Pohybové ústrojí

Pokroky ve výzkumu, diagnostice a terapii

The 25th Prague-Lublin Symposium

Locomotor Apparatus Adaptation IV – Interdisciplinary Aspects

November 4, 2023
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.

ročník 30 / 2023 číslo 2 Suppl.

EMBASE / Excerpta Medica | Bibliographia medica Čechoslovaca

ISSN 2336-4777


ottobock.
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.
Ottobock. The human empowerment company.
Louisa ve videu:
#WeEmpowerPeople
www.ottobock.cz
EXOPULSE
Výrobek je zdravotnickým prostředkem, určeným výhradně k slaboproudé transkutánní neurostimulaci celého těla. Přečtěte si pečlivě návod k použití.

HYPOFOSFATÁZIE (HPP)

NÍZKÁ AKTIVITA ALKALICKÉ FOSFATÁZY (ALP)

společně se souvisejícími klinickými a radiologickými

MANIFESTACEMI

mohou vyvolat podezření na **HPP**[1,2]

NÍZKÁ AKTIVITA ALP +

KOSTERNÍ

- Rachitida vyvolaná HPP[1]
- Osteomalacie[2]/ osteopenie/ /osteoporóza[3]
- Zlomeniny[1,2]/ kosterní deformity[3]

DENTÁLNÍ

- Předčasná ztráta mléčných nebo trvalých zubů[3]
- Abnormální chrup[3]
- Periodontitida[4]

MUSKULÁRNÍ/ /REVMATOLOGICKÉ

- Zlomeniny metatarzů[1]/ netraumatické zlomeniny/ špatné hojení zlomenin[5]
- Sekundární osteoporóza s atypickými zlomeninami, které nereagují na bisfosfonáty[6]
- Nemoc z ukládání pyrofosforečnanu vápenatého (CPPD)[3]/ pseudodna[3]/ /chondrokalcinóza[3]

RENÁLNÍ

- Nefrokalcinóza[3]
- Progresivní renální poškození[6,7]
- Renální selhání[7]

= **HPP**

ZJISTĚTE VÍCE

https://hypophosphatasia.com/

1. Beck C et al. Rheumatol Int. 2011;31(10):1315-1320.
2. Barvencik F et al. Osteoporos Int. 2011;22(10):2667-2675.
3. Rockman-Greenberg C. Pediatr Endocrinol Rev. 2013;10(suppl 2):380-388.
4. Foster BL et al. J Dent Res. 2014;93(suppl 7):7S-19S.
5. Schalin-Jäntti C et al. J Clin Endocrinol Metab. 2010;95(12):5174-5179.
6. Whyte MP. In: Thakker RV, Whyte MP, Eisman JA, Igarashi T, eds. Genetics of Bone Biology and Skeletal Disease. London, UK: Academic Press; 2013:337-360.
7. Eade AWT et al. Ann Rheum Dis. 1981;40(2):164-170.

AstraZeneca

ALEXION
AstraZeneca Rare Disease

CZ-4881 | Datum přípravy: 08/2023

AstraZeneca Czech Republic s.r.o.
U Trezorky 921/2, 158 00 Praha 5 - Jinonice
tel.: +420 222 807 111, www.astrazeneca.cz

POHYBOVÉ ÚSTROJÍ

REDAKČNÍ RADA

REDAKČNÍ RADA

MEZINÁRODNÍ REDAKČNÍ RADA

Pohybové ústrojí. Pokroky ve výzkumu, diagnostice a terapii.

ISSN 2336-4777 (od roku 2013 pouze on-line verze)
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.
Excerpováno v Excerpta Medica a Bibliographia medica Čechoslovaca.
Návrh a grafická úprava obálky Pavel Lorenc.
Časopis je na Seznamu recenzovaných neimpaktovaných periodik vydávaných v České republice. Dvě čísla časopisu vycházejí v elektronické verzi jako ročník s průběžným vydáváním příspěvků po recenzi.
Při příležitosti sympozií je dvakrát ročně vydáváno supplementum.

Pro současné odběratele časopisu PÚ a další zájemce doporučujeme přihlásit se na http://www.pojivo.cz/en/newsletter/, zadat jméno a e-mailovou adresu, na kterou bude časopis posílán. Na webové doméně SPT ČLS JEP http://www.pojivo.cz/cz/pohybove-ustroji/ naleznete ve formátu PDF všechna jednotlivá čísla a dvojčísla časopisu (včetně Supplement) vydaná od roku 1997.
Rukopisy zasílejte na adresu *profesor MUDr. Ivo Mařík, CSc., Olšanská 7, 130 00 Praha 3, (ambul_centrum@volny.cz)* ve formátu doc. Vydavatel upozorňuje, že za obsah inzerce odpovídá výhradně inzerent. Časopis, jakožto nevýdělečný, neposkytuje honoráře za otištěné příspěvky.

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 25TH PRAGUE-LUBLIN SYMPOSIUM

Locomotor Apparatus Adaptation IV – 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 4, 2023

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

Partners of the symposium

AstraZeneca

ottobock.

Exhibitor

Swixx BioPharma
Modern Medicines for All

Sponsor

GHC
GHC GENETICS

PROGRAMME

SATURDAY, NOVEMBER 4, 2023

8.00–9.00 REGISTRATION OF PARTICIPANTS

9.00 OPENING OF THE CONFERENCE

WELCOME SPEECHES

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

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

History of the 25th Prague-Lublin Symposium
Mařík Ivo

9.30–12.30 | MORNING SESSIONS

9.30 | SESSION I: RARE BONE DISEASES

Chairmen: Mařík Ivo, Kutílek Štěpán, Zemková Daniela

INVITED LECTURE

Introduction of Prof. Dr. Ali Abdul Salam Awni Al-Kaissi, DSc
Braun Martin

Skeletal disorders and the misuse of the term idiopathic (30 min.)
Al-Kaissi Ali Abdul Salam
Clinic for the diagnosis of diverse forms of congenital bone disorders in children and adults Viena, Austria
kaissi707@gmail.com

Hypophosphatasia and its differential diagnosis (20 min.)

Kutílek Štěpán
Dept. of Paediatrics; Hospital Klatovy; Klatovy, Czech Republic
stepan.kutilek@klatovy.nemocnicepk.cz

Fibrillin 1 and 2 and their failure in human diseases (20 min.)

Zemková Daniela[1,2], Mařík Ivo[1,3], Maříková Alena[1], Krulišová Veronika[4]
[1] *Centre for Defects of Locomotor Apparatus; Prague; Czech Republic*
[2] *Department of Paediatrics, University Hospital Motol, Prague, Czech Republic*
[3] *Faculty of Health Care Studies, West Bohemia University, Pilsen, Czech Republic*
[4] *GHC Genetics, Prague, Czech Republic*
dezem@email.cz

DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

10.40–11.00 COFFEE BREAK

11.00 | SESSION II: RARE BONE DISEASES: NEUROFIBROMATOSIS TYPE 1

Chairmen: Kraus Josef, Zemková Daniela, Mařík Ivo

Neurofibromatosis type 1 – a complex multi-system genetic based disorder, molecular genetic diagnosis (20 min.)

Krulišová Veronika[1], Renáta Michalovská[1], Vlčková Zděnka[1]
[1] *GHC Genetics, Prague, Czech Republic*
krulisova@ghcgenetics.cz

A neurologist's view of Neurofibromatosis von Recklinghausen type 1 (20 min.)
Neurofibromatosis von Recklinghausem typu 1 z pohledu neurologa.

Kraus Josef
Department of Child Neurology, University Hospital Prague-Motol, Czech Republic
josef.kraus@lfmotol.cuni.cz

Neurofibromatosis type 1 – clinical, radiological and molecular diagnosis, orthopaedic treatment (20 min.)

Mařík Ivo[1,2,5], Zemková Daniela[2,3], Maříková Alena[2], Myslivec Radek[2,5], Krulišová Veronika[4]

[1] *Faculty of Health Care Studies, West Bohemia University, Pilsen, Czech Republic*
[2] *Centre for Defects of Locomotor Apparatus l.l.c., Prague, Czech Republic*
[3] *Dept. of Paediatrics, University Hospital Motol, Prague, Czech Republic*
[4] *GHC Genetics, Prague, Czech Republic*
[5] *Orthopaedic and Traumatology Dept. Hospital Pribram, Czech Republic*
ambul_centrum@volny.cz

DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

12.00–13.00 LUNCH

13.00–17.30 | AFTERNOON SESSIONS

13.00 | SESSION III: PALEOPATOLOGY.VARIA

Chairmen: Povýšil Ctibor, Zemková Daniela

Typhoid fever epidemics in the past (film documentary, 25 minutes)

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

[1] *Institute of History of Medicine and Foreign Languages of the First Faculty of Medicine, Charles University in Prague*
[2] *Municipal Library of Prague*
[3] *Municipality of the Town, Letovice*
sedlcany1@seznam.cz

Chondrosarcoma composed of target-like chondrocytes (20 min.)

Povýšil Ctibor[1], Hojný Jan[2], Kaňa Martin[2]

[1] *Institute of Pathology, First Faculty of Medicine, Charles University and General University Hospital in Prague*
[2] *Department of Otorhinolaryngology, Head and Neck Surgery, First Faculty of Medicine, Charles University and University Hospital Motol, Prague*
ctibor.povysil@lf1.cuni.cz

DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

14.00 | SESSION IV: ADAPTATION OF LOCOMOTOR APPARATUS – NEUROMUSCULAR AND SKELETAL RELATIONS

Chairmen: Piet van Loon, Karski Jacek, Mařík Ivo

INVITED LECTURE

Introduction of Prof. Tomasz Karski, MD, Ph.D.

Braun Martin

Children and Adults. Clinical symptoms of Minimal Brain Dysfunction, Syndrome of Contracture and Deformities. Spine, Hips, Knees, Feet. Therapy. Possibility of prophylaxis. In 12 Points (15 min.)

Karski Tomasz[1], Karski Jacek[2], Karska Klaudia[3]

[1] *Vincent Pol University of Lublin, Poland tmkarski@gmail.com*

[2] *Medical University of Lublin, Poland jkarski@vp.pl*

[3] *Medical University of Lublin, Poland clovdia@o2.pl*

So-Called Idiopathic Scoliosis. Historical Dates of Discoveries. Fate and Fortune of New Knowledge. Biomechanical etiology, new classification, therapy and causal prophylaxis (10 min.)

Karski Tomasz

Professor Lecturer, Vincent Pol University in Lublin, Poland

tmkarski@gmail.com

So-Called Idiopathic Scoliosis. Historical Dates of Discoveries. Fate and Fortune of New Knowledge. Opinions of specialist from many countries (5 min.)

Karski Tomasz

University in Lublin, Poland

tmkarski@gmail.com

Fresh evidence with MRI of the effectiveness of correction of scoliosis by Thoracolumbar Lordotic Intervention (TLI). Extension of the scoliotic spine restores disc morphology first (20 min.)

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

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

[2] *Analyst, Chairman Posture Network Netherlands,*

[3] *Em. prof. neurosurgery Radboud University Nijmegen;*

[4] *Professor Tissue Engineering; Mechanobiology of development and disease; Amsterdam UMC.*

pvanloon@planet.nl

Dutch Healthcare crisis in the light of discongruent Osteoneural Growth Relations. How loss of prevention-knowledge in childhood and political choices produced a socio-economic burden (20 min.)

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

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

[2] *Analyst, Chairman Posture Network Netherlands,*

[3] *Em. prof. neurosurgery Radboud University Nijmegen;*

[4] *Professor Tissue Engineering; Mechanobiology of development and disease; Amsterdam UMC.*

pvanloon@planet.nl

DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

15.10–15.30 COFFEE BREAK

15.30 | SESSION V: TRAUMATOLOGY, ORTHOPAEDICS, ORTHOPAEDIC PROSTHETICS

Chairmen: Karski Tomasz, Krawczyk Petr, Mařík Ivo

INVITED LECTURE

Introduction of Prof. Hans Zwipp, MD, DSc.

Braun Martin

History of Calcaneus Fractures (30 min.)

Hans Zwipp

Professor emmeritus of Universitäts Centrum für Orthopädie und Unfallchirurgie, Dresden, Germany

hans.zwipp@t-online.de

Treatment of calcaneal fractures with calcaneal nail (C-nail) (20 min.)

Pompach Martin[1], Carda Martin[1], Amlang Michael[2], Zwipp Hans[2]

[1] *Department of Traumatology, Pardubice, Czech Republic*

[2] *Universitäts Centrum für Orthopädie und Unfallchirurgie, Dresden, Germany*

martin.pompach@nempk.cz

New mini-invasive surgical techniques for the forefoot. (20 min.)

Holinka Martin

Orthopedic Department, Hospital Karvina – Raj, Ostrava, Czech Republic

MHolinka@seznam.cz

Active patient in orthotics

Kroupa Jan
Otto Bock CR
kroupa@ottobock.cz

Effect of early initiation of orthotic treatment in plagiocephaly (online presentation, 15 minutes)

Drastichová Klára[1], Ohnůtková Petra[2], Dilý Matej[3]
[1] *Univerzita Palackého Olomouc*
[2] *Plagio klinika Ostrava*
[3] *Invent Medical Group, s.r.o.*
jiri@inventmedical.com

DISCUSSION AFTER EACH LECTURE (time in brackets includes discussion)

17.30 CLOSING OF THE SYMPOSIUM AND PLANNING THE 26TH PRAGUE-LUBLIN SYMPOSIUM

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

18.00 DINNER

ORGANIZERS OF THE SYMPOSIUM

Professor Ivo Mařík, MD, PhD & Petr Krawczyk, MD & Martin Braun, RNDr., PhD
E-mails: ambul_centrum@volny.cz & krawczyk@proteorcz.cz & braun@irsm.cas.cz
Faculty of Health Care Studies, West Bohemia University, Pilsen &
Centre for Defects of Locomotor Apparatus l.l.c., Prague, Czech Republic, ambul_centrum@volny.cz
&
PROTEOR CZ l.l.c., Ostrava, Czech Republic, krawczyk@proteorcz.cz
&
Department of Composites and Carbon Materials, Institute of Rock Structure and Mechanics.
The Czech Academy of Sciences, Prague, Czech Republic, braun@irsm.cas.cz

Participants will receive the Programme and Certificate of Attendance
Abstracts of lectures will be published in Supplement 2 of the journal Locomotor System, vol. 30, 2023 (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 25th Prague–Lublin Symposium – Locomotor Apparatus Adaptation IV – Interdisciplinary Aspects

Dear Participants of the 25th Prague-Lublin Symposium, in Prague on 4th November 2023

Dear Professors, Dear Doctors, Dear Colleagues, Dear Friends – participants of the Symposium – it is a big pleasure for Polish Group to attend the 25th Prague–Lublin Symposium.

This time – I want to say again - every scientific progress in the area of medicine, orthopaedics, rehabilitation, physiotherapy, anthropology is only possible when exist the cooperation and "exchange of medical observations".

We are lucky – that such friendly cooperation with Prof. Ivo Mařík and his Team is possible just for 25 years. See – please – ours Meeting had various names and were not only in Czech Republic but also in Greece, in Poland, in Russia – and I hope, that the Czech–Polish medical cooperation will be also continued in next years.

Only such Meetings like this Symposium and – publications in the *Locomotors System Journal* of "the new knowledge in medicine" make progress in therapy and in prophylaxis. It is so important and awaiting – by suffering people – our patients – not only in our countries, but also in the whole Europe and all over the World.

I wish all Participants of Symposium – good and nice time in Prague.

Prof. Tomasz Karski MD, PhD

Vincent Pol University, Lublin, Poland.
Honouree Member of Czech Purkyne Medical Association /
Societas Medica Bohemica J. E. Purkyně
E-mail: tmkarski@gmail.com
www.ortopedia.karski.lublin.pl

Welcome Speech to

The 25th Prague–Lublin Symposium – Locomotor Apparatus Adaptation IV – Interdisciplinary Aspects

Prague, November 4, 2023

Ladies and Gentlemen, dear colleagues,

I cordially welcome you all to the 25th 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. It is a great honour for me to welcome these two important personalities of Czech medicine among us.

I am pleased to welcome a new international guest Profesor Dr. Ali Abdul Salam Awni Al-Kaissi, DSc, (Clinic for the Diagnosis of Various Forms of Congenital Bone Disorders in Children and Adults, Vienna, Austria) and other international guests Professor Hans Zwipp, MD, DSc, (Dresden, Germany), Dr. med. Piet Van Loon (Orthopaedic Surgeon, Proktovar, Hengelo, The Netherlands) and our co-organizers of this international symposium, orthopaedic surgeons Professor Tomasz Karski, MD, PhD (Vincent Pol University of Lublin, Poland) and Assist. Professor Jacek Karski, MD, PhD (Medical University of Lublin, Poland). Prof. Tomasz Karski follows online.

I also warmly welcome Professor Ctibor Povýšil, DrSc., Professor Václav Smrčka, PhD and all other colleagues, specialists from different medical disciplines, experts in biomechanics, orthopaedic anthropology, orthotics and prosthetics, physiotherapy and other participants interested in neuromusculoskeletal disorders from different perspectives.

More and more participants are taking advantage of the online form of participation.

My sincere thanks to my close colleagues, the coordinators of the symposium Petr Krawczyk, MD, PhD. (Vice-Chair of the Society for Connective Tissue Czech Medical Association J.E. Purkynje (SCT CMA JEP) and president of the Orthotic and Prosthetic Society CMA JEP) and RNDr. Martin Braun, PhD. (Scientific Secretary of SCT CMA JEP), and last but not least to the experienced team of the Medical House in Prague, especially Mr. Michal Stavinoha and Mr. Ing Josef 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 AstraZeneca and Swixx Biofarma.

