as ambiguous injury as child is first learning to ambulate. It is typically characterized by history of multiple fractures since childhood (both spontaneous and related to minimal trauma).

Clinically, OI is characterized by generalized low bone mass, recurrent fractures following minor trauma, bone deformities, and various associated features. Specific physical findings vary based on specific type of osteogenesis imperfecta. Variable degrees of short stature are especially in type III – very short stature with adult height range 90–120 cm (35.4–47.2 inches) and type IV – adult height similar to that of healthy, prepubertal child. Skin shows sclerosis (types VII–IX) or skin blisters and bullae at birth (type X). Blue or gray sclera are in types I–III, V, X, XIV. Hearing loss is in types I–V. Triangular face is especially with type III. Dentinogenesis imperfecta – teeth develop abnormally with discoloration and translucence in types III, IV, and X. Delayed tooth eruption and midface hypoplasia is in type XII. Chest skeletal features associated with osteogenesis imperfecta, include: pectus excavatum or carinatum or barrel chest. Back has to be checked for scoliosis and kyphosis. In extremities calcification of interosseous membrane between bones of forearm may limit pronation and supination, and can lead to radial head dislocation in type V. Hyperextensibility of wrists, elbows, and interphalangeal joints is especially with type XII. Ligamentous laxity and hypermobility may lead to severe valgus pronated foot deformities, to rhizomelia – shortening of proximal segment of the limbs in type VII and VIII, and bowing deformities of upper and lower extremities may result from multiple subclinical fractures. Severe clubfoot in child with osteogenesis imperfecta type IV was also seen.

Extraskeletal manifestations are variable and may include dentin abnormalities, altered scleral color, facial dysmorphism, hearing loss, skin laxity, joint hypermobility, and cardiovascular, neurological, or respiratory symptoms. The progressive bone deformities mentioned are the main pathophysiological mechanism. They can lead to a wide range of **neurological abnormalities**.

Bone deformities may also involve the skull. **Wormian ossicles** are present in approximately 60 percent of patients with OI, but are not specific to OI. Multiple Wormian ossicles (with the presence of 10 or more ossicles arranged in a "mosaic" pattern) are seen in more severe forms of OI.

The **central nervous system** is usually involved because of softening of bone at the base of the skull, with resultant upward migration of the upper cervical spine and odontoid process into the skull base. Upward migraton of the spine may cause compression of the brainstem, mechanical impingement of the spinal canal with restriction of cerebrospinal fluid circulation, and impingement of the cranial nerves.

Neurological complications arise from skeletal deformities such as basilar impression. OI is commonly associated with relative **macrocephaly**. Comorbidities observed in association with OI include **platybasia** (flattening of the skull base), **basilar impression** (softening of the bone in the foramen magnum), and **basilar invagination** (BI; upward displacement of the upper cervical spine and clivus into the foramen magnum). Asymptomatic **ventricular dilatation**, **foramen magnum compression** syndrome (with communicating or obstructive hydrocephalus), or even fatal **brainstem compression** (invagination) may occur. Typical symptoms of BI that require urgent management include: headache, nystagmus, ataxia, and altered facial sensation. Patients with severe OI have a high frequency of BI. BI may progress slowly in childhood and take years to develop symptoms. Certain clinical features appear to confer a higher risk of BI: short stature with height < 0.4 percentile, DI (dentinogenesis imperfecta), and specific forms of OI: such as OI type V and AR forms.

Therefore, screening for BI every two years with a lateral radiograph centered on the foramen magnum is recommended, especially in the high-risk group. And if radiographic signs of BI develop, annual magnetic resonance imaging (MRI) and evoked potential testing are followed. Patients with OI, especially those at risk of developing BI, should be closely monitored in centers with available neurosurgery and expertise in managing BI.

Osteogenesis imperfecta also may directly involve **neurovascular structures**, leading to cavernous fistulas of the carotid artery, dissection of the cervical arteries, and cerebral aneurysm. Cerebral hemorrhage can be a potentially fatal complication of OI.

The **brain parenchyma** is frequently affected by the disease, with manifestations including cerebral atrophy, communicating hydrocephalus, and cerebellar hypoplasia. The imaging features of the disorder vary as widely as its clinical manifestations, depending on the severity of diseases. Severe forms accompanied by debilitating skeletal fractures and progressive neurologic impairments may lead to perinatal death, whereas milder asymptomatic forms might cause only a modest reduction in life span.

Kyphoscoliosis of the spine, flattening of the vertebral bodies and their deformities result in compression of the spinal nerve roots or the spinal cord itself with possible **paraparesis** and **paraplegia**.

Initial **diagnosis** should be made in patients presenting with characteristic combination of clinical and x-ray findings. Diagnosis may be confirmed with DNA testing (specifies type) and skin biopsy if necessary. Prenatal diagnosis may be done by ultrasound can which be used to detect abnormalities during antenatal period (may be especially helpful in patients with positive family history). Type III can be detected from 16 to 20 weeks gestation. Type IV can occasionally be detected at 20 weeks gestation. Transvaginal ultrasound may detect abnormality as early as 14 weeks gestation. Transabdominal ultrasound may detect abnormality as early as 15–16 weeks gestation. Ultrasound-guided chorionic biopsy combined with DNA sequencing can diagnosis osteogenesis imperfecta from 14 weeks gestation, but test is invasive and may increase risk of premature delivery and injury to infant. Mildly affected adults sometimes are identified when affected child presents with fractures.

Differential diagnosis varies by age at presentation. Multiple skeletal disorders may present with similar features, eg. early onset osteoporosis in adults; nonaccidental trauma or other skeletal disorders including: a) osteoporosis pseudoglioma syndrome (severe bone fragility with accompanying blindness); b) Cole-Carpenter syndrome (type of osteoporosis with associated distinctive dysmorphic facial features); c) Bruck syndrome (severe bone fragility with accompanying severe contractures); d) idiopathic juvenile osteoporosis (transient self-limiting nonhereditary form of bone fragility in children); e) severe fibrous dysplasia of bone (may mimic osteogenesis imperfecta type III); f) idiopathic autosomal recessive hyperphosphatasia; g) hypophosphatasia.

If presentation during antenatal period, alternative diagnoses to consider include: a) achondrogenesis type IA, IB, and II; b) perinatal or infantile hypophosphatasia; c) thanatophoric dysplasia – severe skeletal disorder characterized by extremely short limbs and folds of extra (redundant) skin on arms and legs (usually lethal at birth or in early life).

OI is a multisystem disease. The **care of patients** with this disease is therefore focused on improving health along with quality of life. The aim of treatment is to reduce fractures and pain and maximize mobility. The basis of treatment in OI is a **multidisciplinary approach**. It consists of physical therapy, surgical interventions and bone-targeted therapy. The patient is refered to a physical therapist for rehabilitation, which is essential for achieving and maintaining maximum functionality. The most important advance in medical therapy for osteogenesis imperfecta has been the introduction of bisphosphonate therapy to slow the resorption of bone in patients with moderate to severe forms of the disease with a high risk of fractures (ie, type III or IV). Bisphosphonates remain a basic component of medical therapy of the patients. In some patients, neurosurgery may be necessary to correct the effects of severe basilar invagination by the odontoid process. Surgery to correct and stabilize deformities is also considered. Intramedullary elongating rod placement ("rodding") is the most common surgical intervention. While medications, surgical procedures, and other interventions can provide partial relief for specific symptoms, a cure for OI remains elusive. Addressing the underlying

genetic defects and improving bone formation, emerging technologies such as gene editing and stem cell therapies show substantial promise for more targeted and potentially curative treatments.

Note: This lecture will be published as a review article in Locomotor System 32, 2025, No. 1.

ABSTRACT

OSTEOGENESIS IMPERFECTA – MOLECULAR GENETIC TESTING

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Keywords: Osteogenesis imperfecta, molecular genetic testing, *COL1A1* gene, causal variant

Background: Osteogenesis imperfecta (OI) is a connective tissue disorder characterized by bone fragility, often leading to fractures after minimal or absent trauma. Additional features may include dentinogenesis imperfecta and, in adulthood, hearing loss. The clinical spectrum ranges from perinatal lethality to severe deforming forms with short stature and mobility impairment, as well as milder phenotypes with normal dentition and stature. Most patients harbor pathogenic variants in *COL1A1* or *COL1A2*, encoding type I collagen, typically with autosomal dominant inheritance. Other associated genes have been identified, with autosomal dominant, autosomal recessive, or X-linked recessive inheritance patterns.

Objective: To present outcomes of molecular genetic testing in 2 patients with clinically and radiographically diagnosed OI.

Methods: Two unrelated female patients with clinical diagnoses of OI underwent molecular genetic testing. Massively parallel sequencing was performed for known OI-associated genes (*COL1A1, COL1A2, BMP1, CRTAP, FKBP10, IFITM5, MESD, MBTPS2, P3H1, PLOD2, PPIB, SERPINF1, SERPINH1, SP7, WNT1*). In the second case, additional array comparative genomic hybridization (array CGH) was conducted.

