Pohybové ústrojí

Pokroky ve výzkumu, diagnostice a terapii

The 24th Prague-Lublin Symposium

Locomotor Apparatus Adaptation III – Interdisciplinary Aspects

November 5, 2022
Medical House, Sokolská 31, Prague, Czech Republic

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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Pohybové ústrojí. Pokroky ve výzkumu, diagnostice a terapii.

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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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Návrh a grafická úprava obálky Pavel Lorenc.
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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).

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 24TH PRAGUE-LUBLIN SYMPOSIUM

Locomotor Apparatus Adaptation III – 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
Medical House, Sokolská 31, 120 26 Prague 2, Czech Republic, on November 5, 2022

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.

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PROGRAMME

SATURDAY, NOVEMBER 5, 2022

8.00–9.00 REGISTRATION OF PARTICIPANTS

9.00 OPENING OF THE CONFERENCE

WELCOME SPEECHES

Professor Ivo Marik, MD, PhD
President of the Society for Connective Tissues, Czech Medical Association J.E. Purkynje

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

Braun Martin, RNDr, PhD
Introduction of Assistant Professor Dr. Jacek Karski (Lublin, Poland)

9.20–12.20 | MORNING SESSIONS

9.20 | SESSION I: ADAPTATION OF LOCOMOTOR APPARATUS – MECHANOBIOLOGY – BIOCHEMICAL AND BIOMECHANICAL ASPECTS 1

Chairmen: Mařík Ivo, Krawczyk Petr, Karski Tomasz

Current options for treating avascula necrosis of hip joints in oncological children. Initial report
Současné možnosti léčby avaskulární nekrózy kyčelního kloubu u onkohematologických dětských pacientů. Předběžná zpráva

Karski Jacek[1], Dudkiewicz Ewa[2], Madej Tomasz[3], Karska Klaudia[3] (Lublin, Poland)

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

[2] *Department of Paediatric Haematology and Oncology and Transplantology Department of Medical University of Lublin, Poland*

[3] *Department of Paediatric Radiology of Medical University of Lublin, Poland*
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Partial astragalectomy in treatment of severe neurogenic clubfoot
Parciální astragalektomie při léčbě těžké neurogenní „golfové“ nohy

Okoński Marek, Kandzierski Grzegorz, Karski Jacek
Paediatric Orthopaedic and Rehabilitation Department of Medical University of Lublin, Poland
jkarski@vp.pl

Is better prevention on cancer reachable and shouldn't it be aimed in childhood?
Lze dosáhnout lepší prevence rakoviny a neměla by být zaměřena již na dětství?

Carcinogenesis in the light of Discongruent Osteoneural Growth Relations and Two-Growth-Types (Egg-Sperm) Concepts by Milan Roth and the suboptimal morphogenesis of contemporary youth

Karcinogeneze ve světle diskongruentních osteoneurálních růstových vztahů a koncepce dvou růstových typů (vajíčko-sperma) Milana Rotha a suboptimální morfogeneze současné mládeže

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

[1] *Orthopedic surgeon, Proktovar, Hengelo, the Netherlands;*
[2] *Analyst, Chairman of Posture Network Netherlands, the Netherlands*
[3] *Em. Prof. of Neurosurgery Radboud University Nijmegen, the Netherlands;*
[4] *Professor of Tissue Engineering; Mechanobiology of development and disease; Amsterdam UMC, the Netherlands*
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Evaluation of the effect of ageing on collagen and elastin-based tissues from the biochemical and biomechanical point of view
Hodnocení vlivu stárnutí na tkáně na bázi kolagenu a elastinu z biochemického a biomechanického hlediska

Braun Martin[1], Suchý Tomáš[1,2], Šupová Monika[1], Horný Lukáš[2], Adámek Tomáš[3]

[1] *Department of Composites and Carbon Materials, Institute of Rock Structure and Mechanics, Czech Academy of Sciences, Prague, Czech Republic*
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TIME FOR LECTURE INCLUDING DISCUSSION IS 20 MIN.

DISCUSSION AFTER EACH LECTURE

10.40–11.00 COFFEE BREAK

11.00 | SESSION II: ADAPTATION OF LOCOMOTOR APPARATUS – NEUROMUSCULAR AND SKELETAL RELATIONS

Chairmen: Van Loon Piet, Mařík Ivo, Karski Jacek, Zemková Daniela

INVITED LECTURE – 30 MIN.

Artificial Intelligence – Apocalypse or Salvation
Umělá inteligence – apokalypsa nebo spása

Assoc. Professor Eng Ján Šípoš
GUTTA Slovakia spol. s r.o.
janos@sipos.at | www.guttaeu.eu

INVITED LECTURE – 30 MIN.

History of Discoveries of Biomechanical Etiology of the So-Called Idiopathic Scoliosis (Adolescent Idiopathic Scoliosis [AIS]) in dates and "think over" / meditations
Historie objevů biomechanické etiologie tzv. idiopatické skoliózy (adolescentní idiopatická skolióza [AIS]) v datech a „zamyšlení" / meditace

Professor Tomasz Karski, MD, PhD
Professor Lecturer in Vincent Pol University in Lublin, Poland / In years 1995–2009 – Head of Pediatric Orthopedic and Rehabilitation Department of Medical University in Lublin, Poland
tmkarski@gmail.com www.ortopedia.karski.lublin.pl

Bodily resilience of army-soldiers, a measure of congruent or discongruent Osteoneural Growth Relations?
Will the impact of a sedentary lifestyle in early childhood be decisive for the endurance of "boots on the ground"?
Tělesná odolnost vojáků – měřítko kongruentních nebo diskongruentních osteoneurálních růstových vztahů? Bude mít vliv sedavého způsobu života v raném dětství rozhodující vliv na výdrž "bot v terénu"?

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

[1] *Orthopedic surgeon, Proktovar, Hengelo, the Netherlands*
[2] *Analyst, Chairman of Posture Network Netherlands the Netherlands*
[3] *Em. Prof. of Neurosurgery Radboud University Nijmegen, the Netherlands*
[4] *Professor of Tissue Engineering; Mechanobiology of development and disease; Amsterdam UMC, the Netherlands*
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Influence of COVID-19-Related Restrictions on the Prevalence of Overweight and Obese Czech Children
Vliv omezení souvisejících s COVID-19 na výskyt nadváhy a obezity u českých dětí

Vážná Anna[1], Vignerová Jana[2], Brabec Marek[3,4], Novák Jan[1], Procházka Bohuslav[5], Gabera Antonín[6] and Sedlak Petr[1]

[1] *Department of Anthropology and Human Genetics, Faculty of Science, Charles University, Prague, Czech Republic*
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TIME FOR LECTURE INCLUDING DISCUSSION IS 15 MIN.

DISCUSSION AFTER EACH LECTURE

12.30–13.15 | LUNCH

13.15–17.30 | AFTERNOON SESSIONS

13.15 | SESSION III: BONE DYSPLASIAS. ETIOPATHOGENESIS OF GENETIC SKELETAL DISORDERS

Chairmen: Kutílek Štěpán, Bayer Milan, Zemková Daniela, Mařík Ivo

Hypophosphatasia
Hypofosfatázie

Kutílek Štěpán (Klatovy, Czech Republic)
Dept. of Paediatrics; Hospital Klatovy; Klatovy, Czech Republic
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Two heterozygous sequence variants of the CTSK gene in a girl with very small stature
Dvě heterozygotní sekvenční varianty genu CTSK u dívky s velmi malým vzrůstem

Bayer M.[1], Gregorova A.[2], Romanova M.[1]

[1] *Department of Children and Adolescents, 3rd. Faculty of Medicine, Charles University and University Hospital Královské Vinohrady, Prague, Czech Republic*
[2] *Department of Medical Genetics, University Hospital Ostrava, Czech Republic*
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Beals-Hecht syndrome: comparison of radioclinical findings and molecular genetic testing of DNA isolated from blood and bone tissue. Long term follow up
Beals-Hechtův syndrom: srovnání radioklinických nálezů a molekulárně genetického vyšetření DNA izolované z krve a kostní tkáně. Dlouhodobé sledování

Mařík Ivo[1,2], Krulišová Veronika[3], Zemková Daniela[1,4], Smrčka Václav[5], Myslivec Radek[1,6], Maříková Alena[1], Paszeková Helena[3], Michalovská Renáta[3], Vlčková Zděnka[3]

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[6] *Orthopaedic and Traumatology Dept; Hospital; Pribram, Czech Republic*
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Phenotypic continuum of pathogenic COMP variants. Comparison MED1 and PSACH
Fenotypové kontinuum patogenních variant COMP. Srovnání MED1 a PSACH

Zemková Daniela[1, 2], Krulišová Veronika[5], Vážná Anna[1,4], Krutílková Věra[6], Petrášová Šárka[1], Mařík Ivo[1,3]

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Radioulnar Synostosis – uncommon manifestation of Feingold syndrome
Radioulnární synostóza – neobvyklý projev Feingoldova syndromu

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

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[4] *Dept. of Paediatrics; University Hospital Motol; Prague, Czech Republic*
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Early molecular genetic diagnosis of Spondylometaphyseal dysplasia – Kozlowski typ
Časná molekulárně genetická diagnostika spondylometafyzární dysplazie – typ Kozlowski

Černa Šárka[1], Laštůvková Jana[1], Zemková Daniela[2, 4], Černý Jan[5], Mařík Ivo[2, 3]

[1] *Department of Medical Genetics, Masaryk hospital, Usti n/L, Czech Republic*

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TIME FOR LECTURE INCLUDING DISCUSSION IS 15 MIN.

DISCUSSION AFTER EACH LECTURE.

14.45–15.00 | COFFEE BREAK

15.00 | SESSION IV: SESSION IV: NEUROMUSCULAR AND SKELETAL ADAPTATION – REMODELLING OF CONNECTIVE TISSUES

Chairmen: Kraus Josef, Mařík Ivo, Krawczyk Petr

Adaptation to extrapyramidal lesion in extrapyramidal form of cerebral palsy
Adaptace na extrapyramidovou lézi u extrapyramidové formy mozkové obrny

Kraus Josef

Dept. of child neurology, University Hospital Motol, Prague, Czech Republic

josef.kraus@lfmotol.cuni.cz

Clinical and psychological symptoms of Minimal Brain Dysfunction (MBD). Causes. Children and adults. Examples of pathology. Methods of therapy
Klinické a psychologické příznaky minimální mozkové dysfunkce (MBD). Příčiny. Děti a dospělí. Příklady patologie. Metody terapie

Karski Tomasz[1], Karski Jacek[2], Kędzierski Zbigniew[3], Domagała Marian[4]

[1] *Professor Tomasz Karski MD, Ph.D., Vincent Pol University, Lublin, Poland*

[2] *Assist. Professor Jacek Karski MD Ph.D., Medical University in Lublin, Poland*

[3] *Dr med. Zbigniew Kędzierski, Orthopedic Scientific Center in Lublin, Poland*

[4] *Dr Domagała Marian, Medical Center in Laszczów, District Tomaszów Lubelski, Poland*

tmkarski@gmail.com

Exopulse Mollii Suit – the first neuromodulation suit
Exopulse Mollii Suit – první neuromodulační oblek

Vostracká Karolína
Otto Bock Czech Republic, l.l.c., Zruč-Senec, Czech Republic
email@ottobock.cz

TIME FOR LECTURE INCLUDING DISCUSSION IS 20 MIN.

DISCUSSION AFTER EACH LECTURE.

16.00 | SESSION V: REMODELLING OF CONNECTIVE TISSUES

Chairmen: Krawczyk Petr, Černý Pavel, Karski Jacek

Development and testing of a 3D printed protective cranial orthosis
Vývoj a testování 3D tištěné ochranné lebeční ortézy

Rosický Michael, Martínek Matěj, Rosický Jiří
Invent Medical Group, Ostrava, Czech Republic
michael@inventmedical.com

Ongoing evaluation of the treatment of pectus excavatum with a vacuum bell and pectus carinatum with a thoracic brace
Průběžné hodnocení léčení pectus excavatum vakuovým zvonem a pectus carinatum hrudní ortézou

Černý Pavel[1,3], Mařík Ivo[1,4], Doucha Miloš[2], Kučerová Barbora[2], Zemková Daniela[5]

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Risk of knee osteoarthritis in patients with transtibial amputation – effect of prosthesis weight
Riziko osteoartrózy kolenního kloubu u pacientů s transtibiální amputací – vliv hmotnosti protézy

Krawczyk Petr[1], Rygelová Markéta[2], Kutáč Petr[2], Uchytil Jaroslav[2], Bužga Marek[2], Zemková Dana[3,4], Mařík Ivo[4,5]

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The use of technical aids to prevent serious consequences of falls in the elderly
Využití technických pomůcek k prevenci závažných následků pádů u starších osob

Šorfová Monika, Islami Timur

Department of Biomedical Foundation in Kinanthropology, Faculty of Physical Education and Sport, Charles University, Prague, Czech Republic

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Analysis of the contact area of the upper limb for three types of blows
Analýza kontaktní plochy horní končetiny pro tři typy úderů

Beranek Václav[1], Šťastný Petr[2], Turquier Frederic[3], Nováček Vít[1,4], Votápek Petr[5]

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[3] *Ecole Spéciale de Mécanique et d'Electricité, Lyon, France*

[4] *Biomechanical modelling of the human body, New Technologies – Research Centre, University of West Bohemia in Pilsen, Czech Republic*

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TIME FOR LECTURE INCLUDING DISCUSSION IS 15 MIN.

DISCUSSION AFTER EACH LECTURE.