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.

Finally, I would like to express my sincere thanks to Associate Professor Michael Bellemore from the New Children's Hospital in Sydney for his many years of collaboration in the field of paediatric orthopaedics. Last but not least, I would like to express my sincere thanks to Professor Mikhail Dudin (Director Emeritus of the Ogonyok Centre) and his colleagues for their active support of this traditional event in 2013–2019, when they co-organized and actively participated in the Prague-Lublin-Sydney-Petrograd symposium with original contributions especially in the field of spinal deformities (adolescent idiopathic scoliosis).

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

From right: Professor Ivo Marik, MD, PhD, professor Jana Pařízková, MD, DSc, Alena Marikova MD, Professor Michail Dudin, MD, DSc and his wife Tatjana Dudinova, MD.

10.10.2023 Mikhail Dudin wrote me:

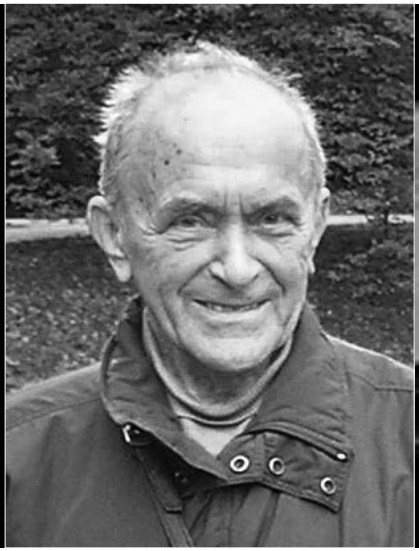
We hope that for you we remain normal Russian people with a healthy psyche. People who are categorically against the war that has made my country an outcast. Therefore, I can only afford to participate in absentia in my beloved and highly respected Symposium 2023. Best wishes to you, your family and, of course, the Symposium!

Mikchail and Tatyana

It is my sad duty to mention that the honorary member of the Society for Connective Tissues, CMA, J.E. Purkynje Assoc. Professor Dr. Med. Kazimierz S. Kozlowski (world-renowned expert in the diagnosis of bone dysplasias and bone tumors in children) died in December 2022 (6. 6.1928–11.12.22).

Honour to his memory!

See REMEMBERING ASSOC. PROFESSOR KAZIMIERZ KOZLOWSKI, MD, M.R.A.C.R. Locomotor system, vol. 29, 2022, No 2/Pohybové ústrojí, ročník 29, 2022, č. 2, p. 278–283.



Let me present a few commemorative photos from the 24th Prague-Lublin Symposium.

Professor Ivo Mařik, MD, PhD – openning of the 24th Prague–Lublin symposium

Discussion on the 24th Prague–Lublin symposium

Presentation of the award to Assistant Prof. Jacek Karski, MD, PhD (on right). From left: Professor Ivo Mařík MD, PhD, Martin Braun, RNDr., PhD and Professor Štěpán Svačina, MD, DSc.

Participants of the 24th Prague–Lublin symposium at the Medical House in Prague.

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

Prof. Ali Abdul Salam Awni Al-Kaissi, MD, MSc, DSc

Clinic for the diagnosis of diverse forms of congenital bone disorders in children and adults, Viena, Austria
e-mail: kaissi707@gmail.com
https://www.researchgate.net/profile/Ali-Al-Kaissi
https://m.facebook.com/people/Ali-Al-Kaissi/100078996342924/

Prof. Ali Al-Kaissi was born in Baghdad, Iraq. He graduated in Egypt from Cairo University in 1978 where he obtained degree in Medicine and Surgery and then continued at the School of Medicine, University of Warwick in the United Kingdom (1987–1989) where he specialized on Paediatrics and later was clinically attached to Coventry-Warwickshire Hospital and Walsgrave Hospital (1987–1990). Then he established the first center for early diagnosis of handicapping conditions in Tunisia (in 1991–2003) and with Prof. Franz Grill established also the first specialized clinic for the diagnosis of diverse forms of congenital bone disorders in children and adults (2004–2021).

Prof. Ali Al-Kaissi is specialized mainly in growth and bone disorders in children (obtained certificate, diploma and Master´s Degrees in this field) and is also an expert in congenital bone deformities, spine malformation, bone radiology and CT scans.

In the course of his professional career he has developed research partnerships with a number of clinical institutions e.g. H. Turner National Medical Research Center for Children's Orthopedics and Trauma Surgery in Saint Petersburg (Russia), National Ilizarov Medical Research Centre for Traumatology and Ortopaedics in Kurgan (Russia), Pediatric Kidney Clinic in Makhachkala (Russia), Department of Radiology of Sydney Children's Hospital (Australia) and currently he works in Vienna (Austria) like in Orthopädisches Spital Speising, Department of Pediatric Orthopaedics and Foot Surgery or in Ludwig Boltzmann Institute for Osteology, First Medical Department of Hanusch Hospital in Vienna.

He published more than 180 research papers in international journals and achieved medical breakthrough in five diseases, one of which was even named after him as "Al Kaissi syndrome" (ALKAS) which is an autosomal recessive developmental disorder characterized by growth retardation, spine malformation, particularly of the cervical spine, dysmorphic facial features, and delayed psychomotor development with moderate to severe intellectual disability.

The Austrian Ministry of Scientific Research granted him the title of scientist and the Austrian Ministry of Health awarded him the title of expert on bone deformities in children. The Turner Orthopedic Research and Surgery Institute in St. Petersburg, Russia awarded him the degree of DSc, an honorary doctorate in bone deformities, and he was awarded also the Russian Gold Medal for Scientists and the Russian Gold Medal. Moreover, Prof. Ali Al-Kaissi was nominated as a honorary Professor at Ilizarov Medical Centre in Kurgan, Russia in 2021 too.

Prof. Dr. Med. Hans Zwipp

Orthopedic and Traumatology Department of the University in Dresden, Germany
e-mail: hans.zwipp@t-online.de
https://www.researchgate.net/profile/Hans-Zwipp

Professor Hans Zwipp was born on 1st March 1949 in Neustadt (near Coburg), Germany. In 1969–1975 he studied veterinary medicine, theology and human medicine in Vienna, Berlin, Bochum and Essen and in 1975 he graduated at the Medical Faculty in Essen.

He started his professional career in 1975–1977 as a medical assistant in St. Vincenz hospital/ Bethesda hospital in Essen (Germany), in 1978–1993 he had surgery practice at Teaching hospital in Hannover (MHH) in Lower Saxony. Later he became a specialist in surgery, orthopaedics and traumatology, specialist in sport medicine and urgent medicine, in 1992–1993 he was the head of Trauma and Surgery Clinic in Hannover and since 1994 he works as a professor of surgery and reconstruction surgery at the Department of Trauma and Reconstruction Surgery of University Hospital „Carl Gustav Carus" in Dresden (Germany) – since 2007 he has been the head of Surgery Clinic there.

He has devoted his professional life to surgery, orthopaedics and traumatology and currently he is the Chairman Emeritus of the Dresden Surgical Clinic and recognized as an internationally renowned traumatologist, scientist, teacher, writer and an excellent physician respected by his patients and colleagues.

Professor Zwipp published more than 400 scientific papers, presented more than 400 lectures, participated in numerous research projects and led many student´s dissertations as well.

He has been an active member of many scientific societies and their committees such as the founding member and the president of ESFAS (European Foot and Ankle Society, Dresden), president of Surgery Association in Saxony, German Association for Trauma Surgery, Working Association for Foot of DGU and others.

During his lifetime he received numerous honors and awards for his outstanding work. Here are listed some of them: Hermann – Kümmel´s Price from NWD – Surgeons (1987); Hans – Liniger´s Price of German Association for Trauma Surgery (1988); Honorary membership of AO Alumni Association, Chile (2003); Commemorative Medal of 3rd Medical Faculty, Charles University, Prague (2006); Honorary membership of Czech Society for Trauma Surgery (2011); Honorary membership of the Society for Connective Tissues, Czech Medical Association J. E. Purkynje (2017); Honorary Medal of the Czech Medical Association J. E. Purkynje (2021).

Piet van Loon, MD

Orthopaedic surgeon fighting for "care to move" in Deventer and Hengelo, the Netherlands
e-mail: pvanloon@planet.nl
https://www.researchgate.net/profile/Piet-Van-Loon

Professor Ivo Mařík and Dr. Piet van Loon. The 21st Prague-Lublin-Sydney-St. Petersburg Symposium, 3rd–5th September 2019, Humpolec

Dr. Piet van Loon was born on May 17, 1954 in Haarlem, the Netherlands. He graduated from the Medical Faculty of Free University of Amsterdam and decided practice and focus on orthopaedics. During his professional career, he gained experience in a number of clinical workplaces within the Netherlands.

After attestation, he worked as a consultant in the field of orthopaedics and vertebral surgery at the university and in many hospitals. His concepts are often inspired and based on the ideas of osteovertebral and osteoneural growth relationships studied by the Czech expert Prof. Milan Roth. He is also a founder and board member of Houding Netwerk Nederland since 2016 and Orthopedic Consultant "Care to Move" Orthopedic Clinic Deventer and Hengelo in the Netherlands.

Dr. Piet van Loon has studied and described crucial relationships in sitting such as decline in healthy posture, numerous spinal deformities, scoliosis, pathoanatomy and pathophysiology of spinal pain, stenosis, herniated discs, etc. He provides also numerous tips on healthy lifestyle for people of all ages, and suggests solutions for active sitting and exercises to correct patients' posture. Dr. Piet van Loon is even the inventor and patent holder of Brace for Spinal Deformities called TLI brace EPO as well as Sit Active device, as well as the Sit Active posture optimization device called „Zami". He specializes in function and biomechanics, based approaches on etiology-based interventions in musculoskeletal conditions, posture related and refining technique of TLI (thoracolumbar lordotic intervention) brace techniques for load-dependent postural malalignment problems like scoliosis and others following early thoracolumbar kyphosis.

In addition to his clinical practice, he also devotes time to publishing and lecturing. He is an author of about 50 scientific papers in international medical journals and numerous presentations at clinical conferences. Since 2018 he has been actively participating also at The Prague-Lublin-Sydney-St. Petersburg Symposium and Kubát´s days.

Among other things, Piet is currently also a member of the Editorial board of the journal Locomotor System – Advances in Research, Diagnostics and Therapy and peer reviewer of the journal "Scoliosis". He holds a position in the management of a number of scientific societies with the interest in studying the spine and spinal deformities e.g. Scoliosevereniging (Dutch Scoliosis Association), European Spine Society, International Fellow Scoliosis Research Society, Society on Scoliosis Orthopedic and Rehabilitation Treatment SOSORT, various Dutch medical societies (KNMG/ FMS, DSS, NOV, NVOT) and for his lifelong efforts to advance the insight into the etiopathogenesis of skeletal deformities and for promoting the results of the work of Czech prof. Milan Roth the Society for Connective Tissues of the Czech Medical Association, J.E. Purkynje awarded dr. Piet van Loon an honorary membership In 2021, during the 23rd Prague-Lublin Symposium, Dr. Piet van Loon was awarded the Honorary Medal of the Czech Medical Society J. E. Purkyně.

Professor Tomasz Karski, MD, PhD

Vincent Pol University of Lublin, Poland
e-mail: tmkarski@gmail.com

The professor's professional biography was presented in Suplementum 2, PÚ 26, 2019 on pages 173–177. Laudatio of Professor Tomasz Karski will be published in Locomotor System/Pohybové ústrojí, 30, 2023, No 2.

Presentation of the award to Professor Tomasz Karski, MD, PhD (in the middle).
On the left: professor Štěpán Svačina, MD, DSc., on the right: professor Ivo Mařík MD, PhD.

DIPLOMA

SOCIETAS MEDICORUM BOHEMORUM J.E.PURKYNĚ

HONORI SIBI DUCIT

DOMINUM

Prof. Tomasz Karski, MD, PhD

SINGULARIA EIUS MERITA IN ARTEM MEDICAM

NEC NON IN HUMANITATEM PROVEHENDAM

MAGNI AESTIMANS

SODALIUM HONORIS CAUSA CREATORUM

NUMERO ADSCRIBERE

J·E·P

AB EPISTULIS

PRAESES

MMXIX

ANNO DOMINI

HISTORY OF THE 25TH PRAGUE-LUBLIN SYMPOSIUM

Mařík I.

It will be published in Locomotor System/Pohybové ústrojí, 30, 2023, No 2.

ABSTRACT OF INVITED LECTURE

SKELETAL DISORDERS AND THE MISUSE OF THE TERM IDIOPATHIC

Prof. Dr. Ali Abdul Salam Awni Al-Kaissi, DSc
Clinic for the diagnosis of diverse forms of congenital bone disorders in children and adults, Viena, Austria
e-mail: kaissi707@gmail.com

Key words: Skeletal idiopathic and/or congenital deformities, diagnosis, etiology, treatment

Much of my work is centered on one simple rule that every skeletal deformity /abnormality must have an underlying causality that needs to be explored and addressed. This stems from the conviction that the vast majority of the skeletal deformities - if not all- do not occur randomly.

Interestingly, where many physicians fall into the pitfall of deeming a countless number of diseases idiopathic, as no clear connection has been established between the onset of the deformity and other inexplicit abnormal features that the patient or their immediate families or relatives carry, my work focuses on uncovering and emphasizing these connections, and reiterating the fundamental rule that etiological understanding is paramount to successful management and treatment

From within my clinical experience I would like to present several families who received the erroneous diagnosis of being idiopathic.

ABSTRACT

HYPOPHOSPHATASIA AND ITS DIFFERENTIAL DIAGNOSIS

Kutílek Štěpán
Department of Pediatrics, Klatovy Hospital, Klatovy, Czech Republic
stepan.kutilek@klatovy.nemocnicepk.cz

Key words: hypophosphatasia, differential diagnosis

Hypophosphatasia (HPP) is a rare, inherited, metabolic disease characterized by disorders of calcium and phosphate metabolism, bone deformities, loss of teeth, recurrent fractures, growth retardation.

HPP is caused by mutations of gene encoding tissue-non-specific alkaline phosphatase (TNSALP). Over 400 TNSALP mutations have been documented so far. The mutation results in TNSALP deficiency and leads to defective skeletal mineralization. There are six subtypes of HPP: Perinatal lethal HPP and Infantile HPP, both of which are lethal; Benign prenatal HPP, Childhood-onset HPP, Adult HPP and OdontoHPP with a better prognosis. Clinical manifestations of HPP are very diverse, ranging from severe skeletal deformities to asymptomatic course. It is essential to establish a proper diagnosis and distinguish from other skeletal disorders (rickets, osteogenesis imperfecta, osteopathy of prematurity, cleidocranial dysplasia, thanatoforic dysplasia, achondrogenesis/hypochondrogenesis, campomelic dysplasia, osteoporosis).

EXTENDED ABSTRACT

FIBRILLIN 1 AND 2 AND THEIR FAILURE IN HUMAN DISEASES

Zemková Daniela[1,4], Mařík Ivo[1,2], Krulišová Veronika[3], Maříková Alena[1]

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

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

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

[4] *Dept. of Paediatrics; University Hospital Motol; Prague, Czech Republic*

dezem@email.cz

Key words: fibrillin 1, fibrillin 2, TGF-β signalling, extracellular matrix, Marfan syndrome, congenital contractual arachnodactyly

Fibrillin is one of the most important components of the ECM of elastic and non-elastic tissues in the blood vessels, lung, skin, ligaments, bone, perichondrium, renal glomerulus, cornea etc. Structural and functional failure of fibrillin is a cause of several human diseases. The most common and well-known is Marfan syndrome which is caused by a mutation in the fibrillin 1 gene (*FBN1*). It is characterized by tall stature, slender, asthenic appearance and skeletal features such as arachnodactyly, dolichostenomelia, pectus deformities, and kyphoscoliosis, eye problems (ectopia lentis) and particularly changes in their heart and blood vessels (aortic aneurysm, aortic dissection, heart failure). Recently, we presented a similar phenotype in a case of Congenital contractural arachnodactyly (CCA, i.e. Beals-Hecht syndrome) caused by mutations in Fibrilin 2 gene (*FBN2*). Although the patient was diagnosed at birth similar to the severe neonatal form of Marfan syndrome (MFS), the changes did not progress further, and cardiovascular involvement was not detected.

Fibrillins are large (350 kDa), cysteine-rich glycoproteins that assemble into beaded structures in the extracellular matrix (ECM) of connective tissues (**5**).

Fibrillin microfibrils provide mechanical and functional support to human cells, tissues, and organs. In elastic tissues (lungs, blood vessels, skin, and ligaments) microfibrils serve as a scaffold for elastin deposition and modification during elastic fiber formation. In nonelastic tissues (ciliary zonule

and cornea, tendon, perichondrium, and renal glomerulus) microfibrils provide tensile strength (**5**). Mutations affecting the structure, assembly and stability of FBN microfibrils have been associated with impaired biomechanical tissue properties (**6)**.

In addition to the structural role, equally important is the role of microfibrils in the control of cell signaling pathways through storage and activation of growth factors, including TGF-β, bone morphogenic proteins (BMPs), and growth differentiating factors (GDFs). Interacting with other components of ECM, fibrillin networks regulates bioavailability of growth factors, ECM formation, cell behaviour and the immune response, and thus play a crucial role in development and homeostasis of tissues, including bone (**1, 5, 7, 3, 2, 6**)**.** Altered TGF-β signaling is a major contributor to the pathology of fibrillinopaties (**4**). Loeys-Dietz syndrome caused by mutations in the *TGFBR1*, *TGFBR2*, SMAD2, *SMAD3*, *TGFB2*, *TGFB3* genes also exhibits a Marfan-like phenotype (**2**).