Results: The first patient, aged 49 years, presented with OI type III, short stature (110 cm), multiple skeletal deformities, and approximately 60 lifetime fractures. Molecular analysis revealed a heterozygous *COL1A1* variant c.994G>A, p.(Gly332Arg), previously reported as pathogenic and consistent with her clinical presentation. The second patient, aged 33 years, diagnosed with OI type IV, reported over 20 fractures, bluish sclerae, and short stature (144 cm). Sequencing of 16 known OI-associated genes and array CGH did not reveal a causal variant. The genetic etiology remains

unresolved. The reason may be the presence of a variant that cannot be detected with the applied methods, or a mutation in another predisposing gene that has not yet been examined.

Conclusion: Molecular genetic and cytogenetic analyses are effective tools for confirming the diagnosis of rare disorders such as OI. However, the absence of a detectable pathogenic variant in a patient with a typical phenotype does not exclude the diagnosis. Awareness of methodological limitations remains essential in clinical practice.

ABSTRACT

CONGENITAL DISORDERS OF CONNECTIVE TISSUES – GENES AND COLLAGENS

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Collagen is the most abundant scleroprotein in the extracellular matrix of vertebrates. Each of the 28 types has a specific structure, location, and function, which is important for the proper functioning of soft and hard connective tissues. Differences in amino acid composition, arrangement, and interaction with other proteins lead to differences in a number of physicochemical properties of tissues, such as strength, elasticity, and stability. The highly rigid collagen molecule is characterized by a triple helix structure of three chains with a characteristic amino acid sequence Gly-X-Y, dominated by glycine (30%), with proline, hydroxyproline (Hyp) and hydroxylysine (Hyl), among others, with Hyp and Hyl being formed by post-translational modification of proline and lysine with the participation of ascorbic acid. The structure and properties of collagen are determined by the amino acid sequence in the chain and the secondary structure (helix with a pitch of 1 nm/turn), as well as the tertiary structure (right-handed triple helix consisting of three alpha chains) and the quaternary structure determining the spatial arrangement of the molecule. The most widespread collagen in the human body is type I collagen. The authors show how pathological changes in the COL1A1 and COL1A2 genes, disorders in post-translational modifications, and disruption of collagen metabolism lead to pathological conditions such as osteogenesis imperfecta, Ehlers-Danlos syndrome, osteoporosis, and arthritis.

Keywords: collagen biochemistry, mutations in the COL1A1 and COL1A2 genes, osteogenesis imperfecta, Ehlers-Danlos syndrome

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ABSTRACT

OSTEOGENESIS IMPERFECTA. STORY OF A WOMAN WITH A SEVERE FORM OF THE DISEASE

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Key words: osteogenesis type III, clinical findings, radiological features, comprehensive treatment, molecular genetics.

The authors present the course of osteogenesis imperfecta type III, symptoms, radiological findings, treatment and etiopathogenesis in the case of a woman born in 1974. The first symptoms were evident after birth: lower limb deformities after healed prenatal fractures and soft caput quadratum (caput membranaceum). She was initially treated conservatively for recurrent fractures. At the age of 8 she stopped walking. Comprehensive examination revealed severe growth failure, age-related progressive dorsolumbar dextroconvex kyphoscoliosis of the spine and flattened biconcave vertebrae ("fish" vertebrae). Upper limbs without deformities. The lower limbs showed marked anterolateral curvature of the proximal femurs (Shepherd's crook´s deformity) ventral curvature of the left tibia (sabre shaped deformity) with a fracture on the right tibia. The left lower deformity was 4 cm shorter. She underwent 7 lower limb surgeries from 13 to 21 years of age. She is 108 cm tall.

Thanks to comprehensive treatment, the patient got back on her feet, graduated from high school. She is now in a wheelchair, uses her own specially adapted car, works part-time and has an assistant. But she is able to walk in a short distance – she walks like apes. Molecular genetic testing in 2023 revealed the presence of a pathogenic variant c.994 G<A, p. (Gly332Arg) in the COL1A1 gene in a heterozygous state, confirming type III osteogenesis imperfecta.

Using this example, the authors discuss the etiopathogenesis, classification, and treatment of osteogenesis imperfecta, its changes in recent decades (treatment with bisphosphonates), and future prospects.

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ABSTRACT

WNT1 OSTEOGENESIS IMPERFECTA

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Summary

The authors present an interdisciplinary complex care of a patient with congenital bone fragility in whom two mutations in the *WNT1* gene were found to cause osteogenesis imperfecta type XV. She suffered her first fracture at birth, the second at 2 years of age. From 2.5 years of age she was treated at the *Dept. of Paediatrics; University Hospital Motol* with cycles of pamidronate, from 5 years of age with zoledronate. From the age of 3 to 17 she was treated at the Centre for Locomotor Defects (CLD) in Prague for long bone fractures, repetitive deformities and pseudoarthroses, which required more than 10 reconstructive surgeries (segmental osteotomies). Now a conservative approach is preferred. The patient moves in a wheelchair, standing only when moving from the wheelchair to the bed. She uses a corset to sit in the wheelchair. The final height of the patient is 129 cm (– 6 SD), both trunk and limbs are shortened, and the limb disability became more pronounced during the growth period. The left lower limb is shortened by 4 cm. These parameters corresponded to type IV osteogenesis imperfecta according to Sillence, but healing after surgery was more complicated and longer. Despite treatment with bisphosphonates, bone density in the lumbar spine was significantly low; according to pQCT, trabecular bone density in the radius metaphysis was normal, but cortical density was reduced. The authors discuss the importance of comprehensive care and discuss surgical treatment options and new pharmacological approaches.

Keywords: osteogenesis imperfecta, OI type XV – WNT1, molecular genetics, bone deformities, stress fractures, intramedullary nailing and plates, bone density, bisphosphonates, teriparatide treatment.

Note: This lecture will be published in Locomotor System 32, 2025, No. 1.

ABSTRACT

CEREBRAL PALSY – OVERVIEW OF ETIOPATHOGENESIS, CLINICS, COMPREHENSIVE TREATMENT

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Key words: prematurity, movement disorder, contractures, physiotherapy, orthopaedic surgery

Cerebral palsy is a definition that describes a **persistent disorder of movement and posture**. It is caused by an abnormality of the immature brain, which is **not progressive**. Its incidence is about 1 in 400 to 1000 live births, but obviously it can range in severity from mild to severe. It can be due to many different causes. The majority of causes occur before the time of birth. It may be due the development itself (the brain does not develop normally), due to genetic causes, and sometimes it is because there has been some infection or trauma when the child is developing in the womb. A small proportion they are due to problems around the time of birth, although this, in fact, is quite uncommon. The high-risk group are children who are **born prematurely** and around 40% of children with cerebral palsy have been born prematurely.

Often we know that a child is **at high risk of cerebral palsy**, for example:
- a child that is been on a special care baby unit and
- early ultrasound scan of the brain have shown that there is some damage,
- it is picked up that there are problems during the pregnancy, so we know the child is at high risk,
- there can be signs when the baby is born that things are not quite right,
- fits in the early period, which again are a bit of a warning sign,
- it can just be noted as the child begins to develop that there are problems with their movement,
  - for example they are nor moving the hands and legs normally,
  - or when the time comes when you would be expecting them to walk, a
  - they are **not acquiring their milestones**,
  - so they are maybe not sitting or walking at the right time.
- so the milestones the a health visitor screens you for,
- so we know that they are at high risk and we would screen them carefully.

Once the diagnosis of cerebral palsy is made, the child will then be involved with the local child development team, usually. In this group they will meet a number of professionals who can help with difficulties they are encountering
- particularly this is the pediatrician, and child neurologist, physiatrist and a physiotherapist in the first instance (used methods are Vojta method, Bobath concept, Petö Conductive Education),
- but sometimes children need other people to help,
  - such as speech therapists
  - or occupational therapists,
  - psychologists.

An aim is to identify what particular thing the child finds difficult and try to help them with this.

The **common aim** is:
- to try and help the child achieve their full potential,
- to help the child in their movements,
- to keep the muscles strong and of good length,

because one of the risks of cerebral palsy is,
- that because the muscles are nor working normally and become short,
- **contractures** can develop and sometimes orthopaedic surgery is needed.

So we try to delay this:
- by doing stretching and strengthening exercises,
- using splint and orthotics where necessary,
- in some instances we inject the stiff muscles with dynamic contractures in spastic dystonia with botulinum toxin to relax them,
- occasionally more specialized treatments are indicated,
- but these are only in specialist centres: e.i. intrathecal baclofen, selective dorsal rhizotomy.

A number of children will go to need of orthopaedic surgery to lengthen the muscles.