17.30 | CLOSING OF THE SYMPOSIUM AND PLANNING THE 25TH PRAGUE-LUBLIN SYMPOSIUM

Marik Ivo & Krawczyk Petr & Karski Tomasz & Karski Jacek & Van Loon Piet

18.00 | DINNER

ORGANIZERS OF THE SYMPOSIUM

Professor Ivo Mařík, MD, PhD & Petr Krawczyk MD, PhD & Martin Braun, RNDr, PhD
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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. 29, 2022 (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

Welcome speech to

The 24th Prague-Lublin Symposium – Locomotor Apparatus Adaptation III – Interdisciplinary Aspects

In Lublin, October 28, 2022

Dear Friends, Dear Colleagues, Dear Participants of the 24th Prague-Lublin Symposium, which is held on 5th November 2022

Over a period of time – many things have happened in the World, in Europe and in our Scientific Contacts. Here we can repeat the Latin proverb *"Tempora mutantur et nos mutamur in illis"* or other proverb *"Nihil semper manet suo statu"* (nothing is constant).

Also our Symposia has changed the description – in my first contact with Prof. Ivo Marik (1998) – they were "Prague-Sydney Symposia" next "Prague-Lublin-Sydney Symposia" next "Prague-Lublin-Sydney-St. Petersburg Symposia" and nowadays "Prague-Lublin Symposium". So – only two partners – Partners from Prague and Partners from Lublin stay together in friendly cooperation – for good and proper result in therapy of disorders and illnesses of our patients.

We All – Participants of Symposium – expect to receive only good results in therapy of children, youth and adults patients. We never want to repeat the words of Hippocrates: *"Quae medicamenta non sanant, ea ferrum sanat; quae ferrum non sanat, ea ignis sanat; quae vero ignis non sanat, ea insanabilia reputare oportet".*

We always want to make proper diagnosis, use simple and successful therapy for all our patients. We should also remember about prophylaxis.

Thanks for the nice cooperation over many years – Dr Jacek Karski and I would like to direct our warmest friendship to Dear Friends – to Prof. Ivo Marik and to His Team – Dr. Petr Krawczyk and Mr. Pavel Lorenc as well as to all Friends in Prague and in the Czech Republic.

Prof. Tomasz Karski MD, PhD

Retired Head of Pediatric Orthopedic and Rehabilitation Department
of Medical University in Lublin in year 1995–2009.
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Welcome Speech to

The 24th Prague-Lublin Symposium – Locomotor Apparatus Adaptation III – Interdisciplinary Aspects

Prague, November 5, 2022

Ladies and Gentlemen, dear colleagues,

I cordially welcome you all to the **24th Prague-Lublin Symposium**, which is 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 CMA JEP Professor Josef Hyánek, DrSc.

The current epidemiological situation of Covid-19 allowed us to organize the symposium in a face-to-face format. Due to the very good experience of the last two years, we have also prepared an online format of the symposium.

It is a pleasure to welcome among us not only Dr. Piet Van Loon from Deventer, the Netherlands, as last year, but also our colleagues, friends and long-time co-organizers of this international symposium, Professor Tomasz Karski and Assistant Professor Jacek Karski from Lublin, Poland.

I warmly welcome all colleagues, specialists from different medical disciplines, experts in biomechanics, orthotics, physiotherapy and other participants who are interested in neuromusculoskeletal disorders from different perspectives.

My sincere thanks to my close colleagues, the coordinators of the symposium MUDr. Petr Krawczyk, PhD. and RNDr. Martin Braun, PhD., and last but not least to the experienced team of the Medical House in Prague, especially Mr. Stavinoha and Mr. Ing Šubert, without whose dedication and perfect organization the symposium would not have been possible in online form. I would also like to thank the symposium partner Otto Bock and the exhibiting companies.

Recently, an interdisciplinary approach to congenital and acquired skeletal deformities has been adopted as a major school of thought to recognize new relationships regarding the etiology, pathogenesis, and even causal therapy of several genetic skeletal diseases. Nowadays, new discoveries are mainly made at the interface of disciplines. I believe that the scientific lectures presented today will also 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.

Colleagues from Sydney and St. Petersburg did not participate in the organization of this year's 24th Symposium due to their advanced age, but also for other reasons. My sincere thanks for many years lasting cooperation to Assoc. Professor Kazimierz S. Kozlowski, M.R.A.C.R. and Assoc. Profes-

sor Michael Bellemore, F.R.A.C.S. from New Children Hospital, Sydney. Last but not least, I would like to warmly thank Professor Michail Dudin MD, DrSc (Director Emeritus of the Ogonyok Center) and his colleagues for their active support of this traditional event in 2014–2019, when they co-organized and actively participated in Prague-Lublin-Sydney-St. Petersburg Symposium.

Dear Michail, Thank you very much for your sincere wishes for the success of the 24th Prague--Lublin Symposium. I trust that the senseless war will not suppress interpersonal relations, will not stop the education of the next generation, scientific development and technological progress on planet Earth. But we are all aware of the immense complexity of the future of the Russian Intellectuals and the Russian people.

Let me present a few commemorative photos.

The 15th Prague-Lublin-Sydney Symposium, 15th–22nd September 2013 in the Children's Rehabilitation Center of Orthopaedics and Traumatology "Ogonyok", St. Petersburg, Russia

In front of the Centre of orthopaedics and traumatology "Ogonek"

Mr. and Mrs. Marik (right) with Professor Michail Dudin, MD, DrSc and his wife Tatjana Dudinova, MD.

View of Něva and the museum State Hermitage Museum, St. Petersburg, Russia

Petergof, Saint Petersburg, Russia – Tatjana Dudinova, MD and Alena Maříková, MD

The 20th Prague-Lublin-Sydney-St. Petersburg Symposium, 15th–16th September 2018, hotel Octárna, Kroměříž

From the opening of the symposium in the chapel of the Octárna Hotel

Participants of the symposium in front of the Octárna Hotel

Opening of the morning session: Professor Tomasz Karski, MD, PhD, Professor Ivo Mařík, MD, PhD, Professor Michail Dudin, MD, DrSc

Professor Ivo Mařík MD, PhD and Assoc. Professor Michael Bellemore, F.R.A.C.S.

Participants from St. Petersburg, in the middle Professor Mikhail Dudin, MD, DrSc.

Participants of the symposium in the lectur hall of the Octárna Hotel

At the end of my speech, let me remember our colleague Dr. Jacques Cheneau (19.5.1927–14.7.2022), who was a member of the international editorial board of the journal Locomotor System – Advances in Research, Diagnosis and Therapy for 20 years – since 2002. Dr. Jacques Cheneau has made significant contributions to the non-surgical treatment of scoliosis. He should be considered one of the greatest masters in the field of corset treatment. The concept of the "Cheneau corset" came into use in France under the name called CTM = Cheneau-Toulouse-Münster (1979). In the 1990s, Dr. Cheneau conducted a number of courses for orthopaedic technicians to introduce them to the idea of his corset, and so the Cheneau corset spread in Germany, France, Austria, Switzerland, Italy, Spain and other countries such as the Czech Republic, Slovakia, Poland, Ukraine, Russia, Belarus and other Eastern European countries. The concept of the Cheneau corset has also become popular in other continents such as America, Asia and Africa and gradually influenced many other corset concepts around the world.

Professor Ivo Marik, MD, PhD, FABI

Faculty of Health Care Studies, West Bohemia University, Pilsen, Czech Republic
Chief of the Centre for Patients with Locomotor Defects l.l.c., Prague, Czech Republic
President of the Society for Connective Tissue, Czech Medical Association, J.E. Purkynje
Scientific secretary of the Society for prosthetics and orthotics Czech Medical Association J. E. Purkyne
Chief-Editor of the journal Locomotor System – advances in research, diagnosis and therapy

The 4th Prague-Sydney Symposium, the 8th October, 2003, Medical House, Prague. From left Assoc. Professor Jacques Cheneau, MD, Assoc. Professor Kazimierz S. Kozlowski, M.R.A.C.R., Professor Tomasz Karski, MD, PhD and Assoc. Professor Ivo Mařík, MD, PhD

Lublin-Praha-Sydney-Toulouse symposium, Lublin, April 20–21, 2007. Group of foreign participants in Kozlowka Chateau. Assoc. Professor Jacques Cheneau, MD, second from the right.

Lublin-Praha-Sydney-Toulouse symposium, Lublin, April 20–21, 2007. Discussion at Gala dinner: From left. Professor Tomasz Karski, MD, PhD, Assoc. Professor Jacques Cheneau, MD, Eng Pavel Černý and Assoc. Professor Ivo Mařík, MD, PhD.

The 9th Prague-Sydney Symposium and 12th Kubát´s Podiatric day, October 19–20, 2007, Medical House, Prague. Assoc. Professor Jacques Cheneau, MD and Olga Hudáková, MD, PhD.

Last meeting with Jacques Cheneau at his summer residence in village Augeac near Le Puy in France. On the left Petr Krawczyk, MD, in the middle Assoc. Professor Jacques Cheneau MD, on the right Professor Ivo Mařík, MD, PhD, August. 9, 2017

ABSTRACT

CURRENT OPTIONS FOR TREATING AVASCULA NECROSIS OF HIP JOINTS IN ONCOLOGICAL CHILDREN. INITIAL REPORT
SOUČASNÉ MOŽNOSTI LÉČBY AVASKULÁRNÍ NEKRÓZY KYČELNÍHO KLOUBU U ONKOHEMATOLOGICKÝCH DĚTSKÝCH PACIENTŮ. PŘEDBĚŽNÁ ZPRÁVA

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Key words: avascular necrosis, AVN, leukemia, lymphoma, forage, debridement, paediatric patients

Avascular necrosis (AVN) of the femoral head is a known complication of treatment in-oncological patients. Steroids and cytostatics are used as one of main treatment option of leukaemia, lymphoma and other cancers. AVN is a pathological process that results from disruption of the blood supply to the bone and occurs the most commonly in the femoral epiphysis. Patients usually suffer from pain and limited joint motion. The mechanism involves impaired circulation to a specific area that ultimately becomes necrotic. AVN is frequently associated with high doses of oral and intravenous corticosteroids and prolonged duration of therapy. In the past, the only treatment option for this complication was rehabilitation, which often wasn't successful in long term observations and eventually leaded to necessity of implantation of endoprothesis.

The authors present cases of two paediatric patients with AVN following chemotherapy. The first was a patient with leukaemia, multiple joint inflammation and bilateral AVN of the femoral heads. The second was a patient with testis lymphoma and the bilateral AVN of the femoral heads. In both children the forage method was performed bilaterally. After head debridement, an injectable graft for backfilling the surgically-created defect was used.

In both patients the early effect gives hope for a good result of such a method of treatment.

ABSTRACT

PARTIAL ASTRAGALECTOMY IN TREATMENT OF SEVERE NEUROGENIC CLUBFOOT
PARCIÁLNÍ ASTRAGALEKTOMIE PŘI LÉČBĚ TĚŽKÉ NEUROGENNÍ „GOLFOVÉ" NOHY

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Introduction
The authors present a surgical procedure used in the Paediatric Orthopaedic and Rehabilitation Department in children with the most severe forms of neglected recurrent or untreated neurogenic clubfoot, in myelomeningocele or in arthrogryposis. Most of the children qualified for this procedure walked with help, straining only the outer edge of the foot, and there was a significant adduction of the forefoot and varus of the tarsus. Usually, qualified feet have already been operated on initially on soft tissues. Classic osteotomies or arthrodesis shorten the length of the foot and inhibit the activity of the growth cartilages of the tarsal bones. This partial astragalectomy / curettage preserves the activity of these structures and maintains the length of the foot.

Objective of the work
Presentation of a slightly forgotten method of partial astragalectomy, or rather curettage of the internal structure of the talus with preservation of the growth cartilages in neglected large neurogenic clubfoot deformities.

Nature of work
Review work based on clinical examples

Description of the procedure
The procedure consists in the curettage of most parts of the spongy talus. This creates a loose space under the upper ankle joint of the foot that allows intraoperative correction of the foot through redression: dorsiflexion, valgus and forefoot abduction. The resulting correction of the foot is stabilized by usually 2 Kirschner wires inserted from the plantar side (calcane-tibial, cuboid or spheno-tibial transfixion).

Discussion and conclusions
The obtained correction is permanent. Removal of the inner spongy part of the Talus, actually can be called curettage, spares the articular surfaces of the Talus, which are actually growth zones for this bone in children. The talus bone will adjust its spatial shape to the corrected foot in further development /growth. In this procedure, the foot does not lose its length, which is an unfavorable symptom after classic osteotomies. Partial astragalectomy ensures painless and stable loading of the foot. A similar effect can be obtained with correction using the Ilizarov external fixator, but not all patients can be treated with this method.

Currently, this method seems to be forgotten, hence the proposal to recall this operating method. The advantage of this treatment is also the simplicity of the technique and the short duration of the treatment with long-lasting good results.

ABSTRACT

IS BETTER PREVENTION ON CANCER REACHABLE AND SHOULDN'T IT BE AIMED IN CHILDHOOD?
LZE DOSÁHNOUT LEPŠÍ PREVENCE RAKOVINY A NEMĚLA BY BÝT ZAMĚŘENA JIŽ NA DĚTSTVÍ?