The fibrillin proteins are encoded by three genes, that is, *FBN1* (chromosome 15q15-21.3), *FBN2* (chromosome 5q23-31), and *FBN3* (chromosome 19p13.3-13.2) and have a highly conserved domain architecture. (**5**) Fibrillin 3 is the least important. It is absent in some mammals and is not known to be associated with any disease in humans. Fibrillin-1 and 2 are expressed in the developing and mature tissues in a spatial and temporal-specific manner. Already at the time of the discovery of fibrillin 2 gene, Zhang pointed to preferential accumulation of the gene product in elastic fiber-rich matrices (**7**). Research in recent years has shown that FBN2 makes up the inner core of microfibrils which are surrounded by abundant fibrillin-1. Fibrillin 2 plays an important role in embryonic development, while fibrillin-1 provides the major structural force bearing support in many tissues and organs. Postnatally, fibrillin 2 synthesis is reduced and fibrillin1 expression dominates (**3, 4**). Differental transcription of the fibrillin genes largely explains the differences in the clinical course of MFS and CCA. CCA manifests itself at birth, but during childhood the signs of the disease (with the exception of scoliosis) usually do not progress. Contractures tend to improve with time, and in our patient, we have demonstrated a reduction in disproportion.

MFS-causing variants are spread across the *FBN1* gene, and the most severe „neonatal" forms are most often caused by variants between exons 25–33 encoding TB3-cbEGF18). Most CCA-causing variants cluster between exon 23 and exon 34 (cbEGF10–cbEGF20) of *FBN2* which roughly corresponds to the "neonatal" region of *FBN1*. However, pathological variants resulting in haploinsufficiency of the gene or splice-site alterations and abnormal mRNA have been described, as in our patient (**5**).

Disturbed TGF-β signalling can also have the opposite phenotypic effect – short stature, brachydactyly, heart valve thickening. In case of fibrillin 1, this is geleophysic dysplasia, acromicric dysplasia, Weill-Marchesani syndrome and Stiff skin syndrome. Acromelic dysplasia is also known for fibrillin 2. Nearly all these "acromelic" variants cluster within the TB4-TB5 region (transforming growth factor beta binding-like domains). To date, the pathophysiological mechanisms underlying these contrasting clinical syndromes remain largely unknown (**5**).

It cannot be excluded that other variants of the fibrillin 2 gene with different phenotypes will be found. While loss of fibrillin1 is lethal at birth, fibrillin2 null mice have syndactyly and osteopenia (**2,4**).

Case reports documenting the variability of the clinical course in fibrillinopathies together with basic research findings extends the clinical experience and molecular genetic knowledge and may prospectively lead to the search for a causal treatment for these diseases.

References

1. CHAUDHRY SS, CAIN SA, MORGAN A, DALLAS SL, SHUTTLEWORTH CA, KIELTY CM. Fibrillin-1 regulates the bioavailability of TGFbeta1. J Cell Biol. 2007 Jan 29;176(3):355-67. doi: 10.1083/jcb.200608167. Epub 2007 Jan 22. PMID: 17242066; PMCID: PMC2063961.
2. LOEYS BL. Transforming Growth Factor Beta and Bone: Lessons Learned from TGFbeta-Related Conditions. Chapter 22 in: Jay R. Shapiro, Peter H. Byers, Francis H. Glorieux, Paul D. Sponseller (eds). Osteogenesis Imperfecta. Academic Press, 2014, Pages 211-216, ISBN 9780123971654, https://doi.org/10.1016/B978-0-12-397165-4.00022-8.
3. MEAD TJ, MARTIN DR, WANG LW, CAIN SA, GULEC C, CAHILL E, MAUCH J, REINHARDT D, LO C, BALDOCK C, APTE SS. Proteolysis of f Eibrillin-2 microfibrils is essential for normal skeletal development eLife (2022) 11:e71142. https://doi.org/10.7554/eLife.71142
4. NISTALA H, LEE-ARTEAGA S, SMALDONE S, SICILIANO G, CARTA L, ONO RN, SENGLE G, ARTEAGA-SOLIS E, LEVASSEUR R, DUCY P, SAKAI LY, KARSENTY G, RAMIREZ F. Fibrillin-1 and -2 differentially modulate endogenous TGF-β and BMP bioavailability during bone formation. J Cell Biol. 2010 Sep 20;190(6):1107-21. doi: 10.1083/jcb.201003089. PMID: 20855508; PMCID: PMC3101602.
5. PEETERS S, DE KINDEREN P, MEESTER JAN, VERSTRAETEN A, LOEYS BL. The fibrillinopathies: New insights with focus on the paradigm of opposing phenotypes for both FBN1 and FBN2. Hum Mutat. 2022 Jul;43(7):815-831. doi: 10.1002/humu.24383. Epub 2022 Apr 28. PMID: 35419902; PMCID: PMC9322447.
6. SCHRENK S, CENZI C, BERTALOT T, CONCONI MT AND DI LIDDO R: Structural and functional failure of fibrillin1 in human diseases (Review). Int J Mol Med 41: 1213-1223, 2018 https://doi.org/10.3892/ijmm.2017.3343
7. ZHANG H, APFELROTH SD, HU W, DAVIS EC, SANGUINETI C, BONADIO J, MECHAM RP, RAMIREZ F. Structure and expression of fibrillin-2, a novel microfibrillar component preferentially located in elastic matrices. J Cell Biol. 1994 Mar;124(5):855-63. doi: 10.1083/jcb.124.5.855. PMID: 8120105; PMCID: PMC2119952.

EXTENDED ABSTRACT

NEUROFIBROMATOSIS TYPE 1 – A COMPLEX MULTI-SYSTEM GENETIC BASED DISORDER, MOLECULAR GENETIC DIAGNOSIS

Krulišová Veronika[1], Michalovská Renáta[1], Vlčková Zděnka[1]

[1] GHC Genetics, Prague, Czech Republic

krulisova@ghcgenetics.cz

Key words: Neurofibromatosis type 1, *NF1* gene, pathogenic variant, Sanger sequencing, next-generation sequencing

Neurofibromatosis type 1 (NF1, also Neurofibromatosis von Recklinghausen) is a multi-system disorder characterized by involvement of the skin, central and peripheral nervous system, changes in the iris of the eye, bone changes and an increased risk of developing malignant tumors. Formal diagnostic criteria have been established.

Symptoms manifest from childhood to adulthood and have a progressive character. Clinical symptoms are very variable, even within the same family. According to literature, the frequency of the disease in the population is approximately 1:2,500–4,000. NF1 is inherited in an autosomal dominant manner.

The cause of the development of NF1 is the presence of germline pathogenic variants (rarely deletions) in the tumor suppressor gene *NF1*, which is located on the long arm of the 17th chromosome. The product is the cytoplasmic protein neurofibromin, which is expressed in cells of the central and peripheral nervous system, leukocytes and, in low concentrations, also, for example, in fibroblasts and osteoblasts. Mutations in the *NF1* gene lead to an abnormal protein that causes impaired cell growth and proliferation in target tissues. Approximately 40–50 % of *NF1* gene causal variants arise *de-novo*.

It is believed that the NF1 diagnosis should include molecular testing since it leads to early recognition of NF1 in children and allows for appropriate surveillance. While traditional molecular analysis methods (i.e. Sanger sequencing and multiplex ligation-dependent probe amplification; MLPA) were able to identify around 95% of *NF1* gene alterations (**1**), a next-generation sequencing (NGS) of *NF1* was recently introduced with a sensitivity up to 98.5% (**2**). Furthermore, multigene panel testing using NGS technologies is able to differentiate NF1 from other syndromes such as Legius syndrome, Noonan syndrome, McCune-Albright syndrome etc., i.e. syndromes that should be considered in the differential diagnosis.

If the causal *NF1* variant has been identified in the patient, targeted testing of the variant in family members is possible. Prenatal and pre-implantation genetic testing can be offered to individuals who have tested positive.

The presentation will include specific cases from clinical practice.

Refrences

1. MESSIAEN LM, CALLENS T, MORTIER G, BEYSEN D, VANDENBROUCKE I, VAN ROY N, SPELEMAN F, PAEPE AD. Exhaustive mutation analysis of the NF1 gene allows identification of 95% of mutations and reveals a high frequency of unusual splicing defects. Hum Mutat. 2000;15(6):541–555. doi: 10.1002/1098-1004(200006)15:6<541::AID-HUMU6>3.0.CO;2-N
2. PASMANT E, PARFAIT B, LUSCAN A, GOUSSARD P, BRIAND-SULEAU A, LAURENDEAU I, FOUVEAUT C, LEROY C, MONTADERT A, WOLKENSTEIN P, et al. Neurofibromatosis type 1 molecular diagnosis: what can NGS do for you when you have a large gene with loss of function mutations? Eur J Hum Genet. 2015;23(5):596–601. doi: 10.1038/ejhg.2014.145.

EXTENDED ABSTRACT

A NEUROLOGIST'S VIEW OF NEUROFIBROMATOSIS VON RECKLINGHAUSEN TYPE 1
NEUROFIBROMATOSIS VON RECKLINGHAUSEM TYPU 1 Z POHLEDU NEUROLOGA.

Kraus Josef
Department of Child Neurology, University Hospital Prague-Motol, Czech Republic
josef.kraus@lfmotol.cuni.cz

Keywords: neurofibromatosis, neurofibroma, café-au-lait spots, RASopathy

Neurofibromatosis 1 (NF1) is an autosomal dominant genetic disorder that presents with variable phenotypes as a result of mutations in the neurofibromatosis type 1 (NF1) gene and subsequently, abnormal function of the protein product, neurofibromin.

Patients with NF1 are at increased risk for central nervous system (CNS) manifestations including structural, functional, and neoplastic disease. The mechanisms underlying the varied manifestations of NF1 are incompletely understood, but the loss of functional neurofibromin, resulting in sustained activation of the oncoprotein RAS, is responsible for tumorigenesis throughout the body, including the CNS.

The major defining features of NF1 are café-au-lait spots, peripheral neurofibromas, and Lisch nodules. A variety of non-neoplastic structural (macrocephaly, hydrocephalus, aqueductal stenosis, and vasculopathy) and functional (epilepsy, impaired cognition, attention deficits, and autism spectrum disorder) abnormalities, occur with variable frequency in individuals with NF1. All structures of the eye except the lens can be involved. Sphenoid wing dysplasia is one of the characteristics of NF1 affecting 5%–10% of the cases.

Gliomas in people with NF1 show alterations in the RAS/MAPK pathway, generally in the absence of BRAF alterations (common to sporadic pilocytic astrocytomas) or IDH or histone H3 mutations (common to diffuse gliomas subsets). The most common NF1 brain gliomas are optic pathway gliomas (OPG), usually with a presented incidence of 15–20%. Gliomas outside the optic pathway (GOOPs) in NF1 children are less common. A hallmark of NF1 is the presence of plexiform neurofibromas (pNFs). They are present in 50% of individuals with NF1. pNFs are tumors that arise in the peripheral nerve and involve multiple nerve fascicles. They typically grow along a nerve and its branches and there are frequently collisions of multiple nerve tumors into large masses in plexi such as the brachial or lumbosacral plexi. The RASopathy neurofibromatosis 1 represents a major risk for the development of malignancies, particularly malignant peripheral nerve sheath tumors (MPNSTs). MPNSTs represent the only primary cancer of the peripheral nervous system. To date, surgery is the only treatment modality proven to have survival benefit for MPNSTs and even when maximal surgery is feasible.

A variety of non-neoplastic CNS manifestations are encountered in patients with NF1 through imaging studies, including macrocephaly (50%), hyperintense T1/T2 lesions (FASI, UBO), ventricular dilatation, and cerebellar hypoplasia.

Neurocognitive deficits are common in people with NF1 and autism spectrum disorder has also been increasingly recognized in children. Children with NF1 suffer from deficits in reading, spelling, mathematics, attention, executive functioning, receptive and expressive language, and motor skills.

Epilepsy is another recognized neurologic complication in patients with NF1, with a prevalence estimated at 4–13%. Observational studies suggest that epileptic seizures in individuals with NF1 are often associated with intracranial tumors or structural abnormalities, including hippocampal sclerosis and polymicrogyria.

NF1 has been associated with CNS vasculopathy in both adult and pediatric populations. Multiple imaging studies have found a variety of vascular malformations including vessel ectasia, moya-moya, aneurysm, hypoplasia, and vessel narrowing, including severe stenosis. An important potential complication of vascular malformations associated with NF1 is stroke. Individuals with NF1 frequently suffer from hypertension, risk factor for stroke. Causes of hypertension in these patients include renal artery stenosis, and on occasion an underlying pheochromocytoma.

Obstructive hydrocephalus is mostly caused by an expansive lesion compressing the liquor pathway - especially a chiasmatic, hypothalamic, or brainstem tumour. The incidence in NF1 patients is 1–5%. Idiopathic aqueduct stenosis of the distal part of the aqueduct is a rare condition connected with NF1 and also another possible cause of obstructive hydrocephalus in NF1.

Ongoing efforts are seeking to improve diagnostic accuracy for CNS neoplasms in the setting of NF1 versus sporadic tumors. In addition, MEK inhibitors, which act on the RAS/MAPK pathway, continue to be studied as rational targets for the treatment of NF1- associated tumors, including CNS tumors.

Although NF1 is associated with marked clinical variability, most children affected follow patterns of growth and development within the normal range. Some features of NF1 can be present at birth, but most manifestations emerge with age, necessitating periodic monitoring to address ongoing health and developmental needs and minimize the risk of serious medical complications. Therefore a review of the clinical criteria is to establish a diagnosis, the inheritance pattern of NF1, major clinical and developmental manifestations, is needed. There are also guidelines for monitoring and providing intervention to maximize the health and quality of life of a child and family affected.

EXTENDED ABSTRACT

NEUROFIBROMATOSIS TYPE 1 – CLINICAL, RADIOLOGICAL AND MOLECULAR DIAGNOSIS; ORTHOPAEDIC TREATMENT AT CASE REPORTS

Mařík Ivo [1,2], Zemková Daniela [2,3], Maříková Alena [2], Krulišová Veronika [4]

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

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

[3] *Dept. of Paediatrics; University Hospital Motol; Prague, Czech Republic*

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

ambul_centrum@volny.cz

Key words: Neurofibromatosis type 1, NF-1, radioclinical and molecular diagnosis, orthopaedic treatment, case reports

Neurofibromatosis type 1 (NF-1) known as Recklinghausen disease is blastomatous disease of nervous tissue caused by a disorder of undifferentiated stem cells or nerve sheaths.

The most common subtypes are referred to as NF-1 and neurofibromatosis type 2 (NF-2).

NF-1 is the result of mutations (about 50% of new mutations) in gene located on chromosome 17 in the pericentromeric region of the long arms (at position 17q11.2); its product is the neurofibrin protein, also called NF-1 protein. Penetrance is reported to be almost 100%.

NF-2 („central" neurofibromatosis) is also an autosomal dominant syndrome with high penetrance. It is the result of mutations in genes on the long arm of chromosome 22 (in the 22q4.12 region). Approx. 50% of all NF-2 patients exhibit a de novo NF mutation. The type of tumour tends to be schwannomas and meningiomas arising on the VIIIth cranial nerve (neurinoma n. acustici).

The ***incidence*** of **NF-1** is reported to be 1 : 3 000 - 5 000, **NF-2** 1 : 35 000 live births. Both forms of NF have a highly variable course with progression of neurological disorders, mutations and oppressive syndromes and a high risk of malignancy. These hamartomatous disorders (neurocristopathy, neuroectodermal and mesodermal dysplasia) are characterized by widespread multiple organ system involvement.

The **prognosis** quod vitam is very serious. In generalized neurofibromatosis, malignancy occurs in 5-10% of patients. Approximately 85% of neurofibromatoses are of the NF-1 type. Because of its relatively high incidence and high malignancy, NF-1 is indicated for diagnosis by molecular genetic methods.

Symptomatology of NF-1. In childhood, white coffee-colored pigment spots and neurofibromas appear, causing neurological manifestations in the brain and spinal cord depending on the localization. In 50% of NF-1 cases, neurofibromatous deposits are located intraosseous or close to the bone and cause severe changes and deformities of the axial and limb skeleton, which are diagnosed

on X-ray examination. E.g. kypho-lordo-scoliosis, vertebral body and pedicle deletion; pectus excavatum; pectus carinatum; genu valgum/varum; pes planus; postaxial polydactyly; asymmetrical macrocranium on the skull, dysplasia of the orbits and deepened sella turcica; congenital curvature of the long bones, pseudoarthrosis of the tibia, fibula or both, the association of neurofibromatosis with pseudoarthrosis of the tibia was described by Ducroquet as early as 1937; erosion of the cortical bone, irregular periostoses and even spongiosclerosis; osteomalacia (vitamin D resistant, hypophosphotemic); hyperplasia (macrodactyly) or hypoplasia; intraosseous defects, etc..

Elephantiasis of soft tissues (lymphangio- and hemangiomatous component) leads to localized gigantism of the limbs (hypertrophic axis-curled bones with thickened cortical tissue and multiplication of all other tissues). Often dominated by overgrowth of nervous tissue, causing involution of surrounding structures. Facial elephantiasis always leads to hypoplasia of the splanchnocranium.

NF-1 affects all systems. Malignant reversal can occur in foci of neurofibromatosis.