As the children grow older and go into adult services, what is called the transition into adult services has to be looked carefully. Children needs might be as young adults, and again maintaining their independence as much as possible is important. Most young people with cerebral palsy are fully independent and have full active life. So in describing cerebral palsy it is important to be aware that it can range from very mild to really very severe. There is a lot we can do in helping improve the problems that occur with cerebral palsy. In most severe causes there only a limited amount one can offer sometimes in terms of improving the mobility, but there is quite a lot we can do in terms of comfort, care of the child and giving them the best quality of life possible.

ABSTRACT

KINESIOTHERAPY TO DEVELOP MOTOR SKILLS; OR KINESIOTHERAPY TO DEVELOP DAILY ACTIVITIES IN A CHILD WITH CEREBRAL PALSY (CP)? ARE THESE THE ONLY DIRECTIONS FOR IMPROVEMENT?

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The aim
The aim of the work is to present an innovative approach to the methodology of kinesiotherapy of infants and young children with cerebral palsy.

Introduction
Commonly used methods of kinesiotherapy of infants and young children with cerebral palsy, e.g. the Vojta, Bobath, and Doman methods, use kinesiotherapy to improve motor skills, including the development of correct movement patterns, improving balance, correct posture, and striving to master the standing position and locomotion.

The goal of kinesiotherapy, which improves daily activities, is to develop functional movement patterns used in those activities. This approach is most widely used in the Petŏ (Konductive Education) method for children with cerebral palsy mainly over the age of 3.

Methodology and preliminary results
The author provides examples of the possibilities of combining both forms of kinesiotherapy and its justification. The presented assumptions of this procedure have been presented by the author in the literature and are also the subject of organized courses for physiotherapists from Poland and abroad organized at the Vincent Pol University in Lublin.

Key words: cerebral palsy, methods, children, daily activities.

ABSTRACT

THE INFLUENCE OF MIXED REALITY ON THE ADAPTATION OF THE LOCOMOTOR SYSTEM IN CHILDREN WITH MOVEMENT DISORDERS – OVERVIEW

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Keywords: mixed reality, movement disorders, locomotor functions, postural functions, fine motor skills, walking

The aim of the project was to create a digital system for the rehabilitation of movement disorders based on cognitive-psychological (top-down) approaches using mixed reality (MR) technology in children. We focused on children with cerebral palsy (CP) aged 6–14y. A cure for CP remains elusive. However proper rehabilitation, physiotherapy and supportive care can significantly improve the quality of life and help affected children achieve the greatest possible independence. As part of the rehabilitation care, children with CP practiced using this technology for 4 to 6 weeks.

Using **MR system** therapy with 3D Goggles, focuses on both very close functions – on **locomotor functions** and postural functions. A whole range of MR tasks trains and stimulates of the neuromuscular pathways and systems that ensure them. Part of the tasks is taking the desired body position in

combination with performing specified movements too. For example, one task stimulates bending and the child "crawls through a hollow trunk". Another example is "crossing a stream" by jumping over stones. Next task addresses the stimulation of walking sideways, i.e. sideways. This strengthens weak hip abduction.

Postural abilities are also practiced in tasks primarily focused on the upper limbs. Examples are picking fruits from a tree, tracing patterns, or tracking moving colored balls with maintaining a constant standing base of support.

A large group of 3D MR applications focuses on **fine motor skills**. They use the form of grip (pinching and palmar grip) and its release, targeted manipulation of the held object (planting flowers in flower pots). Pronation and supination of the forearm are also practiced, especially when turning cards in the memory game.

The **advantage** of all these tasks is that the child is drawn into the game or task and, using the visual 3D environment, is stimulated in a fun way to train the above-mentioned motor functions and their natural combinations. Excellent cooperation has also been confirmed with children with associated neurodevelopmental disorders (e.g. autism, attention deficit disorder).

Tests also include assessment **walking ability** by an inertial sensor within the G-Walk system (BTS Bioengineering). A 10m walking test with parameters such as cadence, step length, stance and swing phase duration, are evaluated. During the gait cycle, the position of the pelvis – mainly anteversion, obliquity and the rotation are evaluated.

The mixed reality exercise system was developed by the author's team as part of the TAČR project specifically for the needs of children with CP. A clinical study is currently underway, where children are allowed to exercise with our digital system during a spa-therapy stay. Exercises using this mixed reality system are positively received by both the exercising children and professional rehabilitation workers.

ABSTRACT

THE LATEST TRENDS IN SURGICAL TREATMENT OF THE SPASTIC UPPER LIMB

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Key words: spastic upper limb, muscle stiffness, surgical treatment, Cerebral Palsy Follow-Up Program

Introduction
A spastic upper limb is a limb in which spasticity occurs – a pathological increase in muscle tone resulting from excessive activity of muscle reflexes controlled by the central nervous system. It manifests as muscle stiffness, difficulty performing smooth movements, and characteristic limb postures (flexed elbow and wrist, adducted shoulder).

Typical appearance of the upper limb in cerebral palsy are shoulder in internal rotation, elbow in flexion, forearm in pronation, wrist in flexion and ulnar deviation, fingers in flexion.

Clinical Presentation
We observe: Increased muscle resistance to passive stretching, clasp-knife phenomenon – a sudden decrease in resistance during passive movement, hyperactive deep tendon reflexes, clonus-involuntary, rhythmic muscle contractions elicited by sudden stretch, involuntary contractions of flexor and extensor muscle groups.

There are Features of cerebral palsy: Delayed achievement of milestones: spastic muscles, difficulty controlling muscle movement, difficulty moving around / mobility challenges.

Methods of treatment
There is a Swedish program for children with cerebral palsy – CPUP (Cerebral Palsy Follow-Up Program) which consists of: monitors motor development and detects orthopedic issues early, guides personalized rehabilitation and treatment, uses regular exams and measurements to track progress and optimize care. The patients are divided to three colors group, green which are the smallest presentation, orange with middle, and red with high risk of structural contractures and secondary pain problems, which need immediate medical or orthopedic intervention.

In the program pharmacological treatment, serial casting, botulin injections and operative treatment can be use. There is several opportunity of each level eg. Elbow as: muscle release (biceps brachii, brachioradialis, flexor muscles, and pronator teres), denervation of the above muscles, anterior release of the joint capsule or even osteotomies. In other joint we can use similar methods. In wrist the arthrodesis is an option too.

Conclusions
- Is very important to analyze the problems of ICP child carefully and chose the right method of treatment.
- The combination of rehabilitation, pharmacology, orthosis or casts and botulin injections are the best solution.
- The operative treatment is necessary before structural contractures appears with secondary careing problems and pain.

ABSTRACT

THE ROLE OF ULTRASOUND EXAMINATION IN SCREENING FOR DEVELOPMENTAL HIP DYSPLASIA – 33 YEARS OF HISTORY

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Key words: ultrasound examination, developmental hip dysplasia, screening

Introduction

Hips dysplasia, subluxation and Luxation are severe problem in diagnosis and treatment. In the past, the clinical examination and later (ater 3th month) x-ray give unsatisfactory results. Great number of children have to be operated. The problem was so important that many authors introduce own treatment methods, eg Salter, Dega, Pemberton, Chari and others.

Finally revolution has to be Graf's study and article, which introduce the ultrasound examination in hip luxation prophylaxis and treatment.

History

In CDH examination the ROM examination was used. Additional Barlow Test, Aperrance of Ortolani sign and X-ray – after 3 month of life. In 1983 Prof. Rainhard Graf introduced his method of examination which was revolutionary in prophylaxy of hip luxation.

Prof. Graf has examined six hundred infant hips with ultrasonography and the findings compared to radiography. Twelve hips were dislocated and could be recognized as such on the sonograms. The development of the acetabular roof can be determined through assessment of the preformed, no osseous acetabular rim. Consequently, dysplasia of the hip can be recognized early.

Ultrasonography does not replace clinical investigation, but it does reduce the need for radiography, reducing the exposure of the child to radiation.

Material

In Lublin, we introduced newborn ultrasound examinations in 1986, first we used the US equipment of the gynecologist at the Obstetrics Department, then we received an ultrasound machine as a gift from the Polish community in London, and finally in 1992 a Preluxation clinic was established as a common, free option for hip examinations.

Conclusions

1. Hip ultrasound examinations are an excellent and irreplaceable aid in the early diagnosis of hip abnormalities.

2. US examination enable the age of imaging examinations to be reduced from 3 months to 3 weeks.
3. US examination enable treatment monitoring.

ABSTRACT

TIBIAL DEROTATIONAL OSTEOTOMY FOR IDIOPATHIC TIBIAL TORSION. LITERATURE REVIEW, POSSIBILITIES IN PEDIATRIC MUSCULOSKELETAL IMAGING

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Key words: Tibial derotational osteotomy, Idiopathic Tibial Torsion

Introduction
Tibial derotational osteotomy (TDO) is an established surgical treatment for patients with persistent idiopathic external tibial torsion (ETT). Although torsional deformities of the tibia typically resolve spontaneously during childhood, in a minority of patients (approximately 1%) the deformity persists into adulthood, causing functional and clinical problems.