Carcinogenesis in the light of Discongruent Osteoneural Growth Relations and Two-Growth-Types (Egg-Sperm) Concepts by Milan Roth and the suboptimal morphogenesis of contemporary youth
Karcinogeneze ve světle diskongruentních osteoneurálních růstových vztahů a koncepce dvou růstových typů (vajíčko-sperma) Milana Rotha a suboptimální morfogeneze současné mládeže

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Introduction

Cancer is very much feared condition, but still accepted as a modern human lifestyle disease or as 'Zivilizationskrankheit'. In case of major increase of incidences of conditions there must be a major change in lifestyle over a longer period too. In the Global Burden of Diseases cancer is responsible for much morbidity, an increasing number of deaths and certainly of costs in most countries[1]. Of many types of malignancies, the increase of incidence in younger people is troubling Health systems (breast, prostate, esophagus etc.). In lung cancer prevention looks promising. What kind of prevention is possible for other types in changing lifestyle? And what part of the lifestyle? Early screening programs can alter the course of a malignancy towards chronic disease but will not prevent the primary cause of cell deterioration appearing at younger ages. At the other side the Dutch youth is suffering of many sequelae of discongruent Osteoneural Growth Relations by their intensified sedentary lifestyle (effects of sitting itself and hypokinesia). They cannot reach former levels op optimization in form and function. Can a link between this part of lifestyle and cancer be made? But the costliest increase of socioeconomic Burden of Diseases is seen in spinal degeneration and arthrosis (degenerative arthritis)[2,3] in which in present lifestyle of children the effects of hypokinesia and the effects of sitting itself on discs and cartilage in childhood are more and more accepted as the main causative factors. Prevention is possible. Can that be the case in cancer too?

Epidemiological data on increased incidence of cancer in younger generations in The Netherlands

With the use of epidemical data on incidences and ages of discovery of cancer the increase of incidence in younger generations can be shown for the Netherlands[3].

With an increase of total number of malignancies in the Netherlands between 1989 and 2021 from 55.175 to 123.672 the increase outnumbered by far any demographic changes in population (total increase, ageing, possible exposure to carcinogenic environmental factors). In a 5-years prevalence

increase from 156.015 in 1992 to 379.454 in 2021 the same rate cannot be explained by demographic data. There must be a factor that is overlooked when there is such an increase, also at younger ages. In 1995 the estimation of incidence of breast cancer for 2010 was 11.000 in the light of foreseen "normal" ageing of the population. But the incidence in 2010 was already 15.000! For prostate cancer the incidence in the 90[ties] was about 4000 but increased to more than 13.000 in 2019 with now 43% of diagnosis before the age of 69 years.

Hypokinesia and indirect effects of a sitting in adult lifestyle are relatively accepted as cause of development and increase of colorectal cancers. In animal experiments with rats, it was obvious that hypokinesia of rats in the period of growth or the offspring of pregnant rats caused a (much) shorter lifespan, but with no clue if cancer was a part of this[4]. The Dutch Governmental Institute on Health (RIVM) stated that the sedentary lifestyle of the youth is responsible for the increase under younger generations of Diabetes Mellitus type I; Hearth(rhythm) conditions and prostate – and breast carcinoma. The same institution gave data on sitting hours/day in childhood in relation to other European countries and appointed the Dutch youth as 'European Champion in Sitting'[5].

Progression in therapeutical approach of cancer, but no true prevention available?
While there were tremendous achievements by medical science to cure or diminish morbidity and mortality in malignancies, the call for effective primary prevention is not answered by a clear etiopathogenesis or an escape out of the current prevailing concept, that for one reason or another some young cells, apt to divide, undergo a genetic mutation and all the new cells out of them will grow out to an expanding or aggressive tumor. Can reversing a sitting lifestyle and reversing a great lack of exercises with extending the spinal column and stretching all structures in the period of development be part of missed or forgotten prevention?

New scientific biomedical insights on growth and misgrowth.
Milan Roth is the first scientist that got into the deepest level of biomedical science on growth by researching the consequences of the existence of the two types of growth in nature by revealing the growth by stretch of the neural cells as a distinct type of growth as the growth by mitosis of the somatic cells and concepted the Osteoneural Growth Relations. He started this pathway of "reversed engineering" by his first observations as neuroradiologist with pneumomyelographies in scoliosis with its apparently mismatch in length of the central cord and the skeletal spinal canal and by that of the failing of the human organism to meet Holzer's Neuroprotective mechanism in which all vertebrates achieve in their morphogenesis a complete free space around the central cord-root complex[6,7]. On MRI in all scoliotic and kyphotic spines it is visible this mechanism failed. At the other hand we proofed with in vivo correction method of scoliosis and our results with TLI bracing all sagittal and coronal curves in scoliotic and kyphotic children could be corrected partially or complete in kyphosis, so some form of secondary prevention can be provided in serious discongruent Osteoneural Growth Relations is possible[8,9]. But in understanding that mismatches in growth and connection between peripheral ends of neural cells with somatic cells can easily occur, his interest aroused if this mismatch in connection could not be a decisive mechanism in the origin of cancer cells.

There is consensus, also by Roth, that smoking, alcohol abuse, toxic drugs (lathyrus, tar, asbestos etc.) and other biochemical substances as polyester fibres are important factors in carcinogene-

sis. Already in his book (1985) he mentioned the acceptance of the role of virus in some forms of malignancies like in carcinoma of the cervix uteri. But out of his firm concepts on discongruent Osteoneural Growth relations and his concepts, that the preexistent differences (form, function, moment and way of duplication, mobility, capacity etc.) between the female eggcell and the male sperm are reflected in the same differences that exist between the later nervous cells and the somatic cells in all animal life, he concepted carcinogenesis in accepting that mitotic activity in somatic cells, when they are not in contact and thus under control of nerve cells as part of the CNS, will end up in expanding and aggressive tumors. Any new cell by mitotic activity should have direct contact with the dendrites of neural cells in the very extensive and sub microscopical feltwork and densification in the "Neural skeleton" with synaptic contact between neural cells mutually (Ramon y Cajal, Golgi) or neural cells and somatic cells. If this connection and vital communication fails clusters of newformed, but uncontrolled cells will grow autonomously[10].

Although there is evidence, that metastases of cancers are possible by spread along nervous structures, it is well known, that malignant tumors contain no nervous cells[11]. The absence of nerves (or of normal nerves) within the malignant tumors points to 'a cellular escape' from the limiting confines of the nervous skeleton as the biological cause of malignancy: Research on the relationship between higher incidence of cancer at young ages and the relationship of other more general manifestations of discongruent Osteoneural Growth with its high numbering and increased incidence of musculoskeletal conditions hasn't start anywhere in the world.

Prevention on cancer and musculoskeletal conditions in a similar way by optimization of processes of growth.

Reversing hypokinesia in the period of pregnancy and the complete period of growth, minimizing sitting hours and a change from passive sitting towards active sitting will be the base of primary prevention. Above that, enough bodily exercise with frequent extending and stretching moves on a daily base to provide unhindered growth in length by stretch of the Nervous skeleton can be an effective answer in prevention on the ongoing increase in incidence of malignancies and musculoskeletal conditions. Partly out of data in historic evidence, that in many parts of Europe the implementation of hygienic measures from birth on to adulthood to optimize the processes of growth and strive to achieve healthy postures and a versatile, strong, and flexible locomotor apparatus as in providing school gymnastics could provide durable health with low to very low incidences of cancer in older people too. In The Netherlands many (local) initiatives to stimulate more activity in daily life and even a new Guideline on Moving by the National Health Council for all age groups are striving towards better prevention. but the knowledge on improving quality in locomotion as brought in classic school gymnastics to get healthy postures and a durable locomotor apparatus is no part of scientific knowledge that is behind these guidelines.

Conclusion

To change the lifestyle, especially of the youth will be a gigantic challenge for societies and their Health and Educational systems. Understanding the deepest natural-philosophical background of cell pathology on base of biomechanical and neurodynamical factors that can support or disturb the processes of healthy cell-growth towards healthy adulthood is imperative. It can be a start unto success by acceptance of this knowledge by all actors in the process of raising children with the

parents on the front row. But it will take decades, even with total and acute implementation of this pathway of prevention before the incidence of cancer will drop dramatically. The now youngest generations will be affected by the still rising incidence of malignancies and musculoskeletal conditions because of their ongoing intensive sedentary lifestyle.

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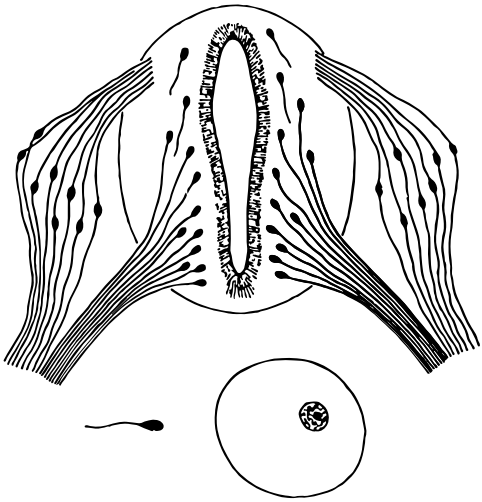

From ref. 10: Schematic cross-section of the human embryonic spinal cord with the individual neuroblasts indicated. Redrawn with permission from: Villiger E, Ludwig E Gehirn und Ruckenmark (Fig.26). 14thedt1, BennoSchwabe, Basel, 1946(18). The outer resemblance, motility and, above all, similar features of interaction with other cells suggest a developmental relationship sperm--neuroblast.

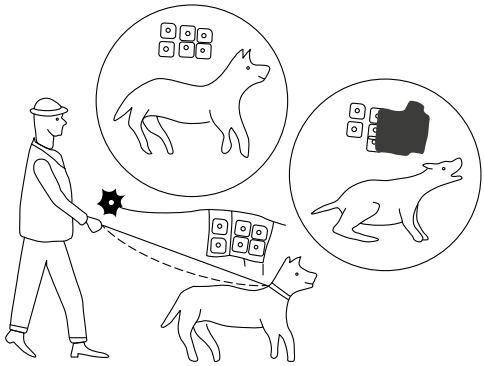

Fig. 5: The 'walker-dog' model of the escape 'extenso-cellular growth pathology'. Independence of the released dog (of explanted cells) upon the lead (upon the nervous skeleton)does not imply the existence of that independence in situ, viz. with the dog attached to the lead (with the cells enmeshed (entangled) within the nervous skeleton). The dog released released from the lead 'bites', explained cells become maligant, even without any additional carcinogenic treatment.

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ABSTRACT

EVALUATION OF THE EFFECT OF AGEING ON COLLAGEN AND ELASTIN-BASED TISSUES FROM THE BIOCHEMICAL AND BIOMECHANICAL POINT OF VIEW
HODNOCENÍ VLIVU STÁRNUTÍ NA TKÁNĚ NA BÁZI KOLAGENU A ELASTINU Z BIOCHEMICKÉHO A BIOMECHANICKÉHO HLEDISKA

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Key words: collagen, elastin, crosslinks, HPLC, FTIR, delamination, aorta, ageing

The study of the properties of biomaterials forming human connective tissues and the changes that occur under the influence of external factors is useful for predicting their behaviour under stress and can contribute to the clarification of the mechanism of their damage. Quantitative evaluation of changes in their composition and their biomechanical parameters that occur during specific pathological conditions and tissue ageing offers ways to eliminate some risk factors causing their degradation, failure of key tissue functions, and serious consequences for the human body.

Our current project is focused on research devoted to the biochemical and biomechanical properties of human tissues made of collagen and elastin, with a focus on the issue of the propagation of cracks in arteries and the rupture of their walls. The key goals of the work include experimentally validated delamination models describing the behaviour of damaged arteries (delamination properties of the human aorta, models for describing discontinuity propagation) and experiments monitoring the interrelationships between the chemical composition, age, and internal structure of the tissue, loading conditions and the resulting crack propagation in *post mortem* obtained aortic tissue samples.

Samples taken from different locations of the aorta (ascending, descending, and abdominal parts) were examined using high-performance liquid chromatography (HPLC) and Fourier-transform infrared spectroscopy (FTIR), which allow the detection of molecules forming crosslinks of collagen and elastin (pentosidine, desmosine isomers), which indicate structural changes, the degree of pathological cross-linking of the key scleroproteins as well as other biochemical changes in the composition of these connective tissues, which can worsen the biomechanical and functional properties of aortas and thus contribute to their easier damage.

Specially designed delamination models and "peeling tests" monitoring discontinuity propagation in real samples were used to evaluate the biomechanical properties, behaviour of the arterial tissue, and determination of critical values under the load of the tested samples of damaged arteries.

The applied HPLC and FTIR analyses as well as parallel mechanical tests enabled observation of changes in tissue composition related to ageing and pathobiochemical processes and revealed significant parameters and risks associated with structural changes in elasticity and stiffness of the tested biomaterial samples.

The results of our first measurements and delamination experiments suggest that the mechanical properties of arteries deteriorate during ageing due to factors such as higher total calcium accumulation, fragmentation of elastic membranes, increased collagen content, additional cross-linking by advanced glycation end products (AGEs) and as a result of the atherosclerotic or non-atherosclerotic thickening of the artery wall. Moreover, the aortas become stiffer and also the delamination force decreases significantly with increasing age (Horný L. et al. 2022 J Mech Behav Biomed Mat 133:105340).

We expect the further biochemical analyses and the proposed delamination models simulating conditions under arterial stress can contribute to the prediction of the behaviour of these biomaterials in real living systems, as well as to a closer understanding of mechanical damage of their internal structure and this study can identify the key risk factors leading to sudden and fatal failure of the functional properties of aortas.

Acknowledgements
This work is carried out with the kind financial support of the Czech Science Foundation (grant No. 20-11186S) and the authors would like to thank also to Ing. Margit Žaloudková, Ph.D. and Martina Křížková from the Institute of Rock Structure and Mechanics, Czech Academy of Sciences, Prague for their excellent cooperation within the project.

SUMMARY

ARTIFICIAL INTELLIGENCE – APOCALYPSE OR SALVATION
UMĚLÁ INTELIGENCE – APOKALYPSA NEBO SPÁSA

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Key words: Artificial Intelligence, Digital neurons, Deep Learning

The purpose of the lecture is:

- to give some inside to the achievement of Artificial Intelligence regarding applications in medicine.
- to explain, how does the Artificial Intelligence works, mainly – how does the Deep learning method able to learn and improve itself.
- to give some thought about the possible future of the collaboration of Artificial Intelligence and the human being in the future.