According to a statement from the National Institutes of Health Consensus Develoment Conference (1998) and (Revised) diagnostic criteria for NF1 (Legius et al. 2021), there are **eight criteria**, two or more of which must be present **to establish NF-1 diangosis**:

(1) Six or more café-au-lait macules (grater than 5 mm in prepubertal patients; grater than 15 mm in post-pubertal individuals
(2) Two or more neurofibromas or one plexiform neurofibroma;
(3) Axillary or inguinal freckling;
(4) Optic gloma;
(5) Two or more Lisch nodules (iris hamartomas); or two or more choroidal abnormalities
(6) A distinctive osseous lesion such as: sphenoid bone dysplasia; anterolatral bowing of tibia (tibial dysplasia) or pseudoarthrosis of la ong bone;
(7) A pathogenic NF1 gene variant
(8) A parent with NF-1 by the above criteria

Symptomatology of NF-2. Hearing loss by growth of bilateral acoustic schwannomas (or neurinomas) in about 95% of the cases; tinnitus, vestibular dysfunction, presenilated posterior subcapsular cataract, intracranial and spinal tumors and other abnormalities such as peripheral neuropathy, skin lesions (café-au-lait, neurofibromas, etc.). It is possible to have NF-1 and NF-2 in the same affected person (inheritance from an affected father with NF-1 and a mother with NF-2). Evidence of bilateral vestibular (nervus VIII) tumors (schwannomas) is sufficient for the diagnosis of NF-2. A complete audiological examination is beneficial for the early detection of the disease among relatives.

Differential diagnosis of NF-1 should consider NF-2, Legius syndrome, Noonan syndrome, Proteus syndrome, Klippel-Trenaunay syndrome, McCune-Albright syndrome, hemihypertrophy, autosomal dominant familial angiolipomatosis, etc.

Treatment is symptomatic, namely orthopaedic-prosthetic, orthopaedic-surgical, spondylo-surgical and neurosurgical, aimed at the treatment of scoliosis, pseudoarthrosis, localised gigantism, pressure syndromes, tumours, etc. Malignant bone lesions or sarcomatous changes in the affected nerves localized peripherally are indications for radical surgical treatment.

We present our experience with problematic orthopaedic treatment using clinical cases.

News

This year, selumetinib (Koselugo cps.) is available in the Czech Republic for the treatment of pediatric patients aged 2 years and older with neurofibromatosis type 1 (NF-1) who have symptomatic, inoperable plexiform neurofibromas (PN). Koselugo is indicated in monotherapy for the treatment of symptomatic, inoperable PN in pediatric patients with NF1 aged 3 years and older. The eligible providers for 2023 are the University Hospital in Motol (Department of Paediatric Haematology and Oncology and Department of Paediatric Neurology) and the University Hospital in Brno (Department of Paediatric Oncology).

References

1. DUCROQUET RL. A propos des pseudarthroses et inflexions congénitales du tibia. Mam Acad Surg, 63, 1937, p. 863–68.
2. KOLÁŘ J, ZÍDKOVÁ H. Nárys kostní radiodiagnostiky. Praha: Avicenum 1986. 419 p.
3. LEGIUS E.et al. Revised diagnostic criteria for neurofibromatosis type 1 and Legius syndrome: an international consensus recommendation. Genet Med. 2021 Aug;23(8):1506-1513. doi: 10.1038/s41436-021-01170-5. Epub 2021 May 19.
4. MAŘÍK I, KUKLÍK M. Generalizovaná forma neurofibromatózy von Recklinghausen I. typu s lokalizovaným gigantismem: souborný referát s kasuistikou. Pohybové ústrojí, 2, 1995, No. 4, p. 150–162.
5. MATĚJOVSKÝ Z, POVÝŠIL C, KOLÁŘ J. Kostní nádory. Praha: Avicenum, 1988, 447 p.
6. MAZURA I, MAZUROVÁ F, KORABEČNÁ M, PETRÁKOVÁ A. Diagnostika neurofibromatózy von Recklinghausen (NF-1) metodou polymerázové řetězové reakce (PCR). Pohybové ústrojí, 2, 1995, No. 3, p. 118–123.
7. MAZUROVÁ F, MAZURA I, MAŘÍK I. Možnosti diagnostiky achondroplazie a neurofibromaózy (NF-1) molekulárně genetickými metodami. Pohybové ústrojí, 6, 1999, č. 1, s. 6–10.
8. National Institutes of Health Consensus Develoment Conference: neurofibromatosis konference statemetn, Arch Neurol 45:575, 1988 (Review article).
9. ROTH M. The role of neural growth in the pathomechanism of skeletal dysplasias: an experimental sudy. Pohybové ústrojí 2, 1995, č. 3, s. 85 – 111.
10. SHARRARD WJW. Paediatric Orthopaedics and Fractures. Vol, 3rd ed. Oxford, London, Edinburgh: Blackwell Scientific Publications, 1993, 718 s.
11. TAYBI H, LACHMAN RS. Radiology of Syndromes, Metabolic Disorders, and Skeletal Dysplasias. 4th ed. St. Louis, Baltimore, Boston: Mosby, 1996, 1135 s.
12. GROSS AM, WOLTERS PL, DOMBI E, et al. Selumetinib in children with inoperable plexiform neurofibromas. N Engl J Med. 2020;382(15):1430-1442.
13. GROSS AM, DOMBI E, WOLTERS PL, et al. Long-term safety and efficacy of selumetinib in children with neurofibromatosis type 1 on a phase 1/2 trial for inoperable plexiform neurofibromas Neuro Oncol. 2023 Oct 3;25(10):1883–1894

ABSTRACT

TYPHOID FEVER EPIDEMICS IN THE PAST *(film documentary 25 minutes)*

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

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

[2] *Municipal Library of Prague*

[3] *Municipality of the Town, Letovice*

sedlcany1@seznam.cz

Kew words: film documentary, typhoid fever, *Salmonella typhi*, epidemics, ossuaries, radiocarbon dating

We prepared a film documentary about the typhoid epidemics of the last thousand years. We used the ossuaries of Bohemia and Moravia as a source of information, because they are a treasure for paleopathology. There are bone remains from different periods and we can take samples. We send them to the Radiocarbon Centre in Poznan, which determines the exact period of the typhus epidemic.

Typhoid fever occurred mainly during wars and wet years, so that typhoid epidemics arose, which were often associated with famine.

The disease, from the paleopathological point of view, was very beautifully described by Thucydides, the Greek historian, who described it in the time of Pericles, 430-426 BCE. His description is so accurate that it can only point to typhus and, at the same time, it has also been confirmed by genomic analysis that it was indeed typhus.

Shakespeare gave a beautiful description of what a typhoid patient looked like in Henry V when he described Falstaff dying. It is one of the most beautiful descriptions of the disease, directly from the artist's point of view.

Here we must emphasize that the description is of typhoid fever, typhus abdominalis, which is caused by a small flagellated bacterium*, Salmonella typhi.*

We can say that the deposits in ossuaries also capture epidemics of typhoid fever occurring on a smaller scale, for example in Žehuň where it is dated to the Hussite period of the 15th century, and in Dlouhá Ves where it dates to the 18th century.

Typhoid fever epidemics on a large scale were caused by a compromised immunity of the whole population, which occurred in connection with famines, the largest of which was probably in the early 14th century, in the Little Ice Age, according to the chronicles from 1315–1318 and in 1328.

This period corresponds to the dating in the ossuaries in Nížkov, Malín, and Sedlec, Kutná Hora, pointing to the beginning of the 14th century.

It is clear that in the past, due to non-adherence to hygiene rules, lowered immunity, and climatic phenomena, more than 10% of untreated cases could die even in small epidemics.

ABSTRACT

CHONDROSARCOMA COMPOSED OF TARGET-LIKE CHONDROCYTES

Povýšil Ctibor[1], Hojný Jan[2], Kaňa Martin[2]

[1] *Institute of Pathology, 1st Faculty of Medicine, Charles University b and General University Hospital in Prague, Czech Republic*

[2] *Department of Otorhinolaryngology, Head and Neck Surgery, 1st Faculty of Medicine, Charles University and University Hospital Motol, Prague , Czech Republic*

Ctibor.Povysil@lf1.cuni.cz

Key words: Chondrosarcoma, Target-like chondrocytes

The aim is to present the two rare cartilage -forming tumours with highly unusual cell types of target-like chondrocytes surrounded with thick perichondrocytic rings (basket). Because of the rarity such histologic poattewrn in chondrogenic tumours, not yeat described and analysed , we shall present the histological, immunohistochemical, electron microscopic and molecular details of these abnormal cells. The unique histological feature is the presence of unusual hypertrophic eosinophilic APAS-positive peichondrocytic rings (baskets), that contained type VI collagen in their peripheral part. Electron microscopic examination revealed that pericellular rings were arranged in two differents layers. The outer extralacunar zone was made up of a layer condensed thin collagen fibrils with admixture of non-fibrilar dense material. Inner intralacunar component was composed of microfibrils withe abundant aggregats of dense amorphous non-fibrillar material probably corresponding to proteoglycans. NGS sequencing identified a fusion transcript involving fibronectin 1 (FN1) and fibroblast growth factor receptor 2 (FGFR2). The clinical significance of this tumour histological subvariant is unclear.

ABSTRACT OF REVIEW ARTICLE

CHILDREN AND ADULTS. CLINICAL SYMPTOMS OF MINIMAL BRAIN DYSFUNCTION, SYNDROME OF CONTRACTURE AND DEFORMITIES. SPINE, HIPS, KNEES, FEET. THERAPY. POSSIBILITY OF PROPHYLAXIS. IN 12 POINTS – see page 55

Karski Tomasz[1], Karski Jacek[2], Karska Klaudia[3]

[1] *Prof. Karski Tomasz - Vincent Pol University of Lublin, Poland tmkarski@gmail.com*

[2] *Dr Jacek Karski MD PhD – Medical University of Lublin, Poland jkarski@vp.pl*

[3] *Dr Klaudia Karska MD - Medical University of Lublin, Poland*

clovdia@o2.pl

Key words: Minimal Brain Dysfunction (MBD), Syndrome of Contracture and Deformities (SofCD), Hips. Knee. Dysplasia. Arthrosis

Disorder in Locomotors System in children is mostly connected with Minima Brain Dysfunction (MBD), with Syndrome of Contractures and Deformities (SofCD) and of course with congenital, neurological and others causes. Adults people are suffering very often - if they in childhood were not fully and properly cured.

In paper we presented problems of hips, knees, feet, spine – in children and adults. We have proposed the methods of therapy and prophylaxis.

ABSTRACT OF REVIEW ARTICLE

SO-CALLED IDIOPATHIC SCOLIOSIS. HISTORICAL DATES OF DISCOVERIES. FATE AND FORTUNE OF NEW KNOWLEDGE. BIOMECHANICAL ETIOLOGY, NEW CLASSIFICATION, THERAPY AND CAUSAL PROPHYLAXIS – see page 69

Karski Tomasz
Vincent Pol University in Lublin, Poland.
Email: tmkarski@gmail.com
www.ortopedia.karski.lublin.pl

Key words: So-called idiopathic scoliosis. Etiology. Role of walking, standing. Therapy

So-Called Idiopathic Scoliosis is very frequent deformity of spine in many children and adolescents in many countries. In Lublin in years 1984/1995–2007 was described the biomechanical etiology, was given the new classification, was described the new therapy and causal prophylaxis. The etiology is connected with 1. asymmetry of movement of hips, 2/ biomechanical influences – walking and standing 'at ease' on he right leg, 3/ influence on pelvis and spine – asymmetrical growing – in result scoliosis

In paper – are presented many examples of old wrong therapy and of new proper therapy.

ABSTRACT OF REVIEW PAPER

SO-CALLED IDIOPATHIC SCOLIOSIS. HISTORICAL DATES OF DISCOVERIES. FATE AND FORTUNE OF NEW KNOWLEDGE. OPINION OF SPECIALISTS FROM MANY COUNTRIES – see page 86

Karski Tomasz
Vincent Pol University in Lublin, Poland
Email: tmkarski@gmail.com
www.ortopedia.karski.lublin.pl

Key words: so-called idiaopthic scoliosis, etiology, opinions of many specialists.

So-Called Idiaopthic Scoliosis – other description – Adolescnet Idiopathic Scoliosis (AIS) is very frequent deformity of spine at many children and adolescents in many countries. In material in Lublin in 1984–2023 we had treated 3500 children and adults with scoliosis. In years 1984/1995–2007 (T. Karski) was described the biomechanical etiology, was given the new classification, was described the new therapy and given rules of causal prophylaxis. In paper there are presented positive opinion of many doctors and prefessors from abroad and also two from Poland. We wait for the time of introducing of the new knowledge about scoliosis for therapy and causal prophylaxis of children on the world.

EXTENDED ABSTRACT

FRESH EVIDENCE WITH MRI OF THE EFFECTIVENESS OF CORRECTION OF SCOLIOSIS BY THORACOLUMBAR LORDOTIC INTERVENTION. EXTENSION OF THE SCOLIOTIC SPINE RESTORES DISC MORPHOLOGY FIRST.

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

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

[2] *Analyst, Chairman Posture Network Netherlands*

[3] *Em. prof. neurosurgery Radboud University Nijmegen*

[4] *Professor Tissue Engineering; Mechanobiology of development and disease; Amsterdam UMC.*

pvanloon@planet.nl

Introduction

The TLI brace technique has its published proof of effectiveness. Etiology-based-treatment in spinal deformities should give correction with dynamic and mechanic factors incorporated reversing the lifestyle dependent abnormal forces that induce deformity. Knowledge on postural changes by sitting of children and its concomitance with neuromuscular tightness (neuro-osseous growth discongruency) by changed biomechanical and neuromuscular loading and tensile patterns was put

in this brace technique TLI (thoracolumbar lordotic intervention). Only recently new experimental confirmation of scoliosis correction in research (now with MRI) was presented.

Method and material in own published studies

In 2008 in Spine, we brought a prospective radiographic study in pure scoliosis[1].

Methods

AP radiographs of adolescents with a double major scoliosis were obtained. In group A radiographs in 3 positions: standing, and supine with and without radio lucent fulcrum (n=12) and group B radiographs in two positions (n=28): standing, and supine with lordotic fulcrum. Cobb angles of the scoliotic curves were determined and evaluated statistically. The sagittal contour of the thoracolumbar junction in standing position was measured.

Results

In group A (supine) a significant correction of the Cobb angle was obtained at the thoracic level of 15.4% and the lumbar level of 27.5% ($p<0.001$). Adding a lordotic fulcrum under the thoracolumbar junction resulted in a coupled further correction at the thoracic level of 15.7% and lumbar 18.1% ($p<0.001$). Comparing in group A the thoracic and lumbar curvatures revealed a total reduction of 31% and 45.6%, respectively. For the independent group B this reduction in one step is 38% and 44.4%, respectively.

Conclusions

Correction of a double major curve scoliosis appeared to benefit in an unprecedent way by application of a lordotic fulcrum on the thoracolumbar junction. This approach was consolidated in a dynamic brace technique with corrective forces aimed at the thoracolumbar area.

In 2012 in Scoliosis Journal, we brought results[2].

Methods

91 adolescent deformities were treated with TLI braces (polyethylene) providing forced lordosis at TL-junction. Scoliosis group (one coronal curve > 25^0) and kyphosis group (coronal curves < 25^0). Radiographs were made i) at start, ii) "in brace" and iii) after one year treatment.

Results

One year treatment shows improvement in all Cobb angles. In scoliosis group coronal curves showed averaged "progression rate" of 12.4%, higher for thoracic right and lumbar sagittal curves than for thoracolumbar left (4.2%) and pelvic obliquity (4.3%). In sagittal curves "progression rate" averaged 1%. In all cases the brace could be adapted towards even more lordosis and correction power in at least two control visits.

Conclusion

TLI bracing gives remodeling of the deformed spine by reposition of the TL- joint in a dynamic process, with significant reduction of all sagittal curves. And with much lower "progression" in coronal curves than other types of braces.

Maybe because of unbelieve or so called "Semmelweis reflexes" the technique could not "grow" in the Netherlands, also because of detoriation of a dedicated scoliosis care and the absence of knowledge on what other forms of postural deviations, like kyphosis, will induce in adulthood in spinal pain syndromes and lumbosacral stenosis. But also, a total change in our Healthcare system with only high imbursements for joint replacements in Orthopedics did make time-consuming conservative treatments in hospital settings very unpopular. So new support was welcome, happily in the time the Healthcare system is under heavy critics of politics and people. New support was welcome.

Fresh evidence

Were we proofed the corrective power in scoliosis on Cobb angle on radiographs, with children supine with a fulcrum (bolster) under the thoracolumbar spine, recently the group of Academical Medical Centre Utrecht could show the same effectiveness, now under MRI with a fulcrum under the lower thoracic spine, with intriguing proof of morphologic restoration of the discs under spinal extension (=lordosis)[3].

They came to the same results in coronal curve reduction and had also to conclude that in fact hyperlordosis or extension of the spine is the only way to correct scoliosis. The advantage of MRI for experimental purposes is clear: the form of the discs and the position of the nucleus is clearly brought to more normal configuration by bringing the discs towards the midline of the spine.

In fact, they showed that according to the so-called Volkmann-Hueter principle the easily deformable parts of the spine, the discs, were the deforming forces acts first, are also the structures that are fist in regeneration towards normal, before also the bony structures, according to Wolff's Law.[4,5] With help of the reciprocal influence the growing Neural system has on the growth in length of the skeleton according to the Osteoneural Growth Relation concepts of Milan Roth.[6,7]

Conclusion

TLI bracing deliver corrective forces by applying symmetrical push on the paravertebral muscles reposition of the TL- joint in a dynamic process in which the intervertebral discs react first. Proper bracing can prevent surgery according the RCT study by Weinstein et al.[8] High compliance can be reached because children love to get a device that offers them a beautiful natural posture in an immediate way. They understand quit easily the etiologic factor out of their sedentary lifestyle. And also, that their extension muscles can do their work in this corrected position properly, rewarded by ongoing adaptations of the brace at controls with shortening of the upper and lower rims and more lordosis in the correcting bars.