A review of 17 studies encompassing 351 patients and 460 operated limbs was performed. The average age of patients was 22 years (range: 7–61), with a predominance of women (77%). The mean follow-up time was 43 months. Thirty-three percent of cases involved isolated TDO, while 25% of patients had undergone prior knee surgery.

Material
The most common indications for TDO were anterior knee pain (88%), patellar instability (59%), gait dysfunction (41%), and cosmetic concerns (12%). Importantly, the majority of publications (71%) described multiple indications combined as reasons for surgery, reflecting the complex nature of this condition.

Clinical assessment remains the cornerstone of diagnosis. The thigh–foot angle (TFA) was the most frequently applied measure (59% of studies), with pathological torsion typically defined as >30°. The transmalleolar angle (TMA) was reported in 24% of studies. Among imaging techniques, computed tomography (CT) continues to be considered the gold standard, providing precise confirmation of tibial rotation, most commonly measured relative to the posterior tibial condylar axis. Normal values range between 19° and 25°, with deviations greater than 5° (i.e. >25–30°) considered pathological. Magnetic resonance imaging (MRI) and EOS imaging have been proposed as alternatives. Notably, EOS technology allows three-dimensional reconstruction of the skeletal system with a radiation

dose reduction of up to 95% compared to CT, which is especially important in pediatric patients and those requiring repeated imaging.

Treatment
Surgically, proximal osteotomy was performed most frequently (59%), followed by distal osteotomy (24%) and diaphyseal osteotomy (6%). The degree of correction ranged from 10° to 36°, with stabilization achieved using plates or intramedullary nails.

Clinical outcomes were highly favorable. Ninety-four percent of patients expressed satisfaction with the procedure, and most experienced significant reduction in anterior knee pain, improved gait mechanics, and increased patellar stability. Complication rates were low, and functional outcomes were generally excellent.

Conclusion
Tibial derotational osteotomy is an effective and safe method for the treatment of symptomatic external tibial torsion. A thigh–foot angle greater than 30° serves as a practical threshold for surgical qualification. Computed tomography remains the most reliable imaging tool for decision-making, although EOS imaging may play an increasingly important role in the future. Further research is needed to establish standardized diagnostic criteria and surgical guidelines.

ABSTRACT

DISEASES AND INJURES OF THE MUSCULOSKELETAL SYSTEM IN CHILDREN CAUSED BY THE CARELESSNESS AND THOUGHTLESSNESS OF PARENTS AND GUARDIANS

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Key words: injures, children, carelessness and thoughtlessnes, parents

Introduction
The protectiveness of parents and caregivers is widely recognized. Unfortunately, many illnesses and injuries of the musculoskeletal system are caused by parents' lack of imagination or carelessness. Orthopedists encounter avoidable accidents and overuse injuries daily.

Material
The clinical material consists of thousands of patients whom we treat every day and epidemiological research shows us that this problem could be avoided or significantly reduced.

Examples of inappropriate behavior by parents:

1. Improperly wrapping babies and carrying babies in an extended position causes the development of hip dysplasia.
2. Tolerating hip adductor contracture in children with cerebral palsy leads to paralytic hip dislocations.
3. Lifting children by the upper limbs, especially those with limpness, may result in dislocation of the radial head.
4. Excessive shaking of a small child results in brain pathology.
5. Tolerating a large number of children or children of different weights playing on a trampoline may lead to injuries.
6. Allowing children to skateboard or ride bikes without helmets or other safety measures is a reckless act by parents.
7. Lack of incentives for children to be physically active and allowing them to use mobile phones for long periods of time contributes to obesity and postural defects.
8. Children's participation in agricultural work amputations, tendon cutting, etc. Currently less of the problem because the are protection for the cutting parts.

Conclusions
Orthopedists are familiar with these rules, but little is said about them, and the lack of knowledge among parents and caregivers, in particular, can lead to accidents and injuries. Therefore, we need to talk more about this within the orthopedic and medical community.

ABSTRACT

SYPHILIS AND LEPROSY

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In the ossuaries over the last thousand years, samples from the Crusades have been dated using ^{14}C, for example in Křtiny (1035±30 years). Additionally, syphilitic samples from ossuaries in Nížkov (1535±30 years), in Letařovice, Mělník, and the National Museum.

Leprosy manifested in soldiers returning from the Crusades only after three years. This caused the spread of the disease across Europe. Up to 19,000 leprosaria were established where the sick were isolated. In Prague, there was a leprosarium on Lazarská Street, near the Church of St. Lazarus.

In the 16th century, leprosaria transformed into hospitals for syphilitic patients. Over 500 years, syphilis was witnessed by 25 generations of doctors, but in different ways. Initially, patients died quickly, and bone findings were rare. Syphilis manifested in all its forms only in the 19th century. Mercury was used for syphilis treatment, initially externally, later in the 18th and 19th centuries internally against bone pain. Due to mercury being toxic, the treatment had to be discontinued as soon as teeth began to fall out. The discovery of antibiotics brought a turning point.

Keywords: Leprosy, syphilis, expansion, treatment, mercury, antibiotics.

Literature

SMRČKA VACLAV, MUSILOVA ZDEŇKA. Tisíc let nemocí a válek z kostnic Čech a Moravy. *Grada Publishing, a.s.,* 2024, 122 s.
SMRČKA V, MUSILOVÁ Z. (in print English version): *A Thousand Years of Disease and War from the Ossuaries of Bohemia and Moravia.*

ABSTRACT

TAR SYNDROME – CURRENT APPROACH TO DIAGNOSIS AND TREATMENT

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Thrombocytopenia with absent radii syndrome (TAR syndrome) is a rare congenital genetic disorder with an estimated incidence of approximately 0.42 per 100,000 births. This disease is characterized by the presence of two key features: severe, recurrent thrombocytopenia and bilateral radial aplasia with thumbs preserved, which distinguishes it from other limb malformation syndromes. The pathogenesis of TAR syndrome is composite and does not fit into the classical monogenic inheritance schemes. The cause of this disorder is a microdeletion of the 1q21.1 chromosome region and coexisting polymorphisms in the non-coding regions of the RBM8A gene, leading to reduced expression of the Y14 protein – a component of the EJC complex, which is key to mRNA processing. The severity of symptoms rests on the combination of mutations and the influence of other genetic modifiers. TAR syndrome is a multisystem clinical disorder. A bilateral lack of the radius, often also deformations of the femur, knee and hip joints, as well as shortening or hypoplasia of other limb bones, occurs in TAR. In hematology, hypomegakaryocytic thrombocytopenia resulting from a defect in megakaryocyte maturation and impaired response to thrombopoietin is characteristic. Hemorrhagic symptoms occur most often in infancy and can be severe. Heart defects such as ventricular septal defect, atrial septal defect, or tetralogy of Fallot often co-occur, as well as abnormalities of the genitourinary system, including kidney defects and Mayer-Rokitansky-Küster-Hauser syndrome. About half of the children also have an intolerance to cow's milk protein, which evinces itself in diarrhoea and allergic reactions, often preceding the exacerbation of thrombocytopenia.

The diagnosis of TAR syndrome can be made based on the typical clinical depiction, supported by genetic testing for 1q21.1 microdeletion and variants in the RBM8A gene. Prenatal diagnosis is possible thanks to ultrasonography, which can show the absence of the radius from about the 18th week of fetal life, and cordocentesis with evaluation of the number of platelets. Treatment of TAR syndrome is symptomatic and multidisciplinary. It includes blood platelet concentrate transfusions in cases of significant thrombocytopenia, orthopedic interventions of limb defects, rehabilitation and treatment of coexisting congenital defects. In some cases, recombinant thrombopoietin or stem cell transplantation is considered. The disease requires long-term care, especially in the first years of life, when the risk of bleeding is the highest.

Keywords: thrombocytopenia with absent radii syndrome, thrombocytopenia, bilateral absent radii, congenital genetic disorder, limb malformation, blood platelets, coexisting congenital defects, 1q21.1, microdeletion, RBM8A gene

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ABSTRACT

ORTHOPEDIC EXPERIENCE OF THERAPY BY DMSO – SHORT DESCRIPTIONS

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Keywords: DMSO. Blood circulation disturbances. Therapy. Legs. Brain

Introduction
Very frequently orthopaedic surgeons and rehabilitation doctors must treat patients with blood circulation disturbances in / of lower extremities. Similarly – is in therapy of patients with locomotor system disorders connected with improper brain or peripheral nervous system function – and these – also connected with blood circulation disturbances. The new therapy is connected with using of DMSO (Di – Methyl – Sulfone – Oxygen). DMSO – is discovered in XIX century – by chemist Alexander Zaytsev (Russia). Next was introduced to medicine in XX century in USA and Germany. DMSO makes improvements of circulation in the lower limbs and other parts of the human body. Authors short presentation is also for other possibilities in therapy of illnesses typical in internal medicine.