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ABSTRACT

HISTORY OF DISCOVERIES OF BIOMECHANICAL ETIOLOGY OF THE SO-CALLED IDIOPATHIC SCOLIOSIS (ADOLESCENT IDIOPATHIC SCOLIOSIS [AIS]) IN DATES AND "THINK OVER" / MEDITATIONS
HISTORIE OBJEVŮ BIOMECHANICKÉ ETIOLOGIE TZV. IDIOPATICKÉ SKOLIÓZY (ADOLESCENTNÍ IDIOPATICKÁ SKOLIÓZA [AIS]) V DATECH A „ZAMYŠLENÍ" / MEDITACE

Karski Tomasz
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Introduction

Etiological factors of scoliosis and other groups of pathology of spine can be varied. There can be: congenital, paresis conditionals, in various pathological syndromes, functional and this group

of scoliosis consist of 20 % of all cases. Other, bigger group 80 % of cases – are "the idiopathic scoliosis" – and its mean – the causes were secret, not founded. My research about idiopathic scoliosis start in the 1984, but describing of etiology, of classification and rules of new therapy is given in 1995–2007.

In literature this kind of spine deformity is called often Adolescent Idiopathic Scoliosis (AIS) and this term I will also use in the presentation.

Material
In the years 1984–2022 I examined more than 4000 children and adults with scoliosis. In years 1984–2009 in this material there were children from Pediatric Orthopedic and Rehabilitation Department of Medical University in Lublin, Poland. Additionally I had examined and treated children and adults in Out-Patients Clinic in my Praxis in years 1984–2022.

History of discoveries of the biomechanical etiology of the so-called idiopathic scoliosis (AIS) in determine following years
1984 – In years 1978–1984 – in every year I have been in Finland for orthopedic education. In 1984 my educative scientific stay in Invalid Foundation Hospital in Helsinki, Finland was with the "program of education about scoliosis". In one month stay I had assist to Dr Olai Snelman in his scoliosis operations. In this time "I decided to find" the etiology of the idiopathic scoliosis. I had examined many of children – but I did not found the etiology.

In years **1984–1995** I stated that the children with scoliosis had the difference of adduction of hips in strait position of the joint, and in some cases also asymmetry of internal rotation of the hips. Namely – in the right hip the adduction was limited, also in many cases the range of internal rotation was smaller.

In next year I come to conclusion – the causes of scoliosis – are not connected *"direct from abduction contracture of right hip"* – but are connected with "function going from this contracture" and it is – standing and walking. In this time I start to say – not "*idiopathic scoliosis*" but "*so-called idiopathic scoliosis".*

1995 – First lecture about biomechanical etiology of the so-called idiopathic scoliosis (AIS) in Szeged, Hungary during the Orthopedic Congress.

1996 – First publication about etiology of the so-called idiopathic scoliosis in Orthopädische Praxis in Germany

T. Karski: Kontrakturen und Wachstumstörungen im Hüft- und Beckenbereich in der Ätiologie der sogenannten „idiopatischen Skoliosen" – biomechanische Überlegungen, Orthopädische Praxis 32, 3 (1996) 155–160

The article was admitted – with congratulations words from Professor K. F. Schlegel – Chief Redactor of this Journal and simultaneous Head of Orthopedic Department in Essen, Germany. Here, I want to inform, that as Participant of DAAD Scholarship Study, I was some months in 1973 in the Orthopedic Department in Essen to learn orthopedics.

1997 – In this year was founded that all children with scoliosis have the habit to stand 'at ease' only on the right leg. It was crucial and very important discovery.

1998 – Presentation of etiology of the so-called idiopathic Scoliosis in Bratislava. In all years of XX century and also in XXI Century were organized by Slovak Orthopedic Association the Orthopedic Congresses under the name "Cervenansky Days". In 1998 I had presented in Bratislava the problem of biomechanical etiology of scoliosis. From the audience of participants only Prof. Ivo Mařik from Prague was especially interested about the problem. We had long time discuss about etiology of the so-called idiopathic scoliosis.

From this year we are all time in scientific contact and cooperation. From this time the Lublin Orthopedics' Team take part in organized "Prague – Sydney Symposia". In next years the name of Symposium was changed into "Prague – Sydney – Lublin Symposia". Professor Mařik – had presented the new *"Lublin knowledge about so-called idiopathic scoliosis"* in many Departments and places in Czech Republic.

2001 – On many cases I could confirm that scoliosis deformity start to develop – when the child start to stand and walk – its mean – in age of 2 – 3 years. In 2001 I described two groups and three types of so-called idiopathic scoliosis (AIS).

2004 – Describing of the third group of the so-called idiopathic scoliosis**.** During lectures and discussions with Prof. Keith Luk and Prof. Kenneth Cheung in Hong Kong (2004) I had presented the type of spine deformity – which has form "stiffness" only. So – this form of spine deformity is described by me – as "scoliosis without scoliosis". This type of scoliosis is connected only with walking.

2006 – Precisely and definitively was described the model of movement of hips and type of scoliosis. On many examples in all next years I could confirm these three models of hips movement and four types of scoliosis.

2007 – **A/** Answer to the question – why the blind children do not have scoliosis. **B/** Describing of the indirect influences from CNS on development of scoliosis (AIS).

New classification. Practical information about all three groups & four types of scoliosis and about causes

1. First group – "S" double scoliosis. 3D. Specific "First Model" of hips movement. Causes – standing 'at ease' on the right leg and walking.

2. Second group – two types. In this group is "C" – left lumbar convex scoliosis and "S" scoliosis – two curves – lumbar left convex and thoracic right convex. Specific "Second Model" of hips movement. Causes – standing 'at ease' on the right leg.

3. Third group. In this form of deformity we see only stiffness of spine. Specific "Third Model" of hips movement. Causes – walking only.

Influence going from "walking" is following:

A. maximally limited movement in right hip,
B. during waking – the "absent movement" of right hip is "compensatory performed" in pelvis and spine,
C. this "rotation movement of spine" is bigger than normally and has the character of "distortion movement",
D. make stiffness of the spine.

Therapy of the so-called idiopathic scoliosis (AIS) – old and new methods.

In former old methods of therapy – never was possible to receive good results of the treatment. Why? In therapy – was recommended – strengthening exercises – and these make – curves bigger, spine more stiff, gibbous more expressed.

So, only stretching exercises – to receive full movement of the right hip, proper position of pelvis, full movement of spine – flexion, deviation to the right and to the left side, rotation to the right and to the left side – give proper – conditions of growth and development of spine.

First in Poland and maybe on the world – who recommend the flexion exercises for scoliosis was Prof. Stefan Malawski from Warsaw.

Also – exercises – like karate, taekwondo, aikido, yoga – are proper for scoliosis therapy – because in these sport arts – the are stretching exercises.

Discussion

The biomechanical influences are: permanent standing 'at ease' on the right leg – and walking.. Standing 'at ease' on the right leg – because it exist better stability of right hips during standing. Better – because the adduction in extension position of right hip is smaller. Smaller – because the tracts ilio – tibiale and fascia lata is shorter. It is connected with *Syndrome of Contractures and Deformities [SofCD]* according to Professors Hans Mau (German "*Siebenersyndrom*") and Lublin observations.

The abnormalities of CNS – by children with MBD – make additionally influences in development of scoliosis. Anterior tilt of pelvis diminish the stability of pelvis and spine, make easy development of scoliosis and about this influences had spoken in Poland many years ago Prof. Donat Tylman and Prof. Kazimierz Rąpała.

Confirmation of "biomechanical etiology of so-called idiopathic scoliosis was in SICOT Congress in Prague, Czech Republic in 2011 – with the words: "Your presentation contributed to the high scientific level of the Congress *(SICOT – Prague, Czech Republic)* which covered all aspects of today's most advanced orthopaedic treatments …". Best regards, On behalf of SICOT President Prof. Maurice Hinsenkamp and Prof. Tomas Trc – Congress President.

Conclusions

1. The etiology of the so-called idiopathic scoliosis is fully biomechanical – connected with permanent standing 'at ease' on the right leg and walking.

2. The abnormalities of CNS – by children with MBD – give only additionally influences in development of scoliosis.

3. There are three groups and four types of scoliosis. Etio – pathological – groups" (epg) – connected with three models of hips movements:
"S" scoliosis – 1st etiopathological group (epg)
"C" scoliosis 2nd / A epg
"S" scoliosis 2nd / B epg
"I" scoliosis 3rd epg.

4. In new therapy and in prophylaxis important are: standing 'at ease' only on the left leg, stretching exercises to receive full movement of right hip, proper position of pelvis, full movement of spine in all directions.

5. In new therapy – it is important to avoid standing 'at ease' on the right leg and do permanent sport – karate, taekwondo, aikido, kung fu, yoga – just in kindergartens and in primary school.

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ABSTRACT

BODILY RESILIENCE OF ARMY-SOLDIERS, A MEASURE OF CONGRUENT OR DISCONGRUENT OSTEONEURAL GROWTH RELATIONS?
TĚLESNÁ ODOLNOST VOJÁKŮ – MĚŘÍTKO KONGRUENTNÍCH NEBO DISKONGRUENTNÍCH OSTEONEURÁLNÍCH RŮSTOVÝCH VZTAHŮ?

Will the impact of a sedentary lifestyle in early childhood be decisive for the endurance of "boots on the ground"?
Bude mít vliv sedavého způsobu života v raném dětství rozhodující vliv na výdrž "bot v terénu"?

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Introduction

It is the quality of physical education during the period of growth that depicts the durability of health in adulthood, but certainly also the level of physical performance still present at the time the individual has to 'deliver' in young adulthood? As in the army? The strength of the military in Western countries depends on a constant flow of qualified volunteers out of the population. Is there enough of them?

In the light of increased geopolitical tension in the world and a cruel and devastating war in Eastern Europe the urge of preparing more young people for military duties faces many Western countries with the unfavorable fact, that their youth shows a decrease in bodily and mental fitness over the last decades. The steep rise of incidence of musculoskeletal conditions and particular musculoskeletal injuries in young generations is part of that. Musculoskeletal conditions have also created the greatest socio-economic burdens in those societies as presented in the Global Burden of Diseases reports as published in the Lancet[1].

Goal

With data out of US and Dutch military registries we will give a glimpse on this actual problem in the light of classic orthopedic knowledge and the Osteoneural Growth Relations concepts of Milan Roth and the role of hypokinesia and the (in)direct consequences of sitting on morphogenesis and musculoskeletal performance in modern youth.

The situation on incoming manpower in the military in The Netherlands and the USA

A report in an American newspaper: "Every branch of the U.S. military is struggling to meet its fiscal year 2022 recruiting goals according to defense officials, and numbers obtained by journalists show both a record low percentage of young Americans eligible to serve and an even tinier fraction willing to consider it. "They think they're going to be physically or emotionally broken after serving," said one senior

U.S. military official. The pool of those eligible to join the military continues to shrink, with more young men and women than ever disqualified for obesity, drug use or criminal records"[2]. But is it??

It looks that US army officials but also the mainstream of their medical science do not recognize the more biomechanical drawbacks of contemporary lifestyle (e.g., overload sitting activities and screentime), leading to the loss of healthy natural alignment (posture) and the increased muscular tightness that causes stiffening and loss of flexibility in the locomotor system as a more plausible explanation for exponential growth in incidence of musculoskeletal conditions in young people. Certainly those, that must perform in heavy physical activities.

The same lack of etiologic knowledge is present in the Netherlands. Dutch Ministry of Defense (1920): *The total dropout rate in military training was 53.9%, dropout due to Musculoskeletal Injuries (MSI) was 23%, and 68% of all recruits suffered from one or more MSIs during the training period. Twenty-four per cent of the MSIs were acute and 48% had a gradual onset. The most frequently affected locations were foot, knee and leg*[3]. Reports out of nineties show a total dropout rate of the training less than 10%! Nor in the American military medical reports, neither in those of the Netherlands a clue of evidenced causes is given or an attempt to improve the vulnerability of young people to injuries is proposed.

Explanation out of classic orthopedic knowledge on growth and the underlying biomedical mechanism of discongruent Osteoneural Growth (Milan Roth, Brno, 1923–2006)

The European development of orthopedic knowledge on the importance of optimization of processes of growth, leading to healthy postures and a high quality of performance of the locomotor system to create a guarantee on durable health was extensively anchored in (most German language) scientific work (Praktische Anatomie, Gymnastik, Heilgymnastik, Orthopaedie). From Andry in 1741 on, sitting of children on chairs was depicted as counterproductive of reaching healthy postures. You cannot raise children towards resilient military personnel without this knowledge. Even the Greek and Romans were aware of that. This, as part of medical science, never reached any level of entering and thus acceptance in the USA and only scarcely in the UK. Countries like the Netherlands wasted their good implementation once in the hygiene in nurture and (school)education of children when these societies went for the "American lifestyle" and expelled German, as the language of medical and technical science, out of the educational system in favor of English. Of course, the German occupation (and more) created an emotional aversion towards their language and knowledge too.

The research Milan Roth did on giving evidence that intrinsic disturbances of the stretchgrowth of neural cells (like by deprivation of oxygen at birth, lathyrus and other teratogens) can produce skeletal deformities like scoliosis is unparalleled and should have been Nobel prize worthy under not-censored conditions[4,5]. But at his time the Czech youth was still under full influence of above knowledge, so he could not be aware that the steady intensifying sedentary lifestyle of children and the influx of "screentime" (TV, computer, games, tablets etc.) should jeopardize the congruent Osteoneural Growth in otherwise healthy children on a massive scale. The lack of sufficient cycles of extension and stretching the body as in many exercises and free play will end up in shorter or tight neuromuscular structures and insufficient development of healthy postures even unto scoliosis and a diminished quality of locomotor functionality.