References

1. VAN LOON PJM, * KÜHBAUCH BAG, * AND THUNNISSEN FB. †. Forced Lordosis on the Thoracolumbar Junction Can Correct Coronal Plane Deformity in Adolescents with Double Major Curve Pattern Idiopathic Scoliosis. Spine (2008)33;7(797-801)
2. VAN LOON PJM; ROUKENS M; THUNNISSEN FB; MUNNEKE J. (†). A new brace technique for adolescent scoliosis and kyphosis based on restoration of thoracolumbar lordosis. Radiological and subjective clinical results after one year of treatment. Scoliosis 2012, 7:19
3. LORENZO COSTA, TOM P. C. SCHLOSSER, PETER SEEVINCK, MOYO C. KRUYT, RENÉ M. Castelein; CASE SERIES The threedimensional coupling mechanism in scoliosis and its consequences for correction · Spine Deformity https://doi.org/10.1007/s43390-023-00732-8
4. SCHANZ A. Die statischen Belastungsdeformitäten der Wirbelsäule mit besonderer Berücksichtigung der kindlichen Skoliose (in German) Dresden:Ed.: Ferdinand Enke Verlag, Stuttgart, 1904, 82-1058
5. MURK J. The Physiologic Scoliosis and its Cause (in Dutch)1912, Leiden, E.J.Brill, publisher.
6. ROTH M. Neurovertebral and Osteoneural Growth Relations. A concept of normal and pathological development of the skeleton. first ed. Brno, Cech Republique.: ed. J.E. Purkyne University Brno, Medical Faculty; 1985 (complete PDF available on ResearchGate profile P. van Loon)
7. VAN LOON PJM, GROTENHUIS JA.: MILAN ROTH: Osteoneural growth relations, the biomechanical and neurodynamic processes of physical body growth in vertebrates with tension as its tool to overcome gravity. Clinical implications of discongruent Osteoneural growth. LOCOMOTOR SYSTEM vol. 25, 2018, No. 1 / POHYBOVÉ ÚSTROJÍ, ročník 25, 2018, č. 1
8. WEINSTEIN SL, DOLAN LA, WRIGHT JG, DOBBS MB. Effects of bracing in adolescents with idiopathic scoliosis. N Engl J Med. 2013; 369:1512-21

EXTENDED ABSTRACT

DUTCH HEALTHCARE CRISIS IN THE LIGHT OF DISCONGRUENT OSTEONEURAL GROWTH RELATIONS
HOW LOSS OF PREVENTION-KNOWLEDGE IN CHILDHOOD AND POLITICAL CHOICES PRODUCED A SOCIO-ECONOMIC BURDEN.

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

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

[2] *Analyst, Chairman Posture Network Netherlands*

[3] *Em. prof. neurosurgery Radboud University Nijmegen*

[4] *Professor Tissue Engineering; Mechanobiology of development and disease; Amsterdam UMC.*

pvanloon@planet.nl

Introduction

Undoubtedly the demographic situation in many European is heading for a "reversed pyramid" of ageing, those ages 65 and above. At the top is Italy at 23 percent. Finland, Portugal, and Greece round out the top five at just under 22 percent. Healthcare costs for "chronic multimorbidity" will raise exponentially because of these demographic statistics[1]. The Netherlands look just in the mid-

dle, but hidden disturbers developing in the Dutch youth, especially in the locomotion apparatus, will bring us on unexpected or unforeseen "higher" positions in total costs soon. Because it seems not the ageing of the population but the acceleration of incidences of chronic diseases running into the younger and even youngest generations that will bring the system to the edge of collapsing. We know out of the Lancet study on Global Burden of Diseases that in most Western countries the socio-economic burden caused by arthrosis and of spinal degeneration are the highest, in incidences and in costs[2].

Goal

To try to get a little bit clear how gross change of lifestyle (sitting and hypokinesia), especially in the younger generations and loss of knowledge on prevention, to raise children in a proper way towards good general health, with good posture and flexible, full mobile spines as the guarantee for durability and resilience, has brought us to this economic crisis.

The situation in the Netherlands

In 2020 average spending on health care was after Germany the 5th highest in Europe. But both systems differ in many ways. Just before new elections in the Netherlands for the Parliament in November 2023, no political party (26 parties on the list!) has clear answers how to tackle the ever-ongoing increase of the part of the GNP (gross national product) taken by healthcare. Some of them preach: "there will be more prevention", but without clear instruments how this can be accomplished, other than "stop perverse incentives" or "only appropriate care is paid for", by that apparently blaming the (hospital) doctors for wrongdoing. Draconic interventions seem to be inevitable in which replacement of the Law on Healthcare that brought us in 2006 in the direction of the market driven Healthcare system, that is present in the USA, seems inevitable. It is not known to the people of the USA, that the Affordable Care Act, or "Obamacare" is nothing else as their (much too late) copy of the Algemeine Krankenkasse, that was installed by Otto von Bismarck in Germany (under high pressure of physicians!). The USA have nowadays the highest part of the GDP (gross domestic product) to pay for total Healthcare in the whole world.

Loss of preventive power in Dutch society, educational system and preventive Medicine since the sixties

Exposure of a found knowledge gap out of classic orthopedic knowledge on growth and the underlying biomedical mechanism of discongruent Osteoneural Growth (Milan Roth, Brno, 1923-2006) and effects of sitting (in slumped and sloughed postures) and hypokinesia during growth is a difficult task, when present biomedical science is heading almost only towards curative solutions by pharmacological or surgical interventions for almost all so-called lifestyle diseases.

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) lost its place in medical studies. From Andry in 1741 on, sitting of children on chairs was depicted as counterproductive of reaching healthy postures. In Central Europe this field of preventive medicine reached

impressive implementation by introducing ergonomic school furniture, school gymnastics, good instructive material for mothers and teachers, accessibility to "Heilgymnastik", school screening by school docters and -nurses etc.[4]

The research the late prof. Milan Roth (Prof. of Neuroradiology, University Brno, 1923-2006) 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, was undertaken in a time the Czech youth was under full influence of these preventive measures by parents, schools and authorities.[5,6] "Sedentary life for children outside schools was "not invented" yet! In present time the lack of sufficient cycles of extension and stretching of the child's body, as was performed in many exercises and free play (outside) 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. In fact, Roth's work and concepts brought the biomedical scientific background on what we can see nowadays in body-development by "sitting and swiping". but also, for the way gymnastics, body-exercises with stretching and many forms of sports and dancing that contain all directional movement, can do for optimization of processes of growth. It is reaching a natural posture (spine curvature, alignment) with a thoracolumbar joint in lordosis and with full 3-D motility, that has to be achieved in the earliest period of life, that can guarantee later durability in health, if "preventive maintenance" is also teached to a child. It was the Czech Prof. Jana Parizkova that undertook large epidemiological studies on Hypokinesia in Czech youth, hat led to firm conclusions on inducing illness by hypokinesia. In her experimental studies with rats, she showed undisputedly, that young rats, that were restricted in motion only in the period of growth, lived much shorter than free moving or extra moving (wheels) rats. In a similar study with pregnant rats, the offspring of the restricted rats lived much shorter than from the other two groups[7].

Supporting data and studies in The Netherlands

In recent rapports of the national statistical institute (CBS and IKN) the chance of getting cancer was raised since 1990 with 54% for men and 47% of women! Only by high costs the mortality was diminished in the population under 65-years of age.[8]

In the prognostics on incidences towards 2040 the governmental instate of Health (RIVM) show unprecedented and almost exponential rise in incidences for arthrosis and low back pain, that were already reached in 2021![9]

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 other biomechanical or orthopedic causation was discussed, maybe just because they were forgotten[10].

In 2019 an independent research institution (VerweyJonker) did a scrutinous study to find in all the data of insurance companies all 0–25-year-old people that are in these data with one or more" chronic diagnosis", were was paid for. On the total population of 17 million inhabitants there were

1,3 million 0–25-year-old people with one or more registered diagnoses of chronic diseases. It proofed almost a doubling of a similar study in 2007![11]

Conclusion

The Dutch health and Healthcare situation has its own dynamics, history and difficulties that lead to the unwanted situation at present. Politics and government are not prepared or skilled with tools to counteract these developments in changing people's habits and behavior in connection with sitting and use of modern technology or to reintroduce knowledge on proper body-education in childhood in the many studies and curricula dealing with upraising and on the health of children.

References

1. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Ageing_Europe_-_statistics_on_population_developments
2. https://www.thelancet.com/gbd
3. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Healthcare_expenditure_statistics
4. HOHMANN G, HACKENBROCH M &LINDEMANN K: (1956) Handbuch der Orthopaedie, vol I and II, 6vol.Stuttgart Georg Thieme Verlag (Extended and revised publication of the Handbuch der Orthopaedischen Chirurgie 1907 by G. Joachimsthal, editor, A. Lorenz, A. Hoffa, A. Schanz, W. Schulthess, F. Lange and others
5. P VAN LOON AND J. A. GROTENHUIS: MILAN ROTH: Osteoneural growth relations, the biomechanical and neurodynamic processes of physical body growth in vertebrates with tension as its tool to overcome gravity. Clinical implications of discongruent Osteoneural growth. LOCOMOTOR SYSTEM vol. 25, 2018, No. 1 / POHYBOVÉ ÚSTROJÍ, ročník 25, 2018, č.1
6. ROTH M. Neurovertebral and Osteoneural Growth Relations. first ed. Brno, Czech Republique: ed. J.E. Purkyne University Brno, Medical Faculty; 1985
7. PAŘÍZKOVÁ JANA, R. Poledne *Consequences of long-term hypokinesia as compared to mild exercise in lipid metabolism of the heart, skeletal muscle and adipose tissue;* European Journal of Applied Physiology and Occupational Physiology volume 33, pages331–338 (1974)
8. https://iknl.nl/nkr-cijfers
9. https://www.volksgezondheidtoekomstverkenning.nl/c-vtv/trendscenario-update-2020/ziekten-aandoeningen
10. VAN DEN HEUVEL M, OEI EG, RENKENS J, S. BIERMA-ZEINSTRA, VAN MIDDELKOOP M: Structural spinal abnormalities on MRI and associations with weight status in a general pediatric population; The Spine Journal 21 (2021) 465–476
11. https://www.verwey-jonker.nl/publicatie/een-actueel-perspectief-op-kinderen-en-jongeren-met-een-chronische-aandoening-in-nederland-omvang-samenstelling-en-participatie/

EXTENDED ABSTRACT

HISTORY OF CALCANEUS FRACTURES

Zwipp Hans
Dresden
hans.zwipp@t-online.de

The first 2000 years

Since the recommendation of Hippokrates (460 b. Chr.) conservative treatment with immobilizing the fractured calcaneus lasted for very long time. The first surgical intervention started in 1720 when Jean-Louis Petit (1674–1750) decided to do a percutaneous tenotomy of the Achilles tendon in a "fracture du calcanéum par arrachement" i. e. a calcaneal beak fracture with compression of the soft tissues from inside. In 1768 Pott (1714–1788) performed primary amputation in open calcaneus fractures to prevent tetanus infection saving by this radical method patient's life. In 1850 the British Clark Le Gros (1788–1870) introduced a traction device ("immovable apparatus") to improve by this better healing of the severely collapsed calcaneus [**3**]. In 1888 Carl Ignatz Gussenbauer (1842–1903), an Austrian surgeon being professor at that time in Prague, diagnosed in a 49 years old male clinically a severly displaced calcaneal beak fracture, reduced it percutaneously with a Langenbeck's hook and fixed the completely reduced tuberositas calcanei with a three-edged-nail [**7**]. Due to the new diagnostic method of x-rays the French surgeon Morestin classified in 1902 a "fracture du calcanéum par écrasement" i. e. a severely collapsed intraarticular calcaneus fractures, which he reduced as the very first to do an open remodeling the calcaneus by using a sinus tarsi approach [**10**]. In 1913 it was Leriche, again a Frenchman, who performed as pioneer an open reduction with following osteosynthesis in means of ORIF [**8**]. In 1938 reported Goff [**6**] about 41 different methods of operative treatment like the use of kangaroo tendon, silver wires or bone plates. But because of many poor results after surgery conservative-functional treatment [**15**] or primary subtalar arthrodesis was recommended [**4**] up to the 1980ies.

CT-Diagnostics changed treatment procedures (20th century)

Whereas at the beginning of the 20th century the x-ray diagnostics allowed some imagination of the calcaneal fracture patterns, the relationship of these was understood the very first time when CT-scanning was introduced in diagnostics in the 1980ies. This led to a complete shift of the paradigma of treating intraarticular calcaneus fractures no longer conservative-functionally but by open reduction and internal fixation (ORIF) like all other displaced intra-articular fractures at this time. In the 1990ies started the intraoperative use of arthroscopy controlling anatomic reduction of the posterior facet as a more precise method than intraoperative Broden's view [**5**]. This promoted in the early years of the 21th century the treatment of closed reduction under fluoroscopy and arthroscopy by fixing the reduced fragments with percutaneously inserted screws through tiny skin incisions named as CRIF (Closed Reduction and Internal Fixation). By this new procedure large lateral approaches and plate fixation became unnecessary which were afflicted with wound complications up to 36.1 % including superficial infections up to 19.7 %, and deep infection rates up to 6.9 % [cited in **2**]. Due to the extended lateral incision additional sural nerve damage was as well reported in up to 19 % of cases [**9**]. But it became soon evident that CRIF did not work in osteopenic, osteporotic, inveterated or in multifragmentary calcaneal fractures.

New concepts and implants (21th century)

Recognizing that CRIF worked well in young patients with good bone stock but insufficiently in elderly patients with osteoporotic or osteopenic fracture parts, a new system for treatment of intraarticular calcaneus fractures was introduced in 2011, i.e. C-Nailing. This system equals a minimal-invasive procedure by use of a small sinus tarsi approach for anatomic joint reduction and screw fixation in combination with an interlocking nail which is introduced percutaneously, allowing high stability of the reduced fragments by use of 5 to 6 interlocking screws [**1, 12, 13, 17, 18**]. The higher stability of the reduced and fixed fragments by C-Nail than by use of an interlocking plate was proven experimentally in cadaveric human calcanei with a standardized intraarticular fracture [**11,14**]. By this minimal-invasive procedure all known complications due to ORIF by using extended lateral approach and plate fixation, could be minimized to 1.9% of woundedge necrosis, 0.5 % of infected hematoma, 0.5 % of deep infection and 0 % of sural nerve damage [**1, 12, 17–18**]. In addition AOFAS scoring is not inferior to ORIF and plate fixation.

Literature

1. AMLANG M et al. (2017) Interlocking nail fixation for the treatment of displaced intra-articular calcaneal fractures. JBJS Essential Surgical Techniques 7(4): 33–39
2. BACKES M et al. (2014) Wound infections following open reduction and internal fixation of calcaneal fractures with an extended lateral approach. International Orthopaedics 38: 767–773
3. CLARK LE GROS (1855) Fracture of the os calcis. Lancet 65: 403–404
4. GALLIE WE (1943) Subastragalar arthrodesis in fractures of the os calcis. JBJS 25: 731-736
5. GAVLIK JM et al. (2002) Percutaneous arthroscopically-assisted osteosynthesis of calcaneus fractures. Arch Orthop Trauma Surg 122: 424-428
6. GOFF CW (1938) Fresh fractures of the os calcis. Arch Surg 36: 744-765
7. GUSSENBAUER CI (1888) Ueber die Behandlung der Rissfracturen des Fersenbeines. Prager Medicinische Wochenschrift. XIII. Jg., Nro.18: 161-162
8. LERICHE R (1929) Traitement chirurgical des fractures du calcaneum. Bull Mem s Nat Chir 55: 8-9
9. MAKKI D et al. Osteosynthesis of displaced intra-articular fractures of the calcaneum: A long-term review of 47 cases. Journal of Bone and Joint Surgery - Series B 92, 693–700 (2010)
10. MORESTIN H (1902) Traitement opératoire de l'écrasement du calcanèum. BULLETINS ET MÉMOIRES DE LA SOCIÉTÉ ANATOMIQUE DE PARIS. LXXVIIe ANNÉE, Tome IV: 225-229
11. PINZARU RM et al. (2023) Biomechanical Comparison of Conventional Plate and the C-Nail® System for the Treatment of Displaced Intra-Articular Calcaneal Fractures: A Finite Element Analysis. J Pers Med 13: 587
12. POMPACH M et al. (2016) Die Versorgung des Fersenbeinbruches mit einem Verriegelungsnagel (C-Nail). Oper Orthop Traumatol 28: 218-230
13. POMPACH M et al. (2021) Less Invasive Treatment of 265 Intraarticular Calcaneal Fractures with an Interlocking Nail (C-Nail). Int J Ortho Res 3: 85-93
14. REINHARDT S et al. (2016) Interlocking Nailing Versus Interlocking Plating in Intra-articular Calcaneal Fractures: A Biomechanical Study. Foot and Ankle International 37: 891–897
15. ROWE CR , SAKELLARIDES HAT, SORBIE C, FREEMAN PA (1963) Fractures of the os calcis: long-term follow-up study of 146 patients. JAMA 184: 920-923
16. STEINHAUSEN E et al. (2021) C-Nail versus plate osteosynthesis in displaced intra-articular calcaneal fractures – a comparative retrospective study. Journal of Orthopaedic Surgery and Research volume 16: 1–10

17. VELICEASA B et al. (2020) Treatment of Displaced Intra-articular Calcaneal Fractures With an Interlocking Nail (C-Nail). Journal of Orthopaedic Trauma 34: 414-419
18. ZWIPP H et al. (2016) Introduction of a New Locking Nail for Treatment of Intraarticular Calcaneal Fractures. Journal of Orthopaedic Trauma 30: 88–92

EXTENDED ABSTRACT

TREATMENT OF CALCANEAL FRACTURES WITH CALCANEAL NAIL (C-NAIL)

Pompach Martin[1], Carda Martin[1], Amlang Michael[2], Zwipp Hans[2]

[1] *Department of Traumatology, Pardubice, Czech Republic*

[2] *Universitäts Centrum für Orthopädie und Unfallchirurgie, Dresden, Germany*

martin.pompach@nempk.cz

Keywords: C-nail, calcaneal fracture, minimally invasive approach

Objective

Open reduction and osteosynthesis is associated with a certain risk of surgical wound healing disorders, especially with incorrect timing. Mini-invasive procedures make it possible to reduce this risk, in addition to the advantage of earlier treatment of the fracture. C-nail is an implant enabling mini-invasive, highly stable osteosynthesis of calcaneal fractures. To prospectively evaluate our own set of patients treated with the C-Nail and compare these results with studies where plate osteosynthesis from an open lateral approach was used. When using the C-nail, we expect higher biomechanical stability, a lower incidence of postoperative complications, especially a low percentage of the development of infection, and better functional results compared to the conventional method of plating with comparable functional results.