Discussion
Using DMSO for therapy or prophylaxis of orthopaedic and neurology illnesses and disfunctions is for us (Authors) known only for 2 years (the information came from an American citizen coming to Lublin Mr. Krzysztof W.). In Poland this was unknown till now (many – T. Karski – phone discussions with Colleagues in Warsaw, Poznan, Bialystok, Kraków, Lublin – they never listen about DMSO). This – DMSO method of prophylaxis we use for us (Authors) personally and – plus – only in / for some patients coming to our Out-Patients Clinic. Our personal experiences (2 years) have shown – that DMSO for the legs and the brain have given very positive results.

Text for translation prepared by Prof. Tomasz Karski and Dr Jacek Karski – on material of Internet and on the **Book of Dr Hartmut P. A. Fischer** (German doctor and scientist) – the original title of the Book ***"Das DMSO – Handbuch: Verborgenes Heilwissen aus der Natur".*** The Book is translated into Polish by Katarzyna Jurczak.

The author's text of / about information of DMSO – translation from Polish into English – **Mr. David Poynton / UK / Lublin**

Note: The authors are preparing this lecture as a Letter to Editor to be published in the journal Locomotor System, 31, 2024, no. 2 (in progress).

ABSTRACT

IS THERE ANY INFLUENCE OF A GOLD WEDDING RING ON RHEUMATIC HAND OSTEOARTHRITIS? CASE REPORT

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Keywords: wedding ring, rheumatoid osteoarthritis of the fingers

Introduction

Gold salts have been used in the treatment of rheumatoid arthritis. It is known that the gradual accumulation of gold in the body slows down the progression of the disease and alleviates inflammation. There is no information in the literature about the local effects of gold.

Case study

The authors summarize the course of rheumatological treatment of a patient born in 1944, who has been treated for rheumatoid polyarthritis with nonsteroidal anti-inflammatory drugs and for hypothyroidism since the age of 48 (1992). Orthopedic monitoring and treatment has been ongoing since the age of 58: at the age of 59 (2003), arthroplasty of the right (R) knee joint (TEP) was performed, and at the age of 69 (2013), arthroplasty of the left (L) knee was also performed.

At age 65, symptomatic polyarthrosis of the small joints of the hands was diagnosed, with X-ray evidence of destruction in the proximal interphalangeal (PIP) joints of the 2nd finger of the L and R hands and in the PIP joint of the 3rd finger of the R hand with ulnar subluxation.

Since the age of 73 (2017), she has been monitored for chronic lymphocytic leukemia.

At the age of 75, both components of the TEP implant in both knee joints showed no signs of loosening. The images of both hands showed advanced osteoarthritic (OA) changes in the PIP and distal interphalangeal (DIP) joints and trapezo-metacarpal joints of both hands, ulnar subluxation of the middle phalanges of the 2nd-4th fingers of the right hand and the 2nd and 3rd fingers of the left hand. The comparative images show only slight OA changes in the PIP and DIP joints of the 4th finger of the left hand, where the patient wears a gold wedding ring permanently (since her wedding), which she only removes on rare occasions.

Conclusion

The authors pose the „heretical" question of whether the long-term local application of a gold ring could have a beneficial effect on rheumatic inflammation of the PIP and DIP joints of the fourth finger of the left hand. A study is proposed to test the anti-inflammatory effect of gold and long-term use of rings on the 2nd to 4th fingers of both hands in rheumatism patients who are not indicated for

biological treatment. Even today, hand surgery for advanced OA of the hand joints relies on silicone endoprostheses with a short lifespan or arthrodesis of the affected hand joints.

Note: *During a discussion on this paper at the Winter Rheumatology Days held in České Budějovice on January 10–11, 2025, Prof. Ladislav Šenolt, MD, PhD, stated that according to literary sources, the beneficial effects of medicinal products containing gold (administered intravenously or orally) in the long-term treatment of patients with rheumatism have not been confirmed. Therefore, the local effect of gold cannot be considered.*

Message home It is worth considering the mechanical effect of the ring, i.e., the restriction of blood and lymph flow in the finger wearing the ring. I suggest addressing this topic in a thesis: send a questionnaire to women treated for rheumatism asking about the use of rings on their fingers (how long, whether they have rheumatic deformities of the fingers, and whether they observe any differences in the fingers with rings). If positive, send a PHOTO of both hands.

https://www.uspesna-lecba.cz/koloidni-zlato/

ABSTRACT

HEALTH ISSUES BY HYPOKINESIA, SITTING AND LIVING IN A DIGITAL WORLD OF CHILDREN IN "OVERCIVILIZED" SOCIETIES

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Key words: Hypokinesia, digital word of children, overcivilized societies

Each era in history of mankind and each part of the world has had and will have its own frequently present health conditions, because of the way we live. Many of these conditions can disappear too in the case of infectious diseases, but not if caused by the broader negative aspects of civilisation on our body health. Maybe important in this is the way we increasingly misunderstood or forgot the importance of providing our children full help and support with the healthy natural development and the lifelong quality of our neuromusculoskeletal system. The increase in spinal problems and even (‚idiopathic") scoliosis seems part of that decline and is there to stay in the „overcivilized" societies. Accelerated transformation of rural living societies into urban, sedenatary and techdriven societies (like Korea and China) will make musculoskeletal conditions, thus also spinal problems „pandemic". We try to explore and combine different parts of scientific knowledge in a changing environment to understand the global decline of health and the pandemic spinal problems from pain to scoliosis.

Homo sapiens entered as homo sedens an new era with technology, in which now much arousal is raised in the world of concerned parents by the impressive warning psychologists and psychiatrists delivered when the impact of constant input of digital content on smartphones, tablets and smart--tv sets, was aggravated by the brain -poisoning influence of social media content becomes clear an is made responsible for the exponential increase of neurocognitive and neurodegenerative conditions. It seems that modern Medical science, in all its efforts too cure or mitigate all the „lifestyle dependant"health conditions forgot the knowledge on raising children towards a more optimal anatomy and functionality'as the most powerfull preventive medicine you can get. It looks it's done by neglecting the knowledge on what an overload of sitting and abnormal sitting postures as slumping and sloughing will do in terms of deformation with the child's body from „bad posture'to scoliosis.

The general health of peoples is jeopardised by this missing of preventive knowledge in raising children properly into good health, resulting in pandemic chronic diseases or conditions of all organ-systems. Understandig by everybody, that growth should be an optimization of structural integrity with tension as a steering forcs, obeying all Natural Laws in biomechanics.

But all piled up biomedical wisdom and science together did not have yet too much effect on the way modern homo sapiens looks to his own health or cope with it. Or is practising strategies to keep the children away from all health conditions, were they don't ask for!

Huge efforts by politics, authorities, scientists, physicians, educational systems, but above all parents are needed to save the childrens brains and neuromusculoskeletal system for further and irreparable decline of human health by our „overcivilization".

Note: The authors are preparing this lecture as an essay to be published in the journal Locomotor System, 31, 2024, no. 2 (in progress).

ABSTRACT

CHILDREN – SO-CALLED IDIOPATHIC SCOLIOSIS. ADULTS – BACK PAIN SYNDROME. CAUSES. SYMPTOMS. THERAPY. PROPHYLAXIS

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Key words: so-called idiopathic scoliosis, back pain syndrome, therapy, prophylaxis

1. Introduction. [A] Children. More than two thousand years of research about scoliosis. Hippocrates (460 b.Ch.) – first description of this spine deformity. He said – the size / extension of deformity is connected with the age of children. Galen has given the words „scoliosis", „kyphosis", „lordosis". In the next centuries scoliosis was written about by Andy Nicolas (1741 – creator of „orthopaedics" – Paris, France), Wierzejewski – Poznań, Gruca and Tylman – Warsaw, Cotrell and Chopin from Berck Sur Meer, France and many others. But aetiology was not founded over centuries. Therapy also was not proper / not correct. Often results were bad – and it was said "it is the natural history of scoliosis".

Just now in the years 1995–2007 it was described in Lublin, Poland (T. Karski) the biomechanical aetiology, a new classification was presented – three (3) groups and (4) four types, were given the proper therapy and described the rules of causal prophylaxis. From this time we do not speak "Idiopathic scoliosis" but "So-Called Idiopathic Scoliosis".

[B] Adults. Often we must treat adult people with "back pain syndromes". The causes of this illnesses are: **a/** degenerative scoliosis in three groups, **b/** hyper lordosis of lumbar spine – mostly connected with disorder in Central Nerve System, **c/** spondylolisthesis and rarely / seldom other causes – like cooling of the extensor muscles of the trunk during the intensive work or sport. In a lecture the present proper therapy of "back pain syndromes" was discussed.