Supporting studies

In an alarming presentation by Teija Lund et al. in 2011 at the ISSLS[6] on their observational study under healthy schoolchildren between 8–19 year were followed and put under MRI Finnish researchers came to shocking data: *LBP was reported by 9%, 14%, and 59% of the children at the different time points. At age 19, 75% of the smokers (24% of the whole study population) and 51% of the non-smokers reported LBP (p=0.073). None of the children at age 8, 1% at age 13, and 15% at age 19 had black discs on MRI. Additional disc changes were found in 22%, 23% and* ***60%*** *at the ages 8, 13, and 19, respectively. The presence of MRI findings did not correlate with LBP.*

In a follow-up study[7] of this group at the age of 32 year they concluded: *Of the 19 subjects who reported LBP at the age of 18, 16 still reported low back pain at the age of 34; of the 29 subjects who did not report LBP at the age of 18, 10 remained asymptomatic at the age of 34 with the remaining 19 reporting new-onset LBP.*

In the massive longitudinal cohort study on newborns in Rotterdam (Generation R- study) all 9-year-old children had an MRI study of their spine. In 550 children there were many pathological findings, the most striking: in 73% there was a bulging disc on at least one level! The presumed correlation with the bodyweight and BMI of the children was not found. No biomechanical or orthopedic causation was apparently known[8].

In a clinical study we presented earlier the findings in a school cohort of 248 adolescents[8]: Hamstring tightness in both legs was present in 62.1%. Unilateral tightness in 18.2%. Achilles tendon tightness in both legs was present 59.3%. Unilateral in 19, 4%. The correlation of the Finger Floor Test with tight hamstring is 73.2%. Of all photographed sagittal bending test (Finger Floor test) 60% of the spines shows a pathological sagittal contour as angular or arcuair hyperkyphosis.

Conclusion

It seems obvious that the lack (or loss) of classical knowledge of orthopedics, meaning" the art to prevent and correct all deformities and functional shortcomings (discongruent Osteoneural Growth Relations) in the growing human body", had its consequences. Introducing an intensive sedentary lifestyle in children and sitting as itself as a spine deforming activity (at first on the young developing discs) will lead to suboptimal or even pathological development in form (malalignment, bone deformity) and function (contractures, muscular imbalance). Skeletal malalignment and muscular imbalance will cause regional or local overload and/ or shearloads primarily on discs and cartilage leading to (very) early degeneration and failure of structures.

Therefore, societies have to deal with great socio-economic burdens in healthcare-costs and will fail progressively to recruit sufficient numbers of resilient military personnel to meet the targets of the contemporary geopolitical situation.

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ABSTRACT

INFLUENCE OF COVID-19-RELATED RESTRICTIONS ON THE PREVALENCE OF OVERWEIGHT AND OBESE CZECH CHILDREN
VLIV OMEZENÍ SOUVISEJÍCÍCH S COVID-19 NA VÝSKYT NADVÁHY A OBEZITY U ČESKÝCH DĚTÍ

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Key words: COVID-19; children; obesity; severe obesity; COVID-19-related-restrictions effect; GAM; semiparametric statistical modelling

The COVID-19 pandemic has challenged many aspects of our lives. Restrictions related to managing the new situation in world has dramatically changed lifestyle of child population. A sedentary behaviour and an alteration of sleep and eating habits took place and created highly obesogenic environment. The trend of rising prevalence of child obesity has been present for long time, therefore our aim was to evaluate the current situation in child population and also identify the real effect of the pandemic. Height and weight data were collected by 63 paediatricians across Czech Republic giving information of 3517 children (from 4.7 to 17.3 years). Provided data consisted of pre-COVID-19 and post-COVID-19 period measurements. We found a significant growth in the z-score BMI between the years 2019 and 2021 in both sexes, age 7, 9, 11, and 13 years. Most concerning numbers were found in (severely) obese boys at the ages of 9 and 11 years, which even exceed the percentages of overweight boys. To filter the concurrent growth of obesity, the statistical modelling registered the most dramatic increment at around 12 years of age in both sexes, that can be assigned directly as effect of COVID-19- related restrictions and changes in lifestyle. Our research enlightens the effect of the pandemic COVID-19 related restrictions on child population in Czech Republic. We can state that the already present problem of obesity and overweight children has worsen and needs to be addressed.

SUMMARY

HYPOPHOSPHATASIA
HYPOFOSFATÁZIE

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Hypophosphatasia is an inborn, severe disorder resulting from loss-of-function of alkaline phosphatase. Typical signs include skeletal demineralisation, recurrent fractures, growth failure, convulsions, respiratory failure. Hypophosphatasia is divided into perinatal, infantile, juvenile and adult forms and odontohypophosphatasia. Treatment rests in enzyme replacement therapy with asfotase alpha, which improves bone mineralisation and overal improvement of the patients. It is necessary to properly diagnose hypophosphatasia, as curremt treatment is beneficial for the affected children.

ABSTRACT

TWO HETEROZYGOUS SEQUENCE VARIANTS OF THE CTSK GENE IN A GIRL WITH VERY SMALL STATURE
DVĚ HETEROZYGOTNÍ SEKVENČNÍ VARIANTY GENU CTSK U DÍVKY S VELMI MALÝM VZRŮSTEM

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Key words: cathepsin K gene – pycnodysostosis – children

Children with significantly small stature and fractures should be carefully examined for rare bone dysplasias. We put forward a 10-year-old patient with atypical skull shape, shortened phalanges on all limbs and malformed nails. It was a child of unrelated parents. She was born at 39 weeks gestation with normal birth weight. Already at the age of two she had a small stature, but the endocrinological examination did not reveal the cause. Our patient was presented at the age of 8 for repeated fractures of the long bones without an adequate mechanism. She had had a very small stature below the third percentile, trigonocephaly with frontal bossing, slightly blue sclera, noticeably small mandible, shortened phalanges, and atypically enlarged nails. She has hypermetropia and amblyopia in her left eye. X-ray examination showed spacing of the cranial sutures in the occipital bone area, aligned mandibular angle almost 180 degrees, the base is dense, thickened. The basics of the fifth teeth are missing. The long bones of the limbs have dense, thickened cortical bone, acroosteolysis is evident on the distal phalanx of the thumb and second finger. Densitometric examination of the lumbar spine showed very high bone mineral density (Z-score +5.28). Targeted geneic testing identified two variants in the cathepsin K (CTSK) gene in the heterozygous state. Examination of the parents was indicated. It confirmed *trans* position of the variants (one at each chromosome, one from each parent).

Sequence variant c.235G> A. At the protein level leads to the exchange of codon 79 for glycine for the codon for arginine (p.Gly79Arg). This variant has been described and is kept in the Ensembl database under rs750609110. Prediction using the MutationTaster program evaluates the variant as disease causing. According to the classification of variants ACMG/AMP (The American College of Medical Genetics and Genomics/ The Association for Molecular Pathology), processed by bioinformatics software VarSome, the variant is evaluated as probably pathogenic. Based on current knowledge, we evaluate the variant as probably pathogenic. Our patient inherited this variant from mother.

Sequence variant c.20T> C. At the protein level leads to substitution of codon 7 for leucine with codon for proline (p.Leu7Pro). This variant has never been described. Prediction using the MutationTaster program evaluates the variant as disease causing. According to the classification of variants ACMG/AMP (The American College of Medical Genetics and Genomics/The Association for Molecular

Pathology), processed by bioinformatics software VarSome, the variant is evaluated as probably pathogenic. It cannot be ruled out that the variant affects the cut of DNA. Based on current knowledge, we evaluate the variant as probably pathogenic. Our patient inherited this variant from father.

Parents of our patient are healthy carriers of **pycnodysostosis**. Since both variants are missense, a milder phenotype can be expected.

Pycnodysostosis is a very rare autosomal recessive disorder. It is caused by a mutations in the CTSK gene which regulates the activity of catepsin K responsible for osteoclast-mediated bone resorption. Its major features are dense but fragile bones, acro-osteolysis, and and distinctive dysmorphic features. Pycnodysostosis should be taken in account in patients with short stature, fractures, and very high bone mineral density.

ABSTRACT

BEALS-HECHT SYNDROME: COMPARISON OF RADIOCLINICAL FINDINGS AND MOLECULAR GENETIC TESTING OF DNA ISOLATED FROM BLOOD AND BONE TISSUE. LONG TERM FOLLOW UP
BEALS-HECHTŮV SYNDROM: SROVNÁNÍ RADIOKLINICKÝCH NÁLEZŮ A MOLEKULÁRNĚ GENETICKÉHO VYŠETŘENÍ DNA IZOLOVANÉ Z KRVE A KOSTNÍ TKÁNĚ. DLOUHODOBÉ SLEDOVÁNÍ

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Key words: Beals-Hecht syndrome, clinical findings, radiological characteristics, treatment, molecular genetic testing

A female newborn (b.w. 3530 g, b.d. 56 cm) was hospitalized at the Children's Clinic of the University Hospital in Hradec Králové for limb contractures (flexion contractures of hip, knee and elbow joints, contractures of fingers with ulnar deviation of the 2nd–5th fingers of both hands, pedes equinovari bil. and digiti mallei) and genetic stigma (brachycephalic skull, asymmetric nose deviated to the right, asymmetric nostrils, abnormal auricles, very long limbs and chest). Clinical-genetic and laboratory examinations did not reveal associated systemic defects (USG examination of the heart, brain and abdomen, ocular and neurological examination normal) and a diagnosis of arachnodac-

tyly syndrome with contractures, severe form, was made. Differential diagnosis comprised infantile Marfan syndrome, homocystinuria, various arthrogryposes syndromes including lethal congenital contracture syndrome and foetal akinesia syndrome. However, phenotype of the newborn was suspected of Beals-Hecht syndrome (i.e. congenital contractural syndrome or distal arthrogryposis syndrome, type 9) according to above mentioned clinical signs. Since both parents were healthy, *de novo* mutation (or gonadal mosaicism in one of the parents) was presumed.

Since birth, orthopaedic (plaster redress bandages, splints, braces) and rehabilitation treatment of equinovarus contractures and flexion contractures of upper and lower extremities was conducted. Residual deformities and contractures were an indication for surgical treatment already in toddlerhood (by MUDr. J. Charvát, PhD in Nový Bydžov). At 20 months of age, tenotomy of m. rectus femoris bil. and prolongation of hamstrings bil. were done. At the age of 2.5 years, osteotomy of metatarsi I.-V pedis l. dx. was performed. At the same stage osteotomia correctiva calcanei l. sin. propter heel varosity and tenotomia m. abductoris hallucis l. sin. and also resectio phalangis proximalis digiti II. pedis l. sin.

She was examined at the Centre for Defects of Locomotor Apparatus in Prague at the age of 3 years for flexion contractures of the fingers of both hands (110° in the PIP joints with passive extension only up to 90° – the so-called tenodesis effect). At the age of 3 years and 2 months, surgical treatment of the 3rd–5th fingers of the right hand (exstirpatio tendines m. digitorum superficialis manus and partial dissection of the collateral ligaments of the PIP joints) with transplantation of skin defects was performed. At 3 years and 7 months, the same procedure was performed on the 2nd–5th fingers of the left hand. At 7 years osteotomy of metatarsi I.-V pedis l. sin. was performed. At 10 years surgery of flexion contracture of 3rd–5th toe of right foot (tenotomy m. flexoris digitorum profundus). At the age of 12 years, based on clinical and anthropological evaluation, bilateral ventral drilling hemiepiphyseodesis of the distal femoral physis was performed to address 20° flexion contracture and knee valgus; at 12.5 years, medial drilling hemiepiphyseodesis of the distal left femoral physis was indicated to address knee valgus. The outcome of hemiepiphyseodesis treatment was continuously evaluated clinically, radiologically and anthropologically. At 17 years of age, corrective wedge osteotomy of the tibia (10°) and external rotation of the tibia (10–15°) were indicated for persistent valgus in the proximal 1/3 of the left tibia and internal torsion.

She was regularly monitored by an anthropologist. She was above average height with relatively long limbs and underweight. Soon after ventral epiphysiodesis, growth of the lower limbs stopped. In adulthood she reached a height of 171 cm and a sitting height of 89.5 cm indicating relatively longer lower limbs within the normal range. Arm span is 179.5 cm. BMI 20.3 is within normal limits.

The planned procedure was not performed until the patient was 24 years old (4 months ago) due to her studies. The girl continues to be followed by an orthopedic surgeon due to delayed healing of the osteotomy. To date, the proband is dispensed by a plastic surgeon, a cardiologist (v.s. aortic root dilatation) and is osteologically monitored.

Recent molecular genetic analysis performed from patient's blood revealed pathogenic intronic variant c.3724+2T>C (rs863223570) in *FBN2* gene in the heterozygous state. This mutation destroys

the canonical splice donor site and is predicted to cause abnormal gene splicing. The mutation is predicted to lead to either an abnormal protein or no protein product. This mutation has already been reported in genetic databases as pathogenic variant. Genetic testing was performed by massive parallel sequencing using clinical exome panel followed by Sanger sequencing.

Since pathogenic variants in the *FBN2* gene are associated with Beals-Hecht syndrome, we consider variant c.3724+2T>C in *FBN2* gene in the heterozygous state as causal in our patient. The inheritance of identified mutation is autosomal dominant.

Subsequently bone tissue sample from the diaphysis of the tibia was tested for c.3724+2T>C mutation in *FBN2* gene by Sanger sequencing. The presence of the pathogenic variant in a heterozygous state in the *FBN2* gene was confirmed in bone tissue sample as expected.