Method

A total of 249 patients (222 men and 27 women, average age 47.3 years) with 265 calcaneal fractures indicated for surgical treatment were included in the group. Patient data were evaluated in terms of postoperative complications, restitution of Böhler's angle, reconstruction of the posterior joint surface based on X-rays and CT images taken preoperatively, postoperatively, and after 12 months. Functional outcome was assessed using the AOFAS – Ankle-Hindfoot Scale (American Orthopedic Foot and Ankle Society) scoring system.

Results

The average AOFAS value after 12 months reached a value of 90.5 points. Marginal wound necrosis was observed in three cases (1.1%) and soft tissue infection in one case (0.4%). Böhler's angle was restored from mean values of 5.9° preoperatively to 32.1° postoperatively. After 12 months, a slight decrease in the Böhler angle to 27.6° was noted.

Discussion

The less-invasive sinus tarsi approach, combined with the interlocking C-nail osteosynthesis, is well tolerated by patients, evident as improved average AOFAS scores on 1-year follow-up. Strikingly, there were very few incidents of complications, like superficial wound healing problems, one case of deep infection rate, no sural neuritis, and only 1 patient out of 265 requiring subtalar fusion, since we began using the novel implant and treatment approach in 2011. Sanders et al. presented long--term (10-20 years follow-up) results of 108 cases treated with extended lateral approach and plate fixation, of which 11% had wound-edge necrosis, 0.9% developed an infection, 6.5% of patients developed sural neuritis, while 29% of the patients required subtalar arthrodesis. Likewise, Rammelt et al. in a 7.9-years follow-up of 149 cases reported wound edge necrosis (14.7%), infection (5.4%), and subtalar arthrodesis (6.0%) as frequent complications with the conventional technique. Some short-term follow-up reports, with a smaller sample size, of the extended lateral approach with plate fixation have also described superficial soft tissue infection of 19.7%, deep soft tissue infections in 13.6%, or even osteomyelitis of the calcaneus in 9% of patients. The incidence of postoperative hematoma requiring revision after an extended lateral approach was reported up to 5%, compared to none in our study with a considerably larger sample size. In a recent study, Zeman et al. compared the extended lateral approach with locking compression plate fracture fixation in 217 patients and a smaller group of 19 patients undergoing C-nail osteosynthesis using a sinus tarsi approach. They observed almost comparable AOFAS scores and improvement in Böhler's angle in both groups, but the LCP group had more incidents of deep infection (1.9%) compared to none with C-nailing. They concluded that C-nail should be the first choice for treating Sanders type II and III fractures. Veliceasa et al. who presented a report of 75 cases of C-nailing and showed a similarly low incidence of wound edge necrosis (4%), superficial infection (1.3%), and no deep infection. The AOFAS score was 90.2 after 12 months. Finally, to evaluate the biomechanics and stability after plating or nailing a standardized calcaneus fracture in a human cadaveric specimen, Reinhardt et al. compared three implants – the C-Nail (Medin, Czech Republic), the Calcanail (FH Orthopedics, Heimsbrunn, France), and the Rimbus locking plate (Intercus, Rudolstadt, Germany). This biomechanical study also corroborated that the C-Nail was more stable than the interlocking Rimbus-Plate and much more stable than the French Calcanail.

Conclusion

This study efficiently demonstrates the benefits of nailing over plating in calcaneal fractures, as comparable AOFAS-Scores can be obtained but with fewer wound healing problems. This is ensured by the biomechanical stability of the nail with a locking system in three planes supplemented by a minimally-invasive approach for fracture reduction and stabilization. The sinus tarsi approach also safeguards the patient from sural nerve problems, guaranteeing their satisfaction. Although only a few open fractures were included; however, none showed a higher risk of infection and the need for special flapping. The low rates of infection despite the inclusion of heavy smokers and diabetic patients encourages C-nailing in risque patients as well as in the elderly. The long-term results at 10 years show some requirement for a secondary subtalar fusion; however, the procedure can still be regarded superior to the extended lateral approach and plate fixation because it can be performed in Sanders types, in fracture-dislocations, and both closed and open calcaneal fractures. The only contraindications are beak fractures, pediatric fractures, or those with a short calcaneus.

EXTENDED ABSTRACT

NEW MINI-INVASIVE SURGICAL TECHNIQUES FOR THE FOREFOOT

Holinka Martin
Orthopedic department and foot surgery centre, Karviná – Ráj hospital, Karviná, Czech republic
MHolinka@seznam.cz

Key words: minimally invasive foot surgery, osteotomy, tenotomy, burr, absorbable magnesium screws, diabetic foot syndrome, osteomyelitis, hammer and claw toe deformity, hallux valgus

Introduction to minimally invasive foot surgery
Minimally invasive surgical instruments allow surgeons to perform surgical methods on the foot in a gentle and minimally invasive way. These instruments are inserted percutaneously or through skin mini-incisions to the target soft tissues and bones. For the surgeon, it is more important to use a sense of touch rather than direct visual inspection of the operated soft tissues and bones. Bone osteotomy is performed using percutaneously inserted burrs. Incisions on soft tissues are performed using beaver knife, which is adapted to minimally invasive foot surgery. Also, raspatories, bone curettes, bone files and other instruments are designed for minimally invasive surgery. Direct osteotomy with minimal damage to soft tissues allows surgeons to leave smaller bones without osteosynthesis. The corrected bone position is held by intact tendons, ligaments, muscles and the surrounding strength of other soft tissues. The corrected position of larger bones are fixed by installation of the canullated screws over guide K-wires. In the concept of our minimally invasive foot surgery we also use percutaneously installed absorbable magnesium screws. The progress of operation is checked on the X -ray monitor.

Target group for minimally invasive foot surgery
Minimally invasive surgery is performed both in standard orthopedic and diabetic patients with diabetic foot syndrome. The gentleness and minimal invasiveness of these operations make it possible to perform multi level osteotomies on the bones of the foot to the extent that would not be possible using the original open surgery techniques at all. Simultaneously, these operations are more gentle for patients, less painful, have smaller swelling and faster recovery. The most common operations include the following surgical procedures: correction of the hallux valgus, hammer and claw toe deformity, cheilectomy and arthrodesis of metatarsophalangeal and other joints, removal of bone prominence and heel spurs, close wedge osteotomy of heel and correction of valgous or varus heel position.

The principles of mini-invasive foot surgery in diabetic patients
A gentle approach to soft tissues is particularly suitable in diabetic patients with diabetic foot syndrome. Skin calluses and ulcers are directly related to leg deformities and changes in its biomechanics. The correction of deformities and malposition of the toes, removal of osteophytes and the bone prominences adjusts the biomechanics of the foot, reduces plantar pressures and reduces the pressure of the shoe on the areas of irritated skin surface. These methods remove the cause of chronic ulceration. Ulcerations are treated with surgical methods after a failure of conservative therapy or as part of the preventive surgery on the diabetic foot. Simultaneously, minimally invasive

procedures serve to prevent relapses of ulcerations and reduce the risk of lower extremity amputation. In the case of osteotomy, the use of absorbable magnesium screws is also advantageous. After their absorption an artificial surface does not remain that could serve as a place for bacterial biofilm formation.

Specific surgical treatment of osteomyelitis in diabetic foot syndrome
A separate possibility in diabetic patients is the minimally invasive surgical treatment of osteomyelitic lesions. Osteomyelitis of bone is the most common cause of amputation on the lower extremities in diabetics. Minimally invasive surgical techniques allow precise insertion of the burr under X-ray control directly to the location of the osteomyelitic lesion. The osteomyelitic lesion is removed by the rotary movement of the burr with conversion into a pulp. The pulp is then washed away with a physiological solution. We successfully use this surgical principle as an alternative to amputation on the lower extremities. We leave the affected part of the foot without the need for amputation and without shape changes to the toes or other parts of the foot.

Conclusion
The new minimally invasive techniques in foot surgery has the potential to completely replace the standard open foot surgery techniques. In our conception of foot surgery, we replaced the original open surgery techniques with the minimally invasive ones in 95 % of cases. Simultaneously, the instruments allow surgical procedures that could not be realized without their use.

ABSTRACT

ACTIVE PATIENT IN ORTHOTICS

Kroupa Jan, Šnytr Jan
orthotist-prosthetists/CPO
Otto Bock ČR
kroupa@ottobock.cz

Key words: Lower limb orthotics, SCO, SSCO

People with signs of lower limb paralysis often depend on knee-ankle-foot orthosis (KAFO). The systems currently in use stabilize the user's affected leg with a conventional knee lock that supports the patient under load. Due to the lack of functional shortening of the orthosis, walking with a locked knee joint orthosis is very difficult. Stance control orthosis (SCO) allows patients with paretic or paralyzed lower limb muscles to use the free swing phAase and have a much more physiological gait with all the implemented improvements. Even better results are observed for braces with stand- and swing-phase-controlled orthosis. The aim of this report was to show the benefits of the orthosis enabling more natural movement and to open a discussion about the standard equipment of active patients.

ABSTRACT

EFFECT OF EARLY INITIATION OF ORTHOTIC TREATMENT IN PLAGIOCEPHALY

Drastichová Klára[1], Dilý Matej[2], Ohnůtková Petr[3]

[1] *Palacký University Olomouc, klara.drastichova01@upol.cz,*

[2] *Invent Medical Group, matej.dily@inventmedical.com,*

[3] *Plagio klinika Ostrava, petra@plagio.cz,*

Key words: Plagiocephaly, Cranial remoulding orthosis, 3D printing, Logistic regression model

Introduction
Plagiocephaly is one of the most common cranial deformities among children, characterized by one-sided flattening at the back of an infant's head. It is further marked by prominence of the forehead on the side of the posterior flattening and flattening of the forehead on the opposite side. The most common cause of plagiocephaly is positional, where an infant's head shape is affected because they spend a lot of time lying on their back in the same position.

Methods
One of the treatment options for plagiocephaly is cranial remoulding orthosis, custom-made using 3D printing by Invent Medical Group. Patients typically start treatment between 3 to 18 months of age. The key question is whether the initial age at the start of treatment has an effect on the improvement in head shape. We used a real dataset of patients to analyze the effects of early initiation of treatment using various statistical methods. A primary approach is a logistic regression model, which shows that the infant's initial age plays a significant role in the treatment. Different graphical representations will also be employed to demonstrate that the earlier the treatment starts, the better the results and the shorter time it takes.

Discussion
There are only a few studies on the factors that influence treatment outcomes with cranial remoulding orthosis. These orthoses have a remodeling effect that allows for directed growth, resulting in an improved shape of the asymmetrical head while wearing the helmet. The effectiveness of the treatment depends on the initial patient's deformity, as well as the timing of the treatment initiation.

Conclusion
Cranial remoulding helmets help patients treat plagiocephaly, which is characterized by the asymmetrical shape of an infant's head. A statistical logistic regression model demonstrates that early initiation of treatment has a positive effect on treatment results as well as treatment duration.

CHILDREN AND ADULTS. CLINICAL SYMPTOMS OF MINIMAL BRAIN DYSFUNCTION, SYNDROME OF CONTRACTURE AND DEFORMITIES. SPINE, HIPS, KNEES, FEET. THERAPY. POSSIBILITY OF PROPHYLAXIS. IN 12 POINTS

Karski Tomasz[1], Karski Jacek[2], Karska Klaudia[3]

[1] Vincent Pol University of Lublin, Poland, tmkarski@gmail.com

[2] Medical University of Lublin, Poland, jkarski@vp.pl

[3] Medical University of Lublin, Poland, clovdia@o2.pl

This article was published in *International Journal of Orthopaedics Research:*
Citation: Karski T, Karski, J., Karska, K., Karska, K., Menet, M. A. H. (2023). Minimal Brain Dysfunction, Syndrome of Contractures and Deformities, So-Called Idiopathic Scoliosis, Problem of Hips and Knees-in 12 Points and 12 Figures. *Int J Ortho Res, 6(3), 80-90.*

Repeated publication of this research paper was approved by Editorial Board of the Locomotor System journal (Pohybové ústrojí).

ABSTRACT

Disorder in Locomotors System in children is mostly connected with Minima Brain Dysfunction (MBD), with Syndrome of Contractures and Deformities (SofCD) and of course with congenital, neurological and others causes. Adults people are suffering very often - if they in childhood were not fully and properly cured.

In paper we presented problems of hips, knees, feet, spine – in children and adults. We have proposed the methods of therapy and prophylaxis.

Key words: Minimal Brain Dysfunction (MBD), Syndrome of Contracture and Deformities (SofCD), Hips. Knee. Dysplasia. Arthrosis

INTRODUCTION

The proper therapy is possible if the proper diagnosis is first established. In the article we present the disorders and malformations of the locomotor system in following groups of pathology:

1/ Minimal Brain Dysfunction (MBD),
2/ Syndrome of Contractures and Deformities (SofCD),
3/ Problems of hip – children and adults – arthrosis,
4/ So-Called Idiopathic Scoliosis. Therapy. Prophylaxis.
5/ Knee problems connected with improper way of sitting,
6/ Feet problems.

The problems we present in 12 points and suitable figures:

1/ Minimal Brain Dysfunction (MBD). Causes (Fig. 1). Around 18%–20% in our material are cases of MBD The causes of disorders in all cases were asphyxia during pregnancy, during delivery, or both, or because of brain illnesses in first years of life of the child. We present these causes

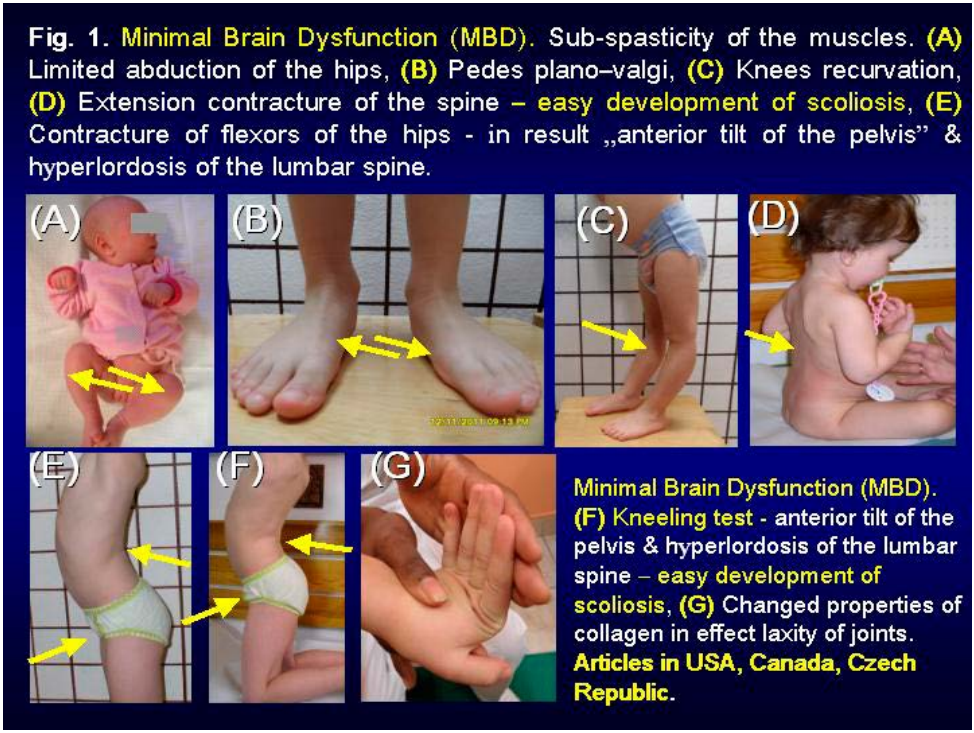


Fig. 1. Minimal Brain Dysfunction (MBD). Sub-spasticity of the muscles. **(A)** Limited abduction of the hips, **(B)** Pedes plano–valgi, **(C)** Knees recurvation, **(D)** Extension contracture of the spine – easy development of scoliosis, **(E)** Contracture of flexors of the hips - in result „anterior tilt of the pelvis" & hyperlordosis of the lumbar spine.

according obstetrics and gynecologists (Prof. Jan Oleszczuk and co-authors) and pediatric and neurology specialists:

(1) chronic inefficiency of placenta and in result intrauterine limitations of fetus growth,
(2) oligohydramnios and spotting,
(3) umbilici cord around the body of fetus,
(4) uterus contractions during pregnancy,
(5) excessively intense action of uterus during delivery as well as uterine tetanus,
(6) hypertension, hypotension and anemia of gravidity mother,
(7) infection of urinary tract,
(8) difficult delivery and use of forceps during delivery,
(9) stress and noise,
(10) overdoses or improper medication during delivery and Twin Twin Transfusion Syndrome,
(11) mellitus at newborns – bigger than normal – first communication – Prof. Harald Thom from Heidelberg (T. Karski – DAAD stay in Heidelberg & Essen, 1972–1973 and stay of J. Karski in 1991 in Heidelberg one and have months).