2. Description of aetiology of the So-Called Idiopathic Scoliosis.
Is described in points of the aetiology, classification, therapy:

A/ First point. Asymmetry of hip movements – one of 7 signs / symptoms of Syndrome of Contracture & Deformities [SofCD] – according to Prof. Hans Mau from Tubingen, Germany. In 2006 we added in Lublin to SofCD the eights (8) deformities – "various deformities of the shanks" (T. Karski, J. Karski).

B/ Second point. Scoliosis causes – **the habit of "standing" only on the right leg.** Such standing is easy – why? Answer: limited adduction in extension position of the right hip – easy to stand. SofCD explains such asymmetry of the movement of the hips.

C/ Third point. Connection also with walking. In **s**ome groups of scoliosis (Lublin classification) is also connected with "walking". Why? M**aximally** limited movement of the right hip – during walking – is transmitted as "compensatory movement" to the pelvis and spine – making rotation – distortion movement / deformity in the spine and their stiffness – confirmation by "computer created gait analysis".

D/ Scoliosis – fourth point. New classification (2001 & 2024) there are three groups and four types of scoliosis:

1st group "S" stiff spine, gibbous, 3D, connection with "gait" and "standing".
2nd group "C" & "S" flexible spine 2D, connection with "standing".

3rd group "I" stiff spine – introduced to "scoliosis group" in 2004 after discussion with Prof. Keith Luk and Prof. Kennth Cheung in Hong Kong (2004). Connection only with "gait" / "walking".

3. Scoliosis. Therapy. Only new therapy is proper – stretching exercises to receive full movement of the hips – recovery of the right hip movement, full movement of the spine in all directions. With this therapy we should start with children of ages 4 – 5. We should inform them about the dangers of standing 'at ease' on the right leg plus encourage them to take-up karate, taekwondo, aikido and other similar sports.

4. Scoliosis. Causal prophylaxis. Yes – is possible the causal prophylaxis of scoliosis – **(A)** standing on the left leg – or at the same time the right leg, left leg, both legs – from the 2nd year of life children, **(B)** «stretching form of therapy / exercises» – to receive full movement of the right hip & full movement of the spine in all directions and **(C)** very beneficial are such sports like karate, taekwondo, aikido, tai chi, yoga. Here my obligation is to inform about flexion exercises for therapy of scoliosis that were introduced by Prof. Stefan Malawski, Warsaw in 1960–1970.

5. Adults. Back pain syndrome. Causes.
The causes of "back pain syndromes" are as follows: *Connection with the not cured So-Called Idiopathic Scoliosis and **connected with (A) "standing on the right leg" and ***(B) walking. The pain syndromes exist if not cured 1st type "S" scoliosis, or 2nd A & B types "C" and "S" scoliosis, and 3rd type of scoliosis "I" – only stiff spine, without curves or with small curves – but in adults give a very big pain. So – proper and full therapy of scoliosis stays at first place.

6. How to treat "back pain" – conservative or operative?. My answer – only by physiotherapy – no surgery. Here I present two opinions about the operation of the spine – especially lumbar parts of the spine: **Professor Stefan Malawski** from Warsaw – told me many years ago – never to operate in the lumbar parts of the spine – the results are never good and pain remains. Similarly **Professor Karl Friedrich Schlegel** – Head of the Orthopaedic Department in Essen (Germany) – told me – many years ago – during an Orthopaedic Congress in Budapest / Hungary – quotation / citation: we in Germany control all cases after lumbar spine operation – after 5 years 50% of patients – have pain again, after 10 years 100% of patients have pain.

7. My recommendation about the therapy of "back pain syndromes". Only physiotherapy – standing – never more on the right leg but in abduction and internal rotation like in karate, massage, dia-dynamic, iontophoresis. Very important are exercises in geothermal waters and especially beneficial – *Persches Brett Behandlung* (PBB) – chair extension (photos) – in my / Lublin praxis – as form / methods of "back pain" therapy from 1968.

8. Conclusions
- **a)** Important is causal prophylaxis of scoliosis and proper therapy – flexion exercises to receive full movement of the spine in all directions.
- **b)** Remember about harmful standing 'at ease' on the right leg – because just children at the age of 2 start to stand on the right leg ! Children – scoliosis, adults – pain.

c) Encourage children to take-up sports like karate, taekwondo, aikido, kung fu, tai chi.
d) Adult persons – if not cured scoliosis – never more stand 'at ease' on the right leg – but in abduction and internal rotation like in karate.
e) Adults – very positive results of therapy give "chair extension" used by me (T. Karski) for patients over 55 years – learnt in Leipzig Orthopaedic Department in 1968. At this time the German Democratic Republic – my orthopaedic education was completed in Neuruppin (1963–1971) and other towns.

9. Literature www.ortopedia.karski.lublin.pl

ABSTRACT

SCAPULOHUMERAL RHYTHM IMPROVES GLENOHUMERAL STABILITY

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Keywords: glenoid; elevation; inverse dynamics; stability

Background: The shoulder's dynamic function is largely influenced by scapulohumeral rhythm (SHR), a coordinated movement of the scapula and humerus that facilitates a safe range of motion. While SHR has been described and quantified in terms of shoulder kinematics, its specific contribution to glenohumeral joint stability has not been thoroughly investigated. This study aims to estimate the impact of SHR on glenohumeral stability using a biomechanical model.

Methods: A five-segment musculoskeletal model based on the work of Wu et al. (2016) was implemented in OpenSim. The model, comprising 26 muscle-tendon units representing major shoulder muscle groups, predicted muscle forces and joint contact forces during shoulder abduction. Three SHR patterns were evaluated: a fixed scapula, a classic 2:1 humeral-to-scapular motion ratio, and an experimentally measured SHR. Muscle forces and glenohumeral stability ratios were calculated using optimization, and the model predictions were compared to electromyography and in vivo joint force data.

Findings: The model accurately predicted muscle activation patterns and glenohumeral loads during shoulder abduction, with strong alignment to experimental data. While glenohumeral contact forces showed minimal variation across different SHR conditions, the stability ratio analysis revealed that the absence of SHR significantly increased the risk of joint instability. In scenarios without SHR, even small shoulder elevations resulted in overloading of the superior glenoid.

Interpretation: SHR does not reduce the overall glenohumeral load but plays a critical role in maintaining glenohumeral stability, particularly during early phases of shoulder elevation. The absence of scapular motion shifts loading to the superior glenoid, increasing the risk of shoulder instability. These findings highlight the importance of scapular kinematics in shoulder joint function and may have implications for managing shoulder pathologies such as rotator cuff tears and impingement, where scapular motion is often compromised.

ABSTRACT

NEW PODOLOGY PROBLEMS – „ANKLE JOINT AND KNEE DISTORTION SYNDROME" BY PEOPLE USING SMALL CARS

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Keywords: Chronic distortion of ankle joint and knee. Chronic pain syndrome of the knee and ankle joint – sometimes also of the hips – if there are already with arthrosis pathology – with limited movement.

1. Introduction

The problem of lower extremity joints in children includes dysplasia of the hip joints, valgus deformity of the knees, varus deformity of the shanks/knees, and equinus or plano-valgus deformity of the feet. In adults, the problem is no longer primarily the pathology of the leg axis but rather „pain problems." These pain syndromes are mostly connected with arthrosis of the hips or knees. There are also problems of the feet in the form of „hallux valgus"or „limited plantar flexion of the toes," which cause gait problems and sometimes also „pain symptoms". In the lecture we present new problem – ankle joint and knee distorsion syndrome.

2. New problem of the feet

In 2012, we definitively found and described a „new problem of the ankle joint" after observing patients (N = 112) from 1995 to 2012. In subsequent years, through examination of new patients, it was found that this problem can be connected also with the knee.

3. Description of the „distortion-rotation syndrome of the ankle joint"

We found a new problem of the foot, namely „insufficiency and pain syndrome of the ankle joint," characterized by limited movement, swelling, and limping. Further observation enabled us to see a similar problem connected with the knee and in some older patients, also with the hips, if the symptoms of arthrosis were presented in the hip joint and the movement was restricted, especially in patients with limited internal and external rotation of the hips.

4. The cause of the „distortion-rotation syndrome of the ankle joint"

We found that this „pain syndrome" is connected with the way of getting out from the car, especially from a small car. This pain syndrome, mostly in the foot but in some cases in the knee, is more frequent among patients who use small cars daily. If the driver or the passenger puts one leg on the ground while getting out from the car, a rotation movement of the whole body appears, and ankle joint and knee joint distortion occurs, as well as hip distortion if the rotation movement was initially limited because of arthrosis. Why such a situation? The ankle joint has only two directions of movement - dorsiflexion and plantar flexion – no rotation movement. Rotation movement in this joint is fully only „pathological." As a result, there is loosening of the ligementum tibio – fubulare and ankle joint, leading to instability, swelling, limited movement, pain and limping. Prophylactic recommendations and physiotherapy gave very good results for all our patients.