ABSTRACT

PHENOTYPIC CONTINUUM OF PATHOGENIC COMP VARIANTS. COMPARISON MED1 AND PSACH

FENOTYPOVÉ KONTINUUM PATOGENNÍCH VARIANT COMP. SROVNÁNÍ MED1 A PSACH

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Key words: pathogenic COMP variants – phenotypic continuum – MED1 – pseudoachondroplasia

Aims of the lecture is to contribute to the understanding of the etiopathogenesis of bone dysplasias and the relationship between genotype and phenotype. In the lecture we compare the clinical findings and radiological picture in a patient with multiple epiphyseal dysplasia, type 1 (MED1) and five patients with pseudoachondroplasia (PSACH). Molecular genetic testing was performed in one patient with MED1 and two patients with PSACH.

Both of these bone dysplasias are caused by pathogenic changes in the gene encoding the cartilage oligomeric matrix protein (COMP). COMP is non-collagenous protein binding other cartilage extracellular matrix (ECM) proteins and catalysing polymerization of type II collagen fibrils. It plays a role in regulation of chondrocyte proliferation. COMP mutations lead to the improper folding of the COMP protein and to retention of the abnormal COMP protein and type IX collagen in the endoplasmic reticulum which causes premature death of chondrocytes. It results in the failure of endochondral ossification and diminished growth of long bones. Additionally, ECM contains

minimal COMP, and the amount of type IX collagen is also reduced. This deficiency results in easily eroded abnormal joint cartilage and painful osteoarthritis. Mutations in COMP produce clinical various phenotypes ranging from early onset arthritis through multiple epiphyseal dyslasia (MED) type 1 to the severe pseudoachondroplasia (PSACH), which is characterized by marked short stature (105–128 cm), more severe deformities of the upper and lower extremities, ligamentous laxity and significant spinal disability.

The authors compare the clinical, anthropological and radiological findings of one patient with MED1 and 4 patients with PSACH. Both dysplasias manifest with waddling gait, pain and various restriction of joint movement, varosity/valgosity of knees or windswept deformity, delayed and irregular ossification of the epiphyses, dysplastic epi-metaphyseal changes and precocious osteoarthritis (Briggs 02). In patients with PSACH, dysplastic skeletal changes start earlier and are more severe, waddling gate is observed in 18–24 months. MED1 is characterized by moderately short stature (145–170 cm), while PSACH is characterized by severe growth failure comparable to achondroplasia. In addition, PSACH is associated with severe limb and also spine deformities which are individually indicated to surgery.

Pathogenic variants of the COMP gene are associated with PSACH and MED. The patients we present document a phenotypic continuum between these two dysplasias.

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ABSTRACT

RADIOULNAR SYNOSTOSIS – UNCOMMON MANIFESTATION OF FEINGOLD SYNDROME
RADIOULNÁRNÍ SYNOSTÓZA – NEOBVYKLÝ PROJEV FEINGOLDOVA SYNDROMU

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Key words: Congenital Radioulnar synostosis, clinical exome, genetic testing, mutation, *MYCN* gene, Feingold syndrome

Introduction
Congenital Radioulnar synostosis (CRUS) is a rare condition where there is an abnormal connection between the radius and ulna bones and occurs as a failure of segmentation of the adjacent radius and ulna at the seventh week of development *in utero*. CRUS affects the supination and pronation movements of the elbow joint. Most cases of CRUS are sporadic and approx. 60 % are bilateral. Isolated CRUS can be associated with family history with autosomal dominant inheritance. However, CRUS can also be part of rare genetic syndromes.

The **aim of this case report** is to introduce a patient, a 16-year-old boy, with bilateral CRUS revealed at the age of 2 years.

Personal history
The child was born from the second physiological pregnancy, delivery at term, 3280 g, 48 cm, Apgar score 7–9–10. Psychomotor development was normal. Diabetes mellitus (DM) type 1 manifested at the age of 5 years. He is treated with Actrapid and Lantus. His older sister is also treated for DM. At the age of 14 years, USG examination of abdomen and kidneys showed normal findings. At the age of 14 years ***clinical and radiological examination*** confirmed flexion contracture in the right elbow 40 degrees, in the left elbow 30 degrees; flexion without limitation. Right forearm fixed in pronation 80 degrees, left in pronation 30 degrees; wrist in medial position bilaterally, no limitation of mobility. ***X-ray examination*** revealed bilateral proximal radioulnar synostosis, brachymesophalangs of the 5th fingers and toes, and talonavicular coalition of the left foot. **Anthropometric examination** proved mildly short stature 160 cm (-1,2 SD), weight 44,5 kg (-1,1 SD), BMI 17,4 (-0,9 SD). The amount of subcutaneous fat was above average, muscle development weaker. Sitting height 82.5 cm (-0.7 SD), subischial length 77.5 cm (-0.7 SD), upper extremities -2.4/-1.6 SD. Head circumference 51.1 cm (-2.6 SD) was indicative of microcephaly.

Genetic examination
Since CRUS can be associated with chromosomal abnormalities, karyotype was performed at the age of 4. The karyotype showed normal male result and the patient was not tested for another genetic syndromes at that time.

At the age of 16, the patient with his mother came again for genetic counselling. Besides the CRUS, brachydactyly on the fingers of both upper and lower extremities were present. The patient was of a smaller stature compared to his hereditary predisposition. Microcephaly and mild facial stigmatization were present. His mental and locomotor development was always normal, however, he had learning difficulties at primary school. He was the only person with such symptoms in his family.

According to phenotype of the patient described above, genetic background was presumed. As the CRUS was the main symptom in our patient, varying genetic syndromes including CRUS as a part of phenotype were considered. The differential diagnosis was wide, thus genetic testing using clinical exome was performed. The clinical exome panel is based on new generations sequencing (NGS) technology and covers the coding regions of more than 4,900 genes with known mendelian/inherited disease-causing mutations.

The performed **DNA analysis** revealed a pathogenic mutation c.964C>T (p.Arg322Ter) in a heterozygous state in the *MYCN* gene. Pathogenic mutations in a heterozygous state in the *MYCN* gene cause Feingold syndrome (FS), type 1, that is typically characterized by digital anomalies (shortening, clinodactyly, syndactyly, thumb hypoplasia), microcephaly, facial dysmorphism, gastrointestinal atresia (primarily oesophageal and/or duodenal) and mild-to-moderate learning disability. The pathogenic mutation c.964C>T in the *MYCN* gene has been already described in patients with FS type 1.

Conclusions
FS type 1 is very rare genetic syndrome with prevalence less than 1 in 1,000,000. Clinical genetic databases do not mention CRUS as a symptom of FS. That is the reason why we have not considered FS as a possible cause of patient's phenotype. Other clinical signs found in our patient are consistent with FS type 1. The treatment is only symptomatic. From a biomechanical and orthopaedic point of view, we offered a corrective surgery to change the position of the pronated right forearm from 80 degrees to approximately 30 degrees and at the same time to perform a proximal forearm extension of 15–20 degrees. Additionally, prominence of the medial edge of the talonavicular coalition can be addressed. The decision to perform these interventions is up to the boy and the parents.

Prenatal diagnosis or preimplantation genetic testing of embryos is possible to prevent FS type 1 in the patient's future offspring. The result demonstrates the efficiency of clinical exome sequencing approach in performing molecular diagnosis of undiagnosed inherited diseases and syndromes affecting the locomotor apparatus.

SUMMARY

EARLY MOLECULAR GENETIC DIAGNOSIS OF SPONDYLOMETAPHYSEAL DYSPLASIA – KOZLOWSKI TYP
ČASNÁ MOLEKULÁRNĚ GENETICKÁ DIAGNOSTIKA SPONDYLOMETAPHYSEÁLNÍ DYSPLAZIE – TYP KOZLOWSKI

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Key words: spondylo-metaphyseal dysplasia – Kozlowski type, platyspondyly, metaphyses, short trunk dwarfism, molecular genetic diagnostics, *TRPV4* gene mutation.

Summary of the paper that is accepted for publication in the journal Locomotor System (Pohybové ústrojí), 29, 2022, No.1

The article demonstrates the clinical findings and radiological picture of two cases – a 21.5-year-old patient and his 22-month-old daughter, in whom the diagnosis of spondylometaphyseal dysplasia of Kozlowski type (SMDK) was confirmed by molecular genetic analysis using classical sequencing of the *TRPV4* gene, which revealed a heterozygous mutation c.1781G>A – p.(Arg594His) in exon 11 of the *TRPV4* gene. SMDK also affects the father and three brothers of CASE 1, who were diagnosed in 2006 by clinical and radiological examination.

ABSTRACT

ADAPTATION TO EXTRAPYRAMIDAL LESION IN EXTRAPYRAMIDAL FORM OF CEREBRAL PALSY
ADAPTACE NA EXTRAPYRAMIDOVOU LÉZI U EXTRAPYRAMIDOVÉ FORMY MOZKOVÉ OBRNY

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The predominant forms of high tone in individuals with cerebral palsy (CP) are spasticity and dystonia. Spasticity-predominant CP is seen in up to 79% to 86% of individuals with CP. Dyskinetic CP, which is predominated by dystonia, is seen in 6.5% to 16% of individuals with CP. It should be noted, however, that regardless of the predominant movement type of CP, spasticity and dystonia often coexist.

Movement disorders (MD) including dystonia, chorea and hemiballismus represent some of the most challenging clinical problems. They reflect imbalances between desired and competing motor patterns thought to arise from the physiological interaction of cerebellothalamocortical basal ganglia circuits: summarised as 'a failure to inhibit unwanted movements (eg, chorea, dystonia and tics) through abnormal activation patterns of groups of striatal neurons.

Dystonia is typically thought to involve abnormalities in the basal ganglia and associated thalamocortical network. However, neuroimaging evidence of basal ganglia and thalamic injury (BGTI) is not always necessary to demonstrate the clinical presence of dystonia. In the brains of individuals with PVL-associated CP, there may be BGTI at the microscopic or circuit level even if there is no visible evidence of injury on conventional MRI.

It is widely recognised by clinicians managing childhood dystonic movement disorders that the causes and associated features differ from those seen in adulthood. The clinical features of childhood dystonia are likely to be linked to disturbances in the recently described segregated and integrative connectivity patterns in the human basal ganglia.

A complicating factor is the impact of dystonia on the developing brain, the growing musculoskeletal system, functional adaptation to increasing demands and the extent to which early interventions can improve the prognosis for functionally adaptive development.

Secondary dystonia is far more common than primary dystonia. Dystonic CP being the largest grouping within the secondary dystonias. Spasticity coexists with dystonia in a third of cases. Regardless of dystonia aetiology or duration, a worsening is reported in dystonia over time and, on the other hand, with some perceiving an improvement in dystonia symptoms. Despite the availability of these rigorously derived definitions, scales, and tools, dystonia is still often underdiagnosed or misdiagnosed. This is particularly true when dystonia is comorbid with spasticity as it is in CP.

Although numerous **movement patterns** have been associated with dystonia at large, lower limb adduction was commonly cited when identifying dystonia. Sustained foot inversion has been described as a dystonic posture but leg adduction has not. In the context the leg adduction that may have prompted dystonia identification was probably variable over time and, therefore, dynamic and of short duration. If subtle and fleeting, leg adduction may have previously been missed as a movement associated with dystonia in people with CP. The concept of dystonic 'scissoring' involving leg adduction has historically been noted in those with CP, but can be difficult to differentiate from spasticity. The variability in leg adduction over time allowed for differentiation from spasticity.

Dystonic gait disorders frequently appear bizarre, particularly because activity increases dystonic posturing. The abnormal posture of the foot in a dystonic gait typically involves inversion, plantar flexion and tonic extension of the big toe. In many patients, complex types of walking, such as walking backwards and running, are paradoxically less impaired than walking forward and may appear completely unaffected.

The majority of children often presented with other, non-dystonia-related medical conditions, of which seizures in infancy were commonly experienced, for example, in perinatal hypoxic-ischaemic encephalopathy. The relative influence of these other medical concerns and the potential for anti-dystonic therapies to exacerbate them further add to the complexity in management and clinical heterogeneity in the cohort.

Nowadays, the general **management** of patients with MD is based on rehabilitation, pharmacological treatments, surgery, and traditional splints. Referral to a neurologist is advised, as a minority may improve with levodopa; however, the mainstay of treatment is botulinum toxin injection administered by an experienced injector. Although some attempts have been made to devise specific orthoses for the rehabilitation of patients affected by MD, especially the younger ones, those devices have received limited attention. Design principles will be derived to provide specialised orthoses for the dynamic control of posture and the stabilisation of voluntary movements: those include using biomechanical actions and enhanced proprioception to support the sensorimotor rehabilitation of the children affected by CD. A similar approach could be advantageously applied in other MD-related conditions, especially with hyperkinetic and/or hypertonic traits.

The greater severity of functional impairment is in the children with secondary compared with primary/primary-plus dystonia. There is clearly a trend towards referring the severest cases that are also the most difficult to manage, hence the very high proportion of GMFCS level IV and V cases. It is impossible to determine the precise contribution of coincident spasticity or of other medical conditions to impairment in gross motor function.

An early referral to specialist services for childhood dystonia management at a younger age should be encouraged. Appropriate measures of change, health-related quality of life and care burden for children with dystonia are required to measure meaningful change after intervention. A direct focus of the clinical strategy on reducing the proportion of life lived with dystonia may prove beneficial to all children growing up with dystonia, irrespective of aetiology, by relieving pain, increasing independence and preventing deformity. A clearer understanding of the predicament of children living with dystonia is essential to evaluate the efficacy of therapeutic strategies for relieving dystonia in childhood and in particular to understand whether there are any crucial „windows of opportunity" for such interventions.