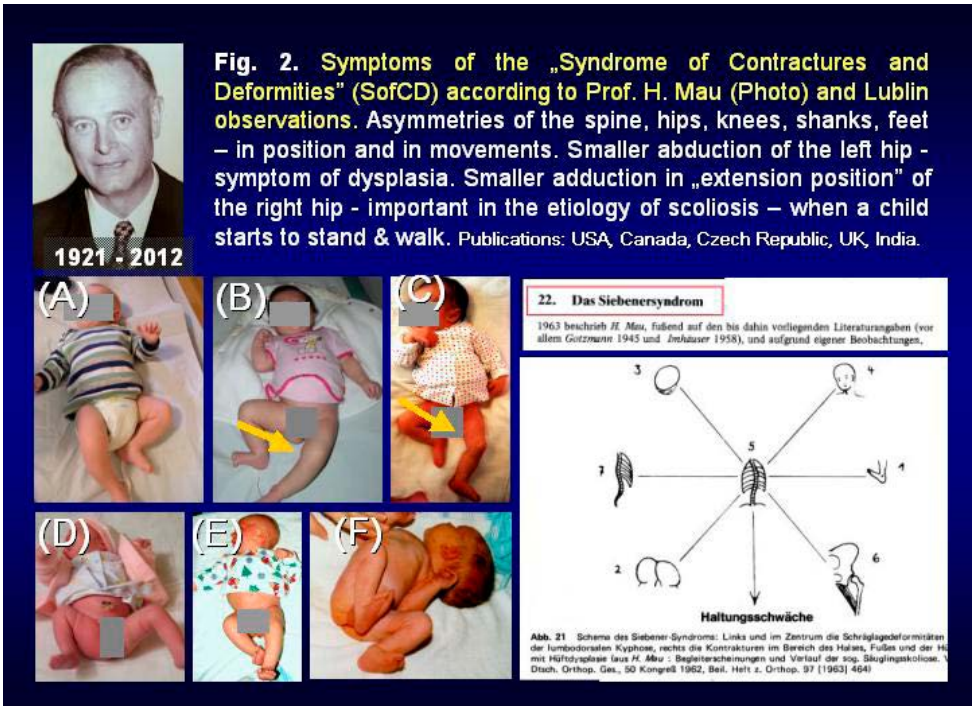


Fig. 2. Symptoms of the „Syndrome of Contractures and Deformities" (SofCD) according to Prof. H. Mau (Photo) and Lublin observations. Asymmetries of the spine, hips, knees, shanks, feet – in position and in movements. Smaller abduction of the left hip - symptom of dysplasia. Smaller adduction in „extension position" of the right hip - important in the etiology of scoliosis – when a child starts to stand & walk. Publications: USA, Canada, Czech Republic, UK, India.

Fig. 3. Importance for hips. On pictures incorrect nursing - wrong way of carrying a child - no abduction of the hips. Danger of development of dysplasia. Such carrying is recommended by „poorly" educated or „over – educated" doctors in many countries in Europe. Pictures taken in Poland (A & B) and abroad (C & D).

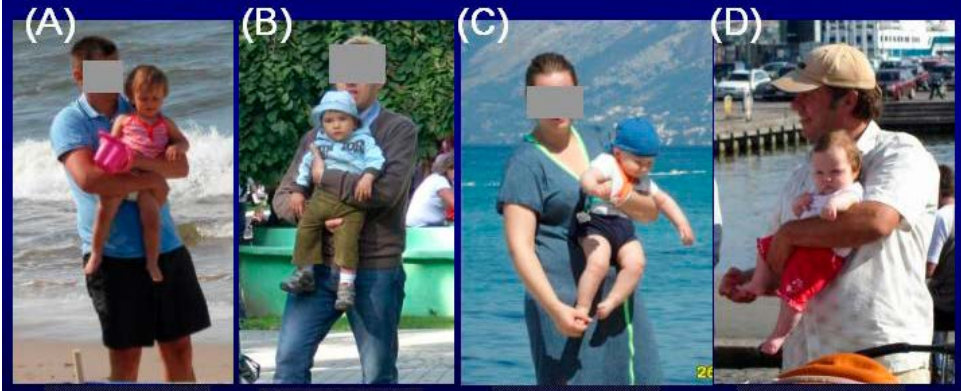
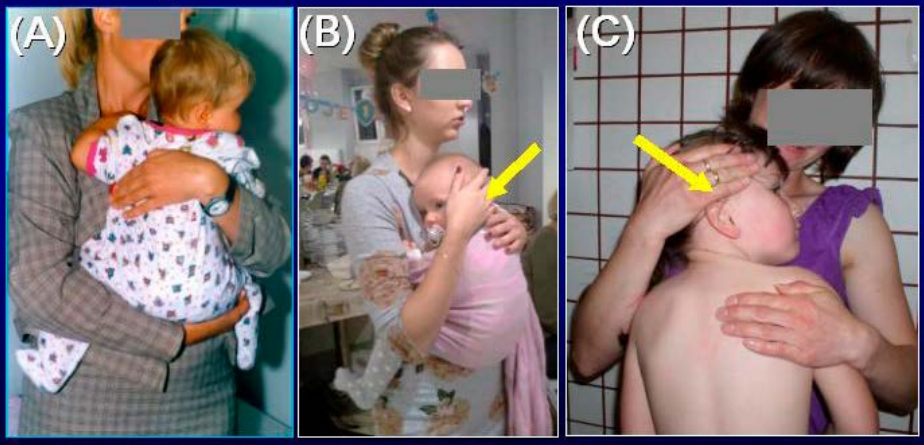
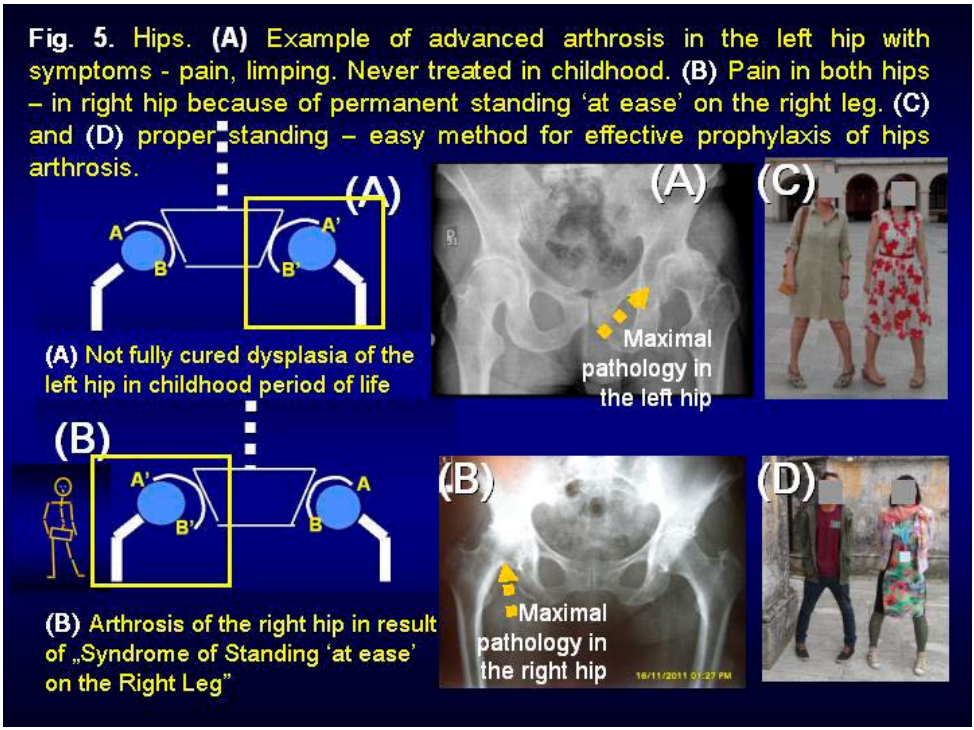


Fig. 4. Importance for hips. The correct way of carrying a child. Prophylaxis of the hips dysplasia **(A) (B)**. Proper therapy of the wry neck / torticollis – in **(B)** on the left side and in **(C)** on the right side. Permanent rotation stretching of the head to the wry neck side is the only proper method of therapy. Articles about this method in Germany and in USA [T. Karski 1991 & 2017, 2020].





In ours material we present in 12 points the problems of hips, knees, feet, pelvis and spine – as one unit. According Prof. Dietrich Schlenska – Helsinki / Finland (1984–2004) – pelvis and spine is "in function one unit" and we confirm this information in connection to "development of the so-called idiopathic scoliosis".

2/ "Syndrome of Contractures and Deformities" – is the second group of pathology presented in our article and lecture (Fig. 2). The *"Syndrome of Contracture and Deformities"* had been described firstly by Prof. Hans Mau from Tübingen (Germany 1960–1970) as *Siebenersyndrom* (German) – it means *"Seven Contractures Syndrome"* (SofC). In 2006 we (T. Karski, J. Karski) complete this SofC for eights deformity – "Varus deformity of shanks" and from this time our diagnosis is *"Syndrome of Contracture and Deformities "* (SofCD). This pathology is connected with improper "development conditions" for fetus in pregnancy period – from mother's side, or from child's side or both.

3/ Problems of hips – children. Information in pictures about improper nursing of children (Fig. 3). In the *„Syndrome of Contractures and Deformities"* (SofCD) we often observe the limited abduction, mostly left hip and in result can be hip dysplasia or even dislocation. For proper development of hips it is necessary proper "prophylactic nursing of the child" one year or longer or using even orthopedic devices. We present pictures of "improper carrying" of children in many European countries.

4/ Problems of hips – children. Information in pictures about proper nursing of children and therapy of wry neck (Fig. 4). The correct way of carrying a child means assurance for good development of hips. Such carrying should be done one or two years. In this time – the acetabulum – in many children is very shallow. Prof. Marian Koszla (1960 –1970) from Warsaw had to spoken – such situation is so frequent that we can say "*physiological* dysplasia"(?!). In paper we presented also proper therapy of the wry neck on left side or on right side. Permanent rotation stretching of the head – its mean – of the muscle sterno – cleido – mastoideus – to the wry neck side is the only proper method of therapy – (Publications in Germany in 1991 and in USA in 2017 [T. Karski, J. Karski, K. Karska].

5/ Problems of hips – adults. Explanation of some causes of the arthrosis left and right hip joint (Fig. 5). In our Department we noticed dysplasia on left side – very often, on right side and both more seldom. It is in correlations with the observation of Prof. Hans Mau. In his description about the "Seven Contractures Syndrome" (German – *Siebenersyndrom*) – the left hip is more frequent threatened. If the dysplasia is not completely cured – in adults age can be arthrosis. Right hip arthrosis is often connected with the permanent standing on the right leg from the childhood till end of life. It is observation in Lublin in 1997. Many articles about this observation are published in USA, UK and in Czech Republic.

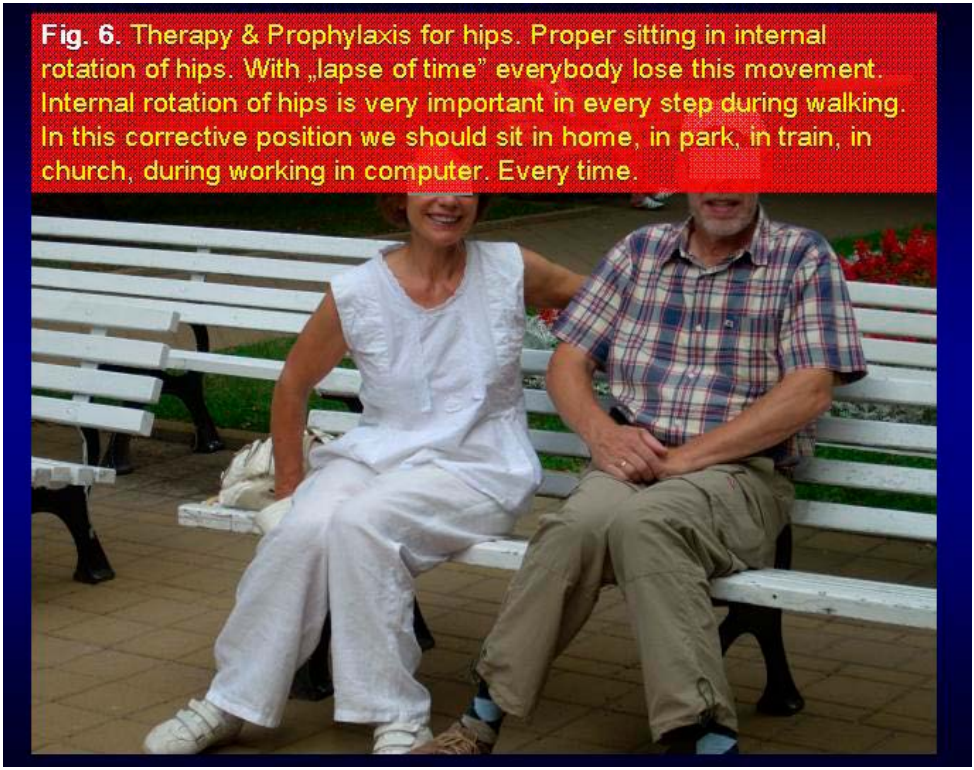
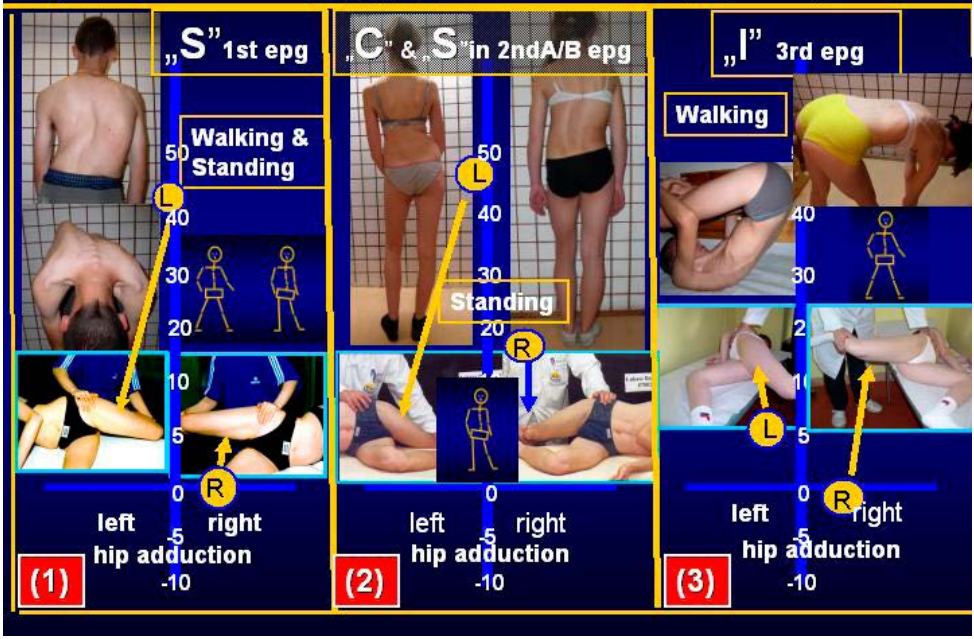
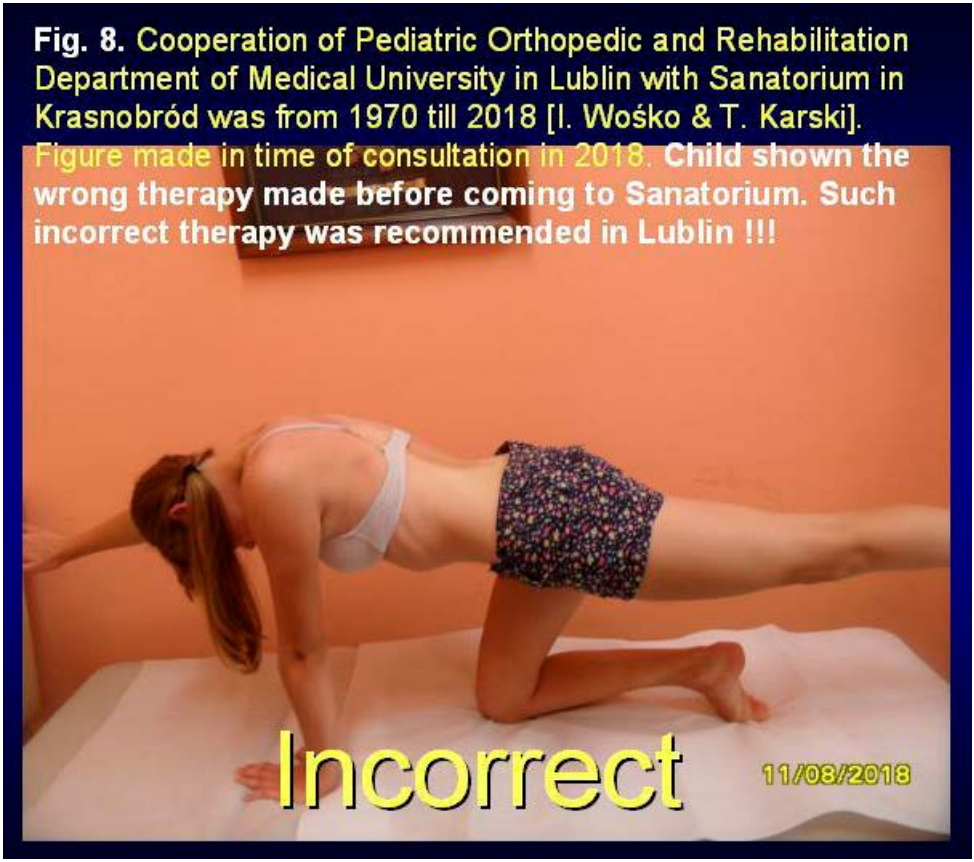


Fig. 7. Biomechanical etiology of the So-Called Idiopathic Scoliosis [Karski T. 1995-2007]. Influence: „Standing 'at ease' on the Right Leg" & „Walking". Connection with range of adduction of the hips **(1) (2) (3).** New classification: 3 groups & 4 types.



6/ Information about prophylaxis methods against arthrosis of hips. Special form of standing and sitting (Fig. 5C D, 6). In prophylaxis and in therapy of hips arthrosis important is – special standing and sitting. In such standing and sitting – the centralization of the femur heads into acetabulum is proper and sufficiently deep, loading is safe and stable. This therapy should be perform – every day in every situation over many years.

7/ So-Called Idiopathic Scoliosis. Information about basic and additional causes of this spine deformity **(Fig. 7).** First observation were performed in years 1984 – 1995 till 2007 (T. Karski). In Helsinki (1984) during scholarship stay in Invalid Foundation Hospital were done the first observations about "etiology of idiopathic scoliosis". But were found and fully described the causes of etiology in years 1995–2007 in Lublin. Minimal Brain Dysfunction (MBD) is the additional cause in development of the so-called idiopathic scoliosis (publications T. Karski: USA, Canada, Czech Republic, Poland). Prof. M. Roth – Czech Republic / Brno / 1923 / described these causes as „neuro--osseous-growth-relations". We confirm this observation - but according ours knowledge the MBD abnormalities are only additional cause in development of scoliosis. The etiology is fully described in www.ortopedia.karski.lublin.pl

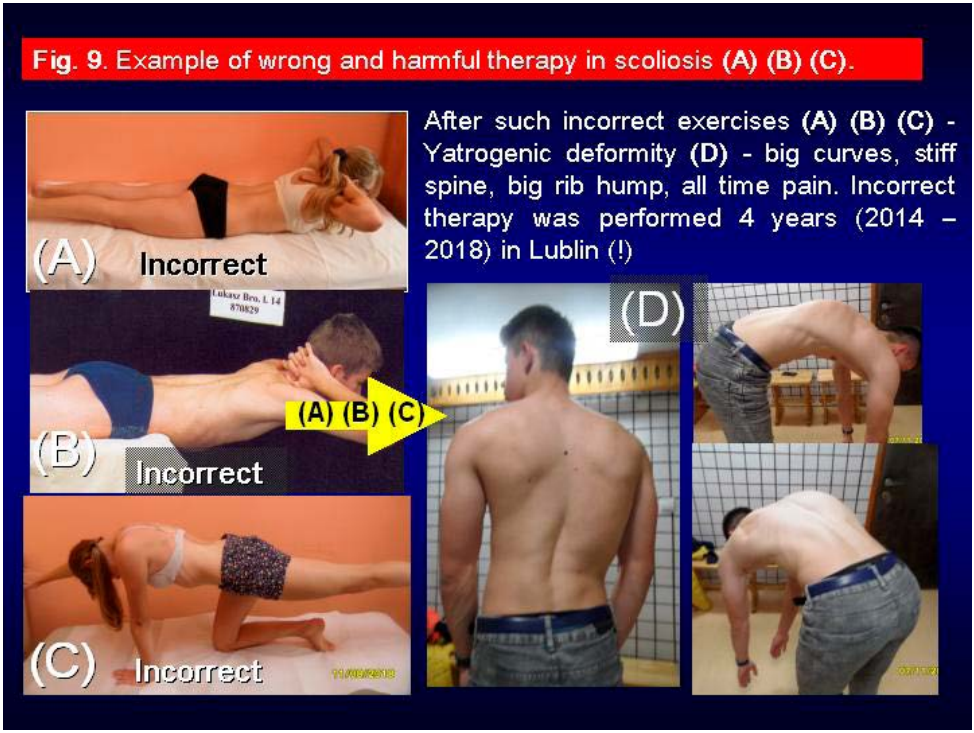


There are 3 groups & 4 types of so-called idiopathic scoliosis.

1/ First group of scoliosis – 1st etiopathological group (epg) is "S" deformity and is connected with "gait" & "standing 'at ease' on the right leg". Deformity is in form 3D – stiff spine, two curves, rib hump on right side of thorax. Progression. Some cases "lordoscoliosis".

2/ Second group – 2nd A epg – "C" & B epg – "S" deformity connected with "standing 'at ease' on the right leg". Deformity is 1D or 2D. Spine flexible. Some cases "kiphoscoliosis". In "S" scoliosis in etiology additionally laxity of joints or / incorrect previous therapy.

3/ Third group – 3rd epg - "I" deformity – only stiffness of spine, no or small curves. Deformity is 2D or 3D. This group of spine deformity was included to scoliosis group and type - of Lublin classifica-



tion in 2004 after discussion with Prof. Keith Luk and Prof. Kenneth Cheung in Hong Kong (2004 – T. Karski).

8/ & 9/ So-Called Idiopathic Scoliosis – information about – old – wrong incorrect therapy (Fig. 8, 9). In our paper we present old incorrect methods of therapy. In spite of ours many publications and presenting the rules of prophylaxis and therapy – on many Symposia and Congresses – 1995–2023 – the therapy in Poland – and in many others countries till now is improper. Even improper in Lublin. In 2007 during Symposium in Regensburg – in discussion about scoliosis – it was told me – it is German proverb *"Vetrauen und kontrollieren"* (English – Believe but control) – but in Poland the authorities – Professors – no control, no introduce the proper method of therapy – they recommended only 'strengthened exercises". My colleagues – tell me only one word "no".

10/ So-Called Idiopathic Scoliosis. Proper therapy (Fig. 10). Ours methods of treatment of scoliosis we introduced in 1984–1995 and we continue such therapy till now (2023). There are stretching exercises – flexions exercises for spine, for concave side of the curve. Here – our obligation is to inform that flexion exercises in therapy of scoliosis had recommended in years 1960–1970 Prof. Stefan Malawski from Warsaw.

In therapy – important is standing only on the left leg. Very important are also sports arts like karate, taekwondo, aikido, kung fu, yoga and should be done since the first years of child's life.

11/ Problem of knees connected with incorrect position of sitting (Fig. 11). Pain syndromes of knees are very frequent at many patients and the causes are: varus deformity, valgus deformity and in result of this not proper axis of legs – instability of knee joint. The improper position of sitting is leading not only to instability of knee but – also – to limitation of hip joint or joints movements and in result to "pains syndrome". (T. Karski & J. Karski & K. Karska – articles: India, UK).

12/ Podology. Two problems (Fig. 12).
First problem – importance of full movement of all joints of feet – and it is connected with shoes. Too high heels of shoes in the cause of limitation of dorsal flexion of feet. Too narrow shoes are the cause of hallux valgus deformity and limitation of plantar flexion of toes. This limitation is very frequent cause of "pain syndromes of feet".

Second problem – instability of ankle joint – because of permanent "distortion syndrome". It can happened during getting out the car on leg. First publication about this second problem was in 2017 in USA next in India and Czech Republic (2016–2021). **See** www.ortopedia.karski.lublin.pl point 17.

DISCUSSION AND CONCLUSIONS

Proper status of locomotor system in adults depends of proper prophylaxis and therapy in children. It is special important in problem of hips, spine, knees and feet.

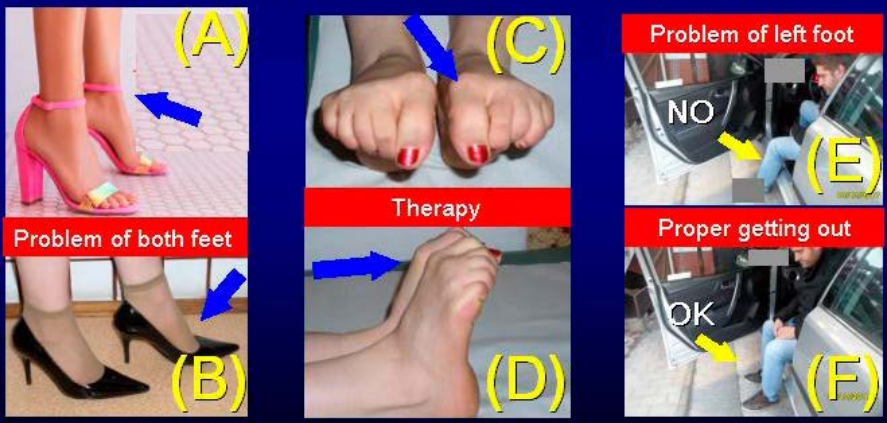
In therapy and in prophylaxis important are only stretching exercises leading to symmetry of anatomical growing and symmetry of function.

This principles are especially important in therapy of the So-Called Idiopathic Scoliosis.

REFERENCES

1. BURWELL G, DANGERFIELD PH, LOWE T, MARGULIES J. (2000). Spine. Etiology of Adolescent Idiopathic Scoliosis: Current Trends and Relevance to New Treatment Approaches, Volume 14(2), 324.
2. DANGERFIELD PH, DORGAN JC, SCUTT D, GIKAS G, TAYLOR JF. (1995). Stature in Adolescent Idiopathic Scoliosis (AIS).14 Meeting EPOS, Brussels, 1995, 210.
3. GREEN NE, GRIFFIN PP. Hip dysplasia associated with abduction contracture of the contralateral hip. (1982). J.B.J.S.1982, 268 63-A, 1273–1281.

Fig. 12. Podology - important proper shoes – not high heels & not narrow front part. **(A)** and **(B)** shoes improper - **(A)** reduce dorsal flexion in ankle joint and **(B)** reduce plantar flexion of toes in metatarsal phalange joints. **(C)** and **(D)** exercise for the toes. **(E)** improper getting out of the car – one leg – in result rotation distortion of ankle joint and knee. In picture **(F)** proper getting out of the car - two legs. Publication USA, India, Czech Republic (2016 – 2021). See www.ortopedia.karski.lublin.pl



4. GRUCA A. in Tylman D. (1995) Patomechanika bocznych skrzywień kręgosłupa, Wydawnictwo Severus, Warszawa, 1995, Seiten 167.
5. HEIKKILÄ, E. (1984). Congenital dislocation of the hip in Finland: an epidemiologic analysis of 1035 cases. Acta Orthopaedica Scandinavica, 55(2), 125–129.
6. HENSINGER RN. (1979). Congenital dislocation of the hip. Clinical Symp. 1979 (31), 270
7. HOWORTH B. (1977). The etiology of the congenital dislocation of the hip, Clin. Orthop., 1977 (29), 164–179.
8. KARSKI, T. (1996). Kontrakturen und Wachstumsstoerungen im Hueft-und Beckenbereich in der Aetiologie der sogenannten" idiopathischen Skoliosen" biomechanische Ueberlegungen. Orthopadische Praxis, 32, 155–160.
9. KARSKI, T. (2002). Etiology of the so-called "idiopathic scoliosis". Biomechanical explanation of spine deformity. Two groups of development of scoliosis. New rehabilitation treatment; possibility of prophylactics. In Research into Spinal Deformities4 (pp. 37-46). IOS Press.
10. KARSKI, T., KALAKUCKI, J., & KARSKI, J. (2006). „Syndrome of contractures" (according to Mau) with the abduction contracture of the right hip as causative factor for development of the so-called idiopathic scoliosis. Studies in Health Technology and Informatics, 123, 34.
11. KARSKI, T. (2010). Factores biomecánicos en la etiología de las escoliosis denominadas idiopáticas. Nueva clasificación. Nuevos test clínicos y nuevo tratamiento conservador y profilaxis. Biomechanical factors in the aetiology of scoliosis so-called idiopathic. New classification. Cuestiones de Fisioterapia, 39(2), 136–143.

12. KARSKI T. (2010). Biomechanical Etiology of the So called Idiopathic Scoliosis (1995-2007). New Classification: 285 Three Groups, Four Sub-types. Connection with „Syndrome of Contractures", Pan Arab J. Orth. Trauma. (14), 286.
13. KARSKI, T. (2013). Biomechanical etiology of the so-called Idiopathic Scoliosis (1995–2007). Three Groups and Four Types in the New Classification. J Nov Physiother S, 2, 4.
14. KARSKI, J, & KARSKI, T. (2013). So-Called Idiopathic Scoliosis. Diagnosis. Tests Examples of Children Incorrect Treated. New Therapy by Stretching Exercises and Results. Journal of Novel Physiotherapies, 3(2), 9.
15. KARSKI T. (2014). Biomechanical Aetiology of the So-Called Idiopathic Scoliosis. New Classification (1995–2007) in Connection with "Model of Hips Movements". Pages 12. Global Journal of Medical Research H: Orthopedic and Musculoskeletal System, 14 (3), 2014.
16. KARSKI T. (2014). Biomechanical Etiology of the Socalled Idiopathic Scoliosis (1995–2007) – Connection with "Syndrome of Contractures"-Fundamental Information for Pediatricians in Program of Early Prophylactics. Surgical Science, 2014 (5), 33–38.
17. KARSKI TOMASZ, KARSKI JACEK. (2015). Syndrome of Contractures and Deformities according to Prof. Hans Mau as Primary Cause of Hip, Neck, Shank and Spine Deformities in Babies, Youth and Adults American Research Journal of Medicine and Surgery, 1(2), 2015.
18. KARSKI TOMASZ, JACEK KARSKI (2015). Biomechanical etiology of the so-called Idiopathic Scoliosis (1995–2007). Causative role of „gait" and „permanent standing 'at ease' on the right leg". New classification. Principles of new therapy and causal prophylaxis. Canadian Open Medical Science & Medicine Journal, 1(1), 1–16.
19. KARSKI J, KARSKI T, PYRC J, KULKA M. (2016). Deformations of the feet, knees, hips, pelvis in children and adults with minimal brain dysfunction. causes. treatment. Prophylaxis. Locomotors System POHYBOVÉ ÚSTROJÍ , ročník 23(2).
20. KARSKI, T. Physiotherapy–Correct, or Incorrect, Based on 'Wrong Principles of Treatment'. Example for Spine, Hip, Knee, Shank and Feet. Spine, 1, 5.
21. KARSKI T, KARSKI, J, KARSKA, K., KARSKA, K., & MENET, H. (2018). Pediatric prophylaxis program of motor system deformations and illnesses in children. Problems of Spine, Hips, Knees and Feet 7: 704–714.
22. KARSKI, T., KARSKI, J., KARSKA, K., KARSKA, K., & MENET, H. (2018). Prophylactic rules for newborns, babies, children and adults in problems of hip, knee, shank, feet and spine. Int J Ortho Res, 2023 Volume6 | Issue3 | 90 Online Journal Crimson Publishers.
23. KARSKI, T, & KARSKI, J. (2016). Bóle krzyża-problem neurologiczno-ortopedyczny. Objawy, przyczyny, leczenie i profilaktyka. Neurol. Prakt, 16(4), 9–16.
24. KARSKI, J, & KARSKI, T. (2016). Imperfect hips as a problem at an older age. Early and Late Prophylactic Management before Arthrosis. Jacobs Journal of Physiotherapy and Exercises, 2(1), 7.
25. KARSKI, T. (2018). Biomechanical Aetiology of the So-called Adolescent Idiopathic Scoliosis (AIS). Lublin Classification (1995-2007). Causative Influences Connected with "Gait" and "Standing 'at ease'on the Right Leg". J Orthop Bone Res, 1(10).
26. KARSKI, T. (2019). Biomechanical Etiology of the So Called Idiopathic Scoliosis, Connection with "Syndrome of Contractures and Deformities", Role of Gait and Standing 'At Ease'On the Right Leg in the Development of Spine Deformity, New Treatment, Causal Prophylactics. spine, 30, 32.
27. KARSKI, T. (2019). Biomechanical Etiology of the So-called Idiopathic Scoliosis (Adolescent Idiopathic Scoliosis [AIS]). New Classification Rules of Therapy and Prophylaxis. Nur and Hea Care J, 4(1), 81–85.
28. LOWE, TG, EDGAR, M, MARGULIES, JY, MILLER, NH, RASO, VJ, REINKER, KA, & RIVARD, CH (2000). Etiology of idiopathic scoliosis: current trends in research. JBJS, 82(8), 1157.

29. STEFAN, M. (1992). Epidemiologia skoliozy. Postępy Polskiej Spondyloortopedii, 5, 5.
30. STEFAN, M. (1992). Własne zasady leczenia skolioz niskostopniowych. Postępy Polskiej Spondyloortopedii, 2, 2.
31. MALAWSKI, S. (1994). Własne zasady leczenia skolioz niskostopniowych w świetle