5. Discussion

The complaints concerning pain in one knee and in one foot should be analyzed also in the context of driving small cars and the manner of getting into and out of the cars. The authors described a group of patients with chronic pain caused by permanent distortion of the knee or ankle joint. In all examined cases, we observed instability of the ankle joint, and in many cases, we observed knee instability caused by the loosening of the lateral, medial, or cruciate ligaments. The anatomy and structure of the ankle joint are very characteristic; that is, the trochlea tali, which has a bigger diameter in the front part than in the back part. Such anatomy enables blockage of dorsiflexion of the foot, which provides stabilization of the ankle joint while every step, for example, while walking upstairs or up mountains. Interestingly, in dorsiflexion, this joint is very susceptible to distortion – what happens when getting out of the car.

6. Conclusion

(1) We described a new pathology syndrome of the knee, ankle joint, and sometimes the hips: chronic distortion caused by rotation movement produced while getting into (hip) and out of the car (ankle joint, knee). (2) The problem affects the left foot and left knee of drivers and the right foot and the right knee of passengers in countries where right-hand traffic rules are obligatory. (3) For therapy, we recommend changing the manner of getting out of the car, which means using both legs and both feet without any rotation movement of the trunk. Additionally, we advise kinesiotherapy, hydromassage, laser and diadynamic therapy. (4) All orthopedic surgeons, rehabilitation doctors, and physiotherapists should be familiar with this problem and they should further inform about the necessity of prophylaxis for all patients in their own countries but also in all countries.

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ABSTRACT

INSTABILITY AND PAIN PROBLEMS IN THE KNEE AS A RESULT OF INCORRECT SITTING POSITION. CASE REPORTS

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Key words: Knee joint. Incorrect sittiing. Instabiity. Pain syndromes

1. Introduction

Explanation of knee problems. In the knee, independent of the patient's age (children and adults), we can see such pathological problems:

a) Varus deformity of the knee: seen in newborns and babies as the eighth symptom of the Syndrome of Contractures and Deformities (SofCD) according to Prof. Hans Mau and Lublin observations. Untreated varus deformity of the shanks/knees in older children is described as Blount's disease. In older persons, it results in instability and pain problems.

b) Valgus deformity of the knee: mostly a result of improper sitting in children, youths, and older persons, more frequent in girls and women, also resulting in instability and pain problems of the knees in older persons.

c) Flexion contracture of the knee: even a small contracture of 3-5 degrees can cause problems. Such symptoms are seen in patients with Minimal Brain Dysfunction (MBD). In adults, pain syndromes are frequent.

d) Recurvation (hyperextension) of the knees: a compensatory deformity in Minimal Brain Dysfunctions (MBD). The symptoms are the same as described above.

e) Patellofemoral joint problems: lateral position of the patella, syndrome of higher patellar pressure, subluxation of the patella, and chondromalacia of the patella, mostly connected with improper axis of the legs/knee, such as valgus deformity.

f) Instability of knee joints: loosening of the medial or lateral collateral ligament and the cruciate ligament because of incorrect sitting position. This problem is the aim of this presented lecture during our 27th Prague-Lublin Symposium at Vincent Pol University in Lublin. All causes described above play a role in „knee pain problems" in adult patients.

2. Observations, new clinical test and Material

Our observations include a cohort of patients with knee pain problems – N = 368 from the years 2009-2025 - with full documentation. These patients reported knee pain connected with the habit or manner of incorrect sitting in daily situations over many years. This problem mainly refers to girls or women who sit in maximal rotation of the hip and maximal flexion of the knee of one or both legs (photos/figures will be presented in the lecture). We found the connection between „incorrect sitting" and „pain problems" as follows: in the years 1995–2009, in the Pediatric Orthopedic and

Rehabilitation Department of the Medical University in Lublin (at that time, Prof. T. Karski was Head of this Department), during knee examinations, we found an incorrect line of movement from „flexion to extension". Specifically, the movement was not precisely straight-meaning „sagittal" – but with additional „rotation movement" or „valgus movement" in the last 20–30 degrees of extension. In subsequent observations, we found that this incorrect movement was a result of incorrect sitting for a long time, mostly many years, often from childhood until the age of 40–50–60 years. The presented article/lecture provides examples of such an incorrect way of sitting – many examples of various forms of „incorrect sitting."

3. Clinical report

The patients informed the doctor about pain appearing in many situations – at home and at work, on the street, and on stairs. The location of the pain was mostly in the lateral or medial region of the knee, or under the patella. The patients had difficulties with standing up, walking in the street, changing the direction of walking on the street if a twist was required, getting up from the bed in the morning and in other situations. The clinical examination showed full extension of the knee, full flexion and no fluid in the joint. Nevertheless, they were accompanied by lateral instability and frequent rotational instability caused by the loosening of the medial or lateral ligament or the loosening of the cruciate ligament. A precise examination with long anamnesis indicated that the cause of knee problems was improper sitting for many hours, days, months, or even years (in the lecture, we present photos of „pathological sitting"). In the lecture, we also present the X-ray pictures – mostly with minimal changes (!). This improper sitting position is the cause of knee instability, insufficiency, and pain, which we had to confirm not only in the years 2012–2016 but also in subsequent years until 2025

4. Conclusions

1) In our clinical activity, it is important for orthopedic surgeons, rehabilitation doctors, internists, and neurology doctors to ask patients about the „character/form" of their standing and sitting.
2) Standing ‚at ease' on the right leg is permanent and, because of this, influences the axis of the right leg, which can lead to greater varus deformity or valgus deformity of the knee.
3) Standing ‚at ease' on the right leg is permanent and, because of this, is the cause in two groups of So-Called Idiopathic Scoliosis in the new „Lublin classification."
4) Incorrect sitting, as presented in the lecture, causes instability of the knee joint and subsequent pain syndromes and causes limitation of movement of the hips and subsequent pain syndromes.
5) Here, I would like to repeat the words of my Orthopedics Teacher, Prof. Stanisaw Piatkowski: the following are important: a) proper diagnosis, b) easy and understandable therapy for patients, and c) always remember about the „importance of prophylaxis."

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ABSTRACT

INSIGHTS INTO THE CURRENT DEVELOPMENTAL TRENDS OF THE MEDIAL LONGITUDINAL ARCH OF THE FOOT

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Keywords: foot arch development, footprint analysis, preschool and school children

Introduction
The most significant period for the development of the medial longitudinal arch (MLA) of the foot begins with its gradual loading at the onset of independent walking. During this time, the arch is typically covered by a fat pad that protects the developing bone structure from excessive load, giving the foot a flat appearance. As the skeletal system matures, this fat pad is gradually resorbed,

and the arch assumes its shape. While it is generally accepted that MLA formation occurs during preschool years, the literature remains inconclusive regarding the age at which the arch attains its final form. Moreover, the growing prevalence of a sedentary lifestyle among Czech children may adversely affect or delay its developmental process due to insufficient physical stimulation.

Objectives
The aim of this study was to expand the current knowledge on the developmental dynamics of the MLA, and to determine whether the developmental pattern observed in contemporary Czech children differs from trends reported in earlier Czech and international studies.

Methods
The MLA was assessed using the Chippaux-Smirak index based on footprint analysis – a simple and effective method suitable for screening purposes. Both cross-sectional (ages 4–8) and longitudinal (ages 4–6) approaches were employed in the analysis.

Results
The results of the cross-sectional analysis indicated that the most critical phase of MLA development concludes by the age of six, after which only minor changes in the shape of the arch occur. Longitudinal observations revealed substantial interindividual variability in both the onset and progression of arch formation. Children with an unformed arch at the beginning of the observation period (age four) exhibited a significantly steeper developmental trajectory than those with an already advanced arch form at the same age. No significant intersexual differences were observed.

A comparison with the findings of a Czech study from the end of the 20th century revealed a higher proportion of unformed arches among girls in most age groups, suggesting a potential change in the dynamics of arch formation. However, the overall development pattern of the MLA was consistent with international trends, indicating that its developmental trajectory has remained unchanged.

Conclusion
This study provides insights into the critical period of medial longitudinal arch development. Our findings indicate that the most dynamic phase of arch formation concludes by age six, regardless of sex. During this stage, the developmental dynamics exhibit considerable interindividual variability, making it difficult to define an age-appropriate arch shape. The overall developmental trajectory of the medial longitudinal arch in the current population remained consistent with international trends.