ABSTRACT

CLINICAL AND PSYCHOLOGICAL SYMPTOMS OF MINIMAL BRAIN DYSFUNCTION (MBD). CAUSES. CHILDREN AND ADULTS. EXAMPLES OF PATHOLOGY. METHODS OF THERAPY
KLINICKÉ A PSYCHOLOGICKÉ PŘÍZNAKY MINIMÁLNÍ MOZKOVÉ DYSFUNKCE (MBD). PŘÍČINY. DĚTI A DOSPĚLÍ. PŘÍKLADY PATOLOGIE. METODY TERAPIE

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Introduction

All orthopedic and psychological observations are based on material from the years 1995–2022: 1425 children and youths in the age between 2 and 18 years and adults in age 20–70. All patients were examined and treated because of orthopedic disorders in feet, knees, hips, spine – in result of Minimal Brain Dysfunction [MBD].

Children

Clinically there were:

1. valgus deformity of the feet,
2. hyperextension of the knees,
3. anterior tilt of the pelvis,
4. hyperlordosis of the lumbar spine,

These symptoms are a result of asymmetrical spasticity or sub – spasticity of the opposite groups of muscles. At the same time, we observe in this group of patients the "laxity of joints" and this is a result of the changes in the properties of collagen.

Obstetrics and gynecologists observations about the causes of Minimal Brain Dysfunction (MBD) in children:

1. Anemia at women in gravidity period,
2. Hypertension or hypotension of blood circulation of mother in gravidity period,
3. Permanent stress– here we have many examples. In stress the blood circulation is disordered, capillaries are closed – as a result, insufficiency of blood circulation from placenta to fetus occurs. Asphyxia of the fetal Central Nervous System is the cause of Minimal Brain Dysfunction.
4. Noise – similar influence like stress,
5. Chronic inefficiency of placenta at mother – because of congenital or acquitted illnesses,
6. Infection of the urinary tract,
7. Intrauterine limitations of fetus growth because of known and unknown causes,
8. Oligohydramnion (limited intrauterine water),
9. Spotting or hemorrhage during pregnancy,

10. Uterus contractions in early stages of pregnancy – that is – prematurely,
11. Excessively intense action of uterus during delivery as well as uterine tetanus,
12. Overdoses or improper medication during delivery,
13. Improper "hand maneuver" of doctor during delivery,
14. Mellitus – of the newborn – bigger than normal – frequent and important cause of MBD or even Cerebral Palsy described by Prof. Harald Thom (Heidelberg, Rummelsberg by Nürnberg – my – T. Karski – cooperation with Professor Thom – in my scholarship time of DAAD – in Heidelberg [1972–1973] and in next years in Rummelsberg.

The "pathological status" of such cases of asphyxia has a particular influence on the Central Nervous System (CNS). Therefore, the time of pregnancy or / and delivery is crucial for a child – and – if asphyxia occurred – we diagnose the pathology called Minimal Brain Dysfunction (MBD) and in very serious cases even Cerebral Palsy.

Adults patients

In the case of the MBD – after years – we observe secondary changes in the locomotors systems also at older people – mostly – back pain syndromes.

Repeated examination of these patients has shown also the psychological disorders – typical like symptoms in Attention Deficit & Hyperactivity Disorder (ADHD).

These symptoms observed in children can very often persist in the adulthood and this problem will be presented during the Symposium.

It is very important to introduce the therapy of disorders of locomotors system and therapy of psychological "aberration of behavior" early on in the childhood.

Aim of therapy & Conclusions

1. In our clinical material there are – children and adults – ca 18% – patients with symptoms of Minimal Brain Dysfunctions (MBD).
2. The clinical symptoms of MBD are: valgus deformity of feet, recurvation of knees, anterior tilt of pelvis and hiperlordosis of lumbar spine, general laxity of joints, very often – "pain syndromes", insufficiency in walking, in daily activity, at work, in sports.
3. Incorrect psychological behavior of children and adults is a frequent symptom typical for patients with MBD.
4. The described "incorrect psychological behavior" is also connected with "genetically conditions" and "negative and tendency education" in families, in school, in television, in radio et cetera.
5. Orthopedic surgeons, neurologists, pediatricians, general doctors should be familiarized with MBD, diagnose the "neurological & orthopedic" disorders and introduce early therapy in children.
6. The proper therapy is based on two directions / ways – a/ physiotherapy with kinesiotherapy and b/ psychological therapy.
7. In physiotherapy – it is important to cure the shortened and "contracted" soft tissues – tendons, fascias, capsules, muscles to receive full and symmetrical movement of joints and proper posi-

tion of the parts of the body and thanks this – enable proper loading, efficient walking and proper sitting and standing.

8. In children and in adults – the therapy should be – "friendly and nice" and recommendations should be understandable for patients.
9. As prophylaxis and prevention of the MBD at children – we should remember about a proper behavior towards pregnant women – and perceive this period of their life' as blessed. It is the best prophylaxis of Minimal Brain Dysfunction in children.

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SUMMARY

EXOPULSE MOLLII SUIT – THE FIRST NEUROMODULATION SUIT
EXOPULSE MOLLII SUIT – PRVNÍ NEUROMODULAČNÍ OBLEK

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Key words: neuromodulation, reciprocal inhibition, transcutaneous stimulation

The Exopulse Mollii Suit is a medical device which fundamentally changes the treatment of neurological conditions. It is the first neuromodulation suit that works on the principle of reciprocal inhibition – it ensures the relaxation of spastic muscles while enabling the activation of weakened muscles at the same time. The combination of its effects allows users to experience a more active and less painful daily life. The device uses whole-body low-energy transcutaneous electrical stimulation and is designed for activating muscles, reducing spasticity and chronic pain, symptoms common in cerebral palsy, multiple sclerosis, stroke, spinal cord injury and other neurological disorders. The neuromodulation suit improves mobility, balance, blood circulation and relieves pain. The suit is available for both children and adults. It comprises 58 integrated electrodes and stimulates 40 key muscles throughout the body. Based on the examination of the patient, the appropriate program is loaded into the control unit of the suit. It is recommended to use the suit for 1 hour every other day – the effect of the therapy lasts for the next 48 hours and can be extended over time. The examination and selection of the relevant therapeutic program is carried out by a specially certified therapist. Exopulse Mollii Suit offers completely new options for the therapy of patients with damage to the central nervous system.

ABSTRACT

DEVELOPMENT AND TESTING OF A 3D PRINTED PROTECTIVE CRANIAL ORTHOSIS
VÝVOJ A TESTOVÁNÍ 3D TIŠTĚNÉ OCHRANNÉ KRANIÁLNÍ ORTÉZY

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Key words: Protective cranial orthosis, 3D scanning, 3D printing, mechanical testing, design optimization

Klíčová slova: Ochranná kraniální ortéza, 3D skenování, 3D tisk, mechanické testování, optimalizace konstrukce

Introduction

A protective cranial orthosis is a medical device that is intended for patients with epilepsy, balance disorder, mental retardation, or persons without part of the skull after surgery. With the use of 3D scanning and 3D printing, it is possible to design a unique custom device that is functional, comfortable and meets design requirements. A device made in this way must be verified to ensure that it does indeed provide the required safety and functionality. In the absence of any standard for testing, a custom testing methodology was devised and implemented. This is based on mechanical drop tests and data collection using sensors and a high-speed camera.

Methods

A protective cranial orthosis is designed based on a 3D scan of the patient's head. Measurement technology and custom test equipment are used to verify the functionality of the device. Mechanical testing is carried out on a drop-test device, which provides a controlled drop of a head-form with the protective orthosis. The head-form and the device drop test are fitted with sensors to measure acceleration and forces. High-speed camera recording and DIC (digital image correlation) processing are used to analyse the deformation of the orthosis. Based on the test results, an optimized internal impact structure is applied in the design of the cranial orthosis.

Discussion

The in-house testing methodology of the protective cranial orthosis helped to develop and optimize its design. At the same time, the correct functionality of the orthosis was verified. Without this testing, it would have been very difficult to quantify the safety of the orthosis. Modern technologies are used for manufacturing and testing. The proposed methodology for testing protective cranial orthosis is unique solution globally.

Conclusion

The 3D printed protective cranial orthosis is a new generation device. Compared to traditional devices, this orthosis is safer, more breathable and has an attractive design. A device made with this technology has the potential to significantly improve the patient's quality of life.

Úvod
Ochranná kraniální ortéza je zdravotnická pomůcka, která je určena pro pacienty s epilepsií, poruchou rovnováhy, mentální retardací nebo pro osoby bez části lebky po operaci. S využitím 3D skenování a 3D tisku je možné navrhnout unikátní zakázkovou pomůcku, která je funkční, komfortní a splňuje požadavky na designový vzhled. Takto zhotovená pomůcka musí být ověřena, zda poskytuje požadovanou bezpečnost a funkčnost. Vzhledem k absenci jakékoliv normy pro testování byla sestavena a realizována vlastní metodika zkoušení. Ta je založena na mechanických pádových testech a sběru dat pomocí senzorů a vysokorychlostní kamery.

Metody
- Ochranná kraniální ortéza je navržena na základě 3D skenu pacientovy hlavy
- Pro ověřování funkčnosti pomůcky je použita měřící technika a vlastní zkušební zařízení.
- Mechanické testování je realizováno na padostroji, u kterého je zajištěn řízený pád makety hlavy s nasazenou ochrannou pomůckou. Maketa hlavy a konstrukce padostroje jsou osazeny senzory pro měření zrychlení a sil.
- Pro analýzu deformace pomůcky je použit záznam z vysokorychlostní kamery a zpracování pomocí DIC (digitální korelace obrazu).
- Na základě výsledků zkoušek je optimalizována tlumící struktura, která je aplikována v konstrukci kraniální ortézy.

Diskuze
Vlastní metodika zkoušení ochranné kraniální ortézy napomohla vývoji a optimalizaci její konstrukce. Zároveň byla ověřena správná funkčnost pomůcky. Bez tohoto testování by bylo velmi obtížné kvantifikovat bezpečnost pomůcky. K výrobě i testování jsou použity moderní technologie. Navržená metodika zkoušení ochranných kraniálních ortéz je unikátní světové řešení.

Závěr
3D tištěná ochranná kraniální ortéza je pomůcka nové generace. Oproti tradičním pomůckám je tato ortéza bezpečnější, vzdušnější a s atraktivním vzhledem. Pomůcka zhotovena touto technologií má potenciál významně zlepšit kvalitu života pacienta.

ABSTRACT

ONGOING EVALUATION OF THE TREATMENT OF PECTUS EXCAVATUM WITH A VACUUM BELL AND PECTUS CARINATUM WITH A THORACIC BRACE
PRŮBĚŽNÉ HODNOCENÍ LÉČENÍ PECTUS EXCAVATUM VAKUOVÝM ZVONEM A PECTUS CARINATUM HRUDNÍ ORTÉZOU

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Key words: pectus excavatum, pictus carinatum, vacuum bell, orthosis, correction, 3D scanning

This therapy began to develop in the world after 2006. In many scientific works, this therapy is mentioned as effective and successful.

In early 2021, a proprietary vacuum bell model line was developed for the treatment of pectus excavatum using negative pressure. To date, we have more than 80 vacuum bell applications for pectus excavatum and more than 30 orthosis applications for pectus carinatum.

For vacuum bells, we use vacuum values from -0.05 to -0.25 Bar. In practice, it turned out that the optimal starting vacuum is -0.10 Bar. Vacuum bells are equipped with a reduction valve, which can be used to set the maximum level of vacuum, so that a long-term defined vacuum value is guaranteed, but also the certainty that a higher vacuum will not be used. Patients are advised of the need to find their own optimal negative pressure value according to individual skin sensitivity and visual correction effect. So far, according to the first applications, it appears that only a small number of patients use a negative pressure higher than -0.15 Bar, they mostly stay at a value of -0.15 Bar and below.

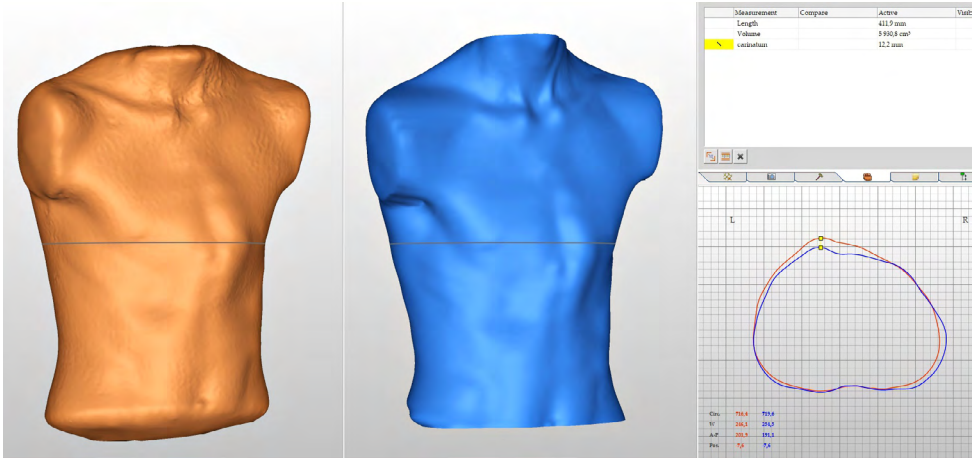
According to information from the world, the usual daily application is 2 hours. In the Motol group of patients, it was set for up to 4 hours. The beginning of the application of the bell is gradual. The cumulative application time is understood as a result of the need to interrupt the application and let the skin rest.

Several system leaks were recorded, with the source of the failure identified as a failure of the one-way valve, which was again likely caused by dirt. The problem was solved by replacing the valve.