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ABSTRACT

ORTHOPAEDIC INSOLES IN DIABETIC PATIENTS. A REVIEW

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Key words: orthopaedic insoles, diabetic foot

Introduction
Diabetic foot is one of the most serious complications of diabetes, potentially leading to infections, gangrene, and in the worst cases, limb amputation. Diabetic foot syndrome arises due to a combination of neuropathy and ischemia, resulting in impaired pain perception, reduced wound healing capacity, and abnormal pressure distribution on the foot during walking. Orthopedic insoles are among the most effective preventative and therapeutic measures for diabetic patients. When properly selected and applied, they can significantly reduce the risk of ulcer formation and improve overall patient comfort. The aim of this presentation is to provide a systematic overview of available information on the effectiveness of orthopedic insoles in the prevention and treatment of diabetic foot syndrome.

Methods
This lecture will include a systematic literature review focused on research and clinical studies regarding the use of orthopaedic insoles in diabetic patients. Publications were selected from databases such as PubMed, Scopus, and Google Scholar, including clinical trials, meta-analyses, and expert reviews from the past 10 years. The studies reviewed focus on various types of orthopedic insoles, their materials, design, and effectiveness in reducing the risk of diabetic ulcer formation, alleviating pain, and improving gait biomechanics. Additional factors examined include the severity of diabetic neuropathy, the presence of foot deformities, and the patient's overall health condition.

Results
Studies show that orthopedic insoles can significantly contribute to the prevention of diabetic foot ulcers and pain relief in patients with diabetic neuropathy. Custom-designed insoles that redistribute pressure across the foot and ensure even load distribution show the best results in ulcer prevention. Specific materials such as silicone, polyurethane, and gel have been identified as optimal for shock and pressure absorption. An interesting finding is the improvement in gait biomechanics, which leads to reduced excessive pressure on certain foot areas, thus preventing deformities. Some studies suggest that combining orthopedic insoles with other therapeutic approaches, such as regular monitoring, footwear modification, and physiotherapy, has a positive synergistic effect on overall foot health in diabetic patients.

Conclusion
Orthopedic insoles are proving to be a key tool in the prevention and treatment of diabetic foot syndrome. High-quality insoles with personalized customization can significantly reduce the risk

of ulceration and alleviate symptoms associated with neuropathy and foot deformities. However, their application must be part of a broader, comprehensive approach to diabetic foot care, which includes patient education, regular monitoring, and collaboration with healthcare professionals. Further research should focus on optimizing materials, insole design, and customization for specific patient needs.

The lecture will offer practical recommendations for clinical practice and propose concrete approaches for implementing orthopedic insoles in diabetic foot care, with a focus on prevention, effectiveness, and safety of use.

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ABSTRACT

LOWER LIMB PROSTHETICS

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Keywords: Lower limb prosthetics, amputation, prosthesis fitting, rehabilitation, biomechanics, socket design, activity levels, interdisciplinary care

This lecture focuses on the comprehensive topic of lower limb prosthetics, with particular emphasis on patient preparation, prosthesis indication, and long-term follow-up care. The key objective is to unify procedures nationwide and highlight interdisciplinary collaboration, which is essential for ensuring the best quality of life for patients after amputation.

The *introduction* addresses patient preparation for prosthesis application, emphasizing the prevention of deconditioning and the necessity of early rehabilitation. Detailed protocols are presented for partial, transtibial, transfemoral, and higher-level amputations (knee disarticulation, hip disarticulation, hemipelvectomy). The lecture reviews different requirements for stump bandaging, patient education, and prosthetic fitting depending on the level of amputation.

A *core part* of the lecture deals with the classification of prostheses according to purpose (early, primary fitting, bionic), structural design, and user activity levels (0–4). For each activity level, minimum patient abilities, therapeutic goals, and suitable prosthetic designs are described. The biomechanics of partial foot amputations are discussed, highlighting how the type of resection (e.g., Chopart, Pirogov, Syme) influences prosthetic height and construction.

Case studies illustrate the prescription process and individualized adaptation of prostheses according to health status and patient activity. Special attention is given to socket designs and their biomechanical principles, including modern suspension systems and dynamic components.

The *conclusion* summarizes epidemiological data on the number of lower limb amputations in the Czech Republic (2010–2022), the number of delivered prostheses (2023), and current preferences regarding amputation levels. The findings suggest the need to increase the ratio of transtibial to transfemoral amputations (optimally 2:1), to prefer knee disarticulation over transfemoral amputation, and to strictly follow continuity of care principles ('timing'). The lecture stresses the importance of regular follow-ups and timely adjustments to prosthetic equipment in response to changes in the patient's health status.

ABSTRACT

PROSTHETICS AND ORTHO-PROSTHETICS OF LOWER LIMBS IN CHILDREN WITH CONGENITAL LOWER LIMB DEFECTS

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Key words: Congenital Lower Limb Defects, prosthetics, ortho-prosthetics of lower limbs, growth, functional remodelling of skeleton, limb defect classification, comprehensive treatment.

Objectives
Main aim is to expand the current knowledge of orthopedic-prosthetic treatment for pediatric patients with **c**ongenital **l**ower **l**imb **d**efects (CLLD) using prostheses and ortho-prostheses.

Further goals are: Indications for amputation in children; Amputation and exarticulation of the lower limb; specifics in children; Principles of prosthetics and ortho-prosthetics for children. Bone tissue remodelling in growth period, use of functional adaptation in orthotics and orthoprosthetics and rehabilitation; Development of limb defect classification: Swanson, ISO standard, Ogino, Oberg et al. (based on developmental biology and molecular genetics).

The field of **prosthetics and orthotics** was separated from orthopedics and surgery. The Jedlička Institute in Prague, founded in 1913 with the significant contribution of surgeon Professor Rudolf Jedlička, MD, achieved worldwide renown for introducing orthopedic prosthetics into clinical practice. As part of providing comprehensive care for disabled children and later for World War I veterans, the term "technical orthopedics" began to be used. Other fields, particularly rehabilitation and neurology, have contributed to the development of the field to this day. With the rapid development of science and technology, individual branches of orthopedic prosthetics have emerged, namely prosthetics, orthotics (orthothetics), epithetics, calceotics, adjuvants, and prosthometrics (prosthesis measurement).

Paediatric orthopaedics, orthopedic prosthetics and adequate rehabilitation play an irreplaceable role in the comprehensive treatment of congenital limb defects (CLD) within the framework of interdisciplinary cooperation. Surgical treatment of CLD is generally focused on correcting deformities and limb shortening by corrective osteotomies, epiphysiodesis and hemi-epiphysiodesis, lengthening procedures of long bones, hip and knee joint surgery, reconstructive surgery of the feet. In children, 60% of amputations are indicated due to biomechanically severe CLD with functional impairment.

Congenital defects of the hands, spine, chest, jaws, skull, and other systems are addressed in close cooperation with specialists from the relevant fields.

Prosthesis replaces the missing part of a limb. *Ortho-prosthesis* replaces the missing part and function of a limb. Corrective forces of orthosis and orto-prothesis act on three-point balanced principle. Efficiency of orthotic and ortho-prosthetic treatment or effectiveness of physiotherapy on remodelling of locomotion system was explained by "Deformational-rheological theory of bone remodelling" (Sobotka a Mařík, Pohybové ústrojí 2, 1995, No.1, p. 15–24).

Children should be fitted with a prosthesis and/or ortho-prosthesis no later than 12–15 months of age. Personalized assessment is essential, taking into account *the user's activity level*. Most children with congenital lower limb defects achieve level 4.

Results

On brief case studies are documented the long-term results of comprehensive treatment of patients with Congenital Lower Limb Defects (CLLD) at the Centre for Defets of Locomotor Apparatus in Prague.

Conclusion

Comprehensive treatment of patients with CLLD requires close interdisciplinary cooperation between the specialists involved.

The aim of comprehensive treatment and care is to prepare disabled children for a dignified, meaningful, and happy life and to integrate them into society as fully-fledged individuals with a good social background.

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Our memories and gratitude go to our teachers, **Professor Rudolf Kubát, MD, DrSc**., and **Associate Professor Ivan Hadraba, MD, CSc**., who made a significant contribution to the development and availability of orthopedic prosthetics for children with genetic skeletal disorders and congenital defects of limbs in The Czechoslovac Socialist Republic in the 1980s and in The Czech Republic in the 1990s; Last but not least to our foreign colleagues **Dr. Jacques Cheneau** (France), and **Professor Georg Neff** (Germany).

Note: The presented objectives of the lecture, supplemented by selected photographic and X-ray documentation of the long-term results of comprehensive treatment of children with congenital lower limb defects, will be published as a review article in the journal Locomotor System, 32, 2025, No.1.

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Významný je i vliv kolagenních peptidů na hustotu kostí, zejména u osob s osteoporózou či osteopenií, potvrzeno už v roce 2010 pilotní studií s doplňkem stravy Calcidrink®.

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Prof. MUDr. Milan Adam, DrSc. byl první, kdo objevil obrovský potenciál kolagenních peptidů a v průběhu let jej další vědci a lékaři opakovaně prokázali a ještě rozšířili oblasti použití, pro které jsou kolagenní peptidy vhodné.

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