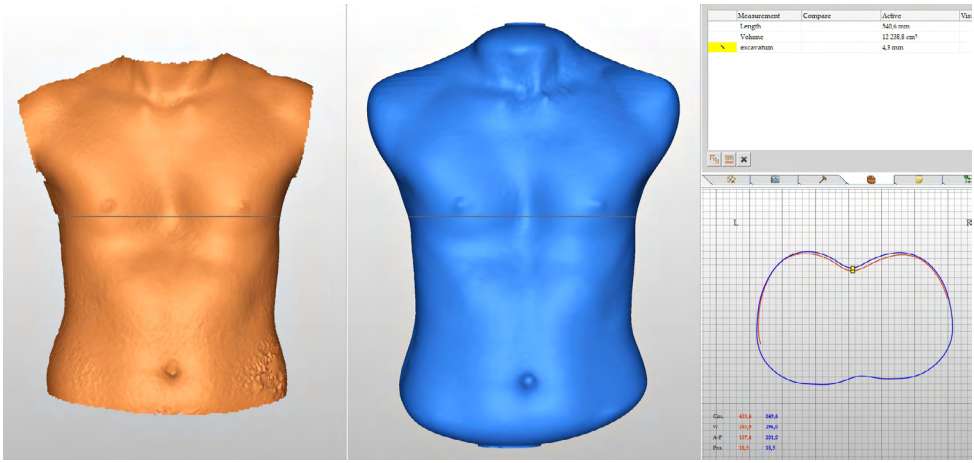
The immediate effect of the application of the bell was also investigated. In one proband, a body shape scan was performed, then a vacuum bell was applied at a vacuum value of -0.10 Bar for five minutes, and a second scan was performed immediately after removal. According to the preliminary observation, it is likely that the correction effect persists for some time and gradually fades away.

With the long-term application of this therapy, remodelling is assumed based not only on the immediate correction of the deformity under the influence of negative pressure but also the process of the fading of the correction.

Currently, we are gradually getting results of long-term use. So far, the data are only recorded, their processing will take place at the end of the study.



Patient 1. Comparation: The current state in blue and the original in red after one year of application.



Patient 2. Comparation: The current state in blue and the original in red after one year of application.

For the treatment of pectus carinatum, a bivalved plastic orthosis is used, which exerts pressure on the prominence of the deformity.

It turns out that it will be advantageous to establish dimensionless indexes for the evaluation of deformation changes in the transverse plane of the thorax. For the pectus excavatum deformity index 'ex' and for the pectus carinatum index 'ca'.

Their depth-to-width ratio at the beginning of treatment minus their depth-to-width ratio over time will determine the degree of improvement (+) or worsening (-) of the deformity for pectus excavatum. For pectus carinatum, the pattern will be the same, only the signs of success are logically opposite. For pectus carinatum, the improvement will have a negative (-) value and the deterioration a positive (+).

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ABSTRACT

RISK OF KNEE OSTEOARTHRITIS IN PATIENTS WITH TRANSTIBIAL AMPUTATION – EFFECT OF PROSTHESIS WEIGHT
RIZIKO OSTEOARTRÓZY KOLENNÍHO KLOUBU U PACIENTŮ S TRANSTIBIÁLNÍ AMPUTACÍ – VLIV HMOTNOSTI PROTÉZY

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Key words: lower limb amputation, prosthesis weight, knee arthrosis

Introduction

The gait stereotype of a TT prosthesis user can be influenced by the length of the prosthesis, the type of prosthetic foot, or the overall alignment of the prosthesis, but also by the weight of the prosthesis. Previous studies have verified that persons with TTA transfer the load from the affected limb to the healthy limb faster. At the same time, a relationship between the adduction moment at the knee joint of the unaffected limb and the risk of knee osteoarthritis has been described.

Objectives of the study
The aim of this presentation is to highlight the influence of prosthesis weight in assessing the risk of gonarthrosis in patients with transtibial amputation.

Patients and methodology
The analyzed population consisted of 14 subjects with unilateral TTA. The study population included 1 female (age 52.7±14.2; height 175.6±6.3 cm; weight 82.3±12.5 kg; duration of prosthesis use (16.5±9.1 years). The etiology of amputation in the subjects (9 trauma, 3 infectious complications, 1 tumor, 1 diabetes mellitus). The second group consisted of a matched set of 14 healthy subjects with identical anthropometric parameters.

We used a DXA bone densitometer to determine the weight of the amputated limb. For kinematic and kinetic analysis, 10 Qualisys infrared cameras, motion capture system (Qualisys AB, Göteborg, Sweden) on three force plates, (Kistler, Winterthur, Switzerland) were used. Data were analyzed using Qualisys Track Manager software.

Subjects performed walking with the original, lighter, commonly used prosthesis and with the prosthesis loaded to the original limb weight as determined by DEXA densitometry.

Results
The execution of the stepping cycle of both the amputee and healthy limb was more similar to the gait parameters of healthy subjects in the control group when using the weighted prosthesis. The results also suggest that in the amputees with weights, as opposed to the group without added weights, the results of kinetic parameters measured at the knee joints of the amputee and unaffected limb were closer to the control group of healthy subjects.

Conclusion
With the application of a prosthesis imported into the weight segment of the healthy limb, the values of spatiotemporal parameters approach the gait of healthy subjects. The maxima of the knee joint adduction moment on the unaffected limb approach the values of the group of healthy subjects in view of the results, we recommend continuing the started research in order to specify even more accurately the optimal weight of the lower limb prosthesis also depending on the load distribution in relation to the prosthesis design and also with regard to the duration of the use of the heavier prosthesis during the day.

ABSTRACT

THE USE OF TECHNICAL AIDS TO PREVENT SERIOUS CONSEQUENCES OF FALLS IN THE ELDERLY
VYUŽITÍ TECHNICKÝCH POMŮCEK K PREVENCI ZÁVAŽNÝCH NÁSLEDKŮ PÁDŮ U STARŠÍCH OSOB

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Key words: falls in the elderly, immobilization of the elderly, biomechanics of falls, fall detection, balance control, fall prevention

Objectives
The aim of this paper is to analyse and classify knowledge about falls in the elderly during usual daily activities with focus on prevention and detection of falls by using wearable and non-wearable systems for detecting falls in the elderly.

Methods
This article is based on a literature review through professional articles and books in the world. We also focus on the specifics of the situation in the Czech Republic. To fulfil the objectives of the presentation, the issue of falls in old age was analysed and clarified using selected examples.

Results
Research sources and clinical literature show that falls in the elderly are a very serious problem for society. At the same time, it is important to be aware of their possible subsequent health, social and economic impacts. That is why it is so important to prevent them. Environmental modification, appropriate footwear and compensatory aids have been shown to reduce the risk of falling. Many fall detection devices are able to call for help in time. Last but not least, knowledge of this issue could help autumn to improve and innovate detection and prevention systems.

ABSTRACT

ANALYSIS OF THE CONTACT AREA OF THE UPPER LIMB FOR THREE TYPES OF BLOWS
ANALÝZA KONTAKTNÍ PLOCHY HORNÍ KONČETINY PRO TŘI TYPY ÚDERŮ

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Key words: combat sport, direkt, elbow strike, palm strike, injury, prevention
Klíčová slova: bojový sport, direkt, úder lokte, úder dlaní, zranění, prevence

Performance in strike combat sports is mostly evaluated through the values of the net force, acceleration, or speed to improve efficient training procedures and/or to assess the injury. There are limited data on the upper limb striking area, which can be a useful variable for contact pressure assessment. Therefore, the aim of this study was to determine the contact area of the upper limb in three different strike technique positions. A total of 38 men and 38 women (n = 76, 27.3 _ 8.5 years of age, 73.9 _ 13.8 kg of body weight, 173.3 _ 8.4 cm of body height) performed a static simulation of punch with a fist, palm strike, and elbow strike, where three segments of the right upper limb were scanned. The analysis of 684 images showed a correlation (r = 0.634) between weight and punch technique position in men and significant differences in elbow strike ($p < 0.001$) and palm strike ($p < 0.0001$) between women and men. In both groups, the palm demonstrated the largest area and the elbow the smallest one. These data may be used to evaluate strike contact pressure in future studies in forensic biomechanics and assessment of injury in combat sports and self-defense.

Výkon v bojových sportech je možné hodnotit prostřednictvím velikosti dopadové síly, kde v dalším kroku je možné zlepšovat efektivitu tréninkových postupů, ale také posuzovat zranění včetně jejich prevence. Zajímavým ukazatelem účinku v momentu dopadu je kontaktní tlak, kde k jeho zjištění je nutné znát velikost úderové plochy. Cílem studie bylo zjištění kontaktní plochy horní končetiny ve třech různých pozicích, respektive technik úderu. Celkem 38 mužů a 38 žen (n = 76, věk 27, tělesná hmotnost 73, tělesná výška 173) provedli statickou simulaci úderu zaťatou pěstí, dlaní a loktem, kde došlo ke skenování tří segmentů pravé horní končetiny na upraveném přístroji Podokam ve speciálních podmínkách. Analýza 684 snímků ukázala korelaci (r = 0,634) mezi hmotností a typem úderu u mužů a významné rozdíly v úderu loktem ($p < 0,001$) a úderu dlaní ($p < 0,0001$) mezi ženami a muži. V obou skupinách vykazovala největší plochu dlaň a nejmenší plochu loket. Tato data mohou být v budoucnu použita k hodnocení kontaktního tlaku pro studium forenzní biomechaniky.

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ASSOC. PROFESSOR JACEK KARSKI, MD, PHD

Medical University of Lublin, Poland

Professor Jacek Karski has been actively participating in the Prague-Lublin-Sydney International Symposium since 2006. Since 2017 he has been a co-organizer of the Prague-Lublin-Sydney-St. Petersburg symposium. In 2020 and 2021, he gave lectures remotely due to the Covid 2019 epidemic measures. This year he will attend the traditional international symposium in person to deliver 2 communications: *"Current options for treating avascular necrosis of hip joints in oncological children. Initial report"* and *"Partial astragalectomy in treatment of severe neurogenic clubfoot".*

Since 2013, he has been a member of the International editorial board of the journal Locomotor System – Advances in Research, Diagnosis and Therapy. In this peer-reviewed journal he has published 10 interesting communications in close collaboration with his father Professor Tomasz Karski, MD, PhD.

Curriculum Vitae
Jacek Karski was born on the 19th of March 1963 in Lublin, Poland. He graduated from Medical University of Lublin in 1988 with gained MD degree.

Since 1989, he is employed in the Paediatric Orthopaedic and Rehabilitation Department of Medical University of Lublin. In 2000, he achieved PhD degree with thesis: „Role of contracture of iliotibial band in ethiopathogenesis of the patella luxation in children and adolescent". In 2001 he was qualified as a fully trained specialist orthopedic surgeon, then in 2010 in Medical Rehabilitation too.

Dr Karski is an experienced academic teacher and has classes with Polish and English Division students of Medical University of Lublin in the field of Paediatric Orthopaedics and Rehabilitation.

Dr Karski is a member of European Paediatric Orthopaedic Society, Polish Orthopaedic and Trauma Society, Polish Paediatric Orthopaedic Society, Polish Podology Association and Polish Geothermal Association.

In his scientific work, he puts special interest in ultrasound diagnostics of paediatric hip joint, knee problems in children and adolescent, foot deformities and podology, cerebral palsy, paediatric orthopaedic oncology, scoliosis and also children traumatology.

Dr Karski is an author or co-author of 133 articles published in medical professional literature and 115 summaries published as Congress materials. He took active part in many Meetings and Congresses including SICOT/SIROT International Conference, Effort Congresses, Epos Symposiums. In his work, he closely cooperates with Czech, Slovak and Hungarian Orthopaedic Societies, which has resulted in numerous co-operative Congresses and scientific exchange (eg. Prague-Lublin-Sydney-St. Petersburg Symposia and Cervenansky Days in Bratislava). Dr. Karski has been a co-organizer of many symposia of the Polish Paediatric Orthopaedic Society, for the last 8 years he has also been a co-organizer of the Prague-Lublin-Sydney-St. Petersburg symposium. He took part in many international fellowship programs in well-known orthopaedic centres in Rummelsberg, Heidelberg, Essen, Ostseeklinik-Damp, Brakel, Erfurt, Dresden, Hong-Kong and Brussel.

Dr Karski is married; his wife Bernadetta Bialik-Karska is a Latin lector. They have two daughters, Klaudia is MD PhD in radiology and Natalia is a Marketing Communication and Social Media Coordinator in an insurance company.

The nomination of Jacek Karski, MD, PhD for the Honorary Medal of the Czech Medical Association J.E. Purkyne (CMA JEP) and Honorary membership of the Society for Connective Tissues (SCT) CMA JEP was approved by the Committee of the SCT CMA JEP at the meeting on 27 September 2022.

These awards will be presented to him by Professor Štěpán Svačina, DrSc., Chairman of the SCT CMA JEP and Professor Ivo Mařík, MD, PhD, Chairman of the SCT CMA JEP on the occasion of the 24th Prague-Lublin Symposium at the Medical House in Prague on 5 November 2022.

Dear Jacek,

Thank you for your long and fruitful cooperation. We wish you many successes in the field of science and orthopaedics, the joy of your big beautiful family and good health!

On behalf of the Committee of the Society for Connective Tissues CMA JEP

Professor Ivo Mařík, MD, PhD
Professor Josef Hyánek, MD, DrSc
Professor Miroslav Petrtýl, Eng, DrSc
Martin Braun, RNDr, PhD
&
Petr Krawczyk, MD, PhD

From the trip to the grove at the end of the Farewell Symposium of Professor Tomasz Karski. September 18–19, 2009, Kozlowka, Poland.

Systém výživy kloubů dle výzkumu prof. MUDr. Milana ADAMA, DrSc.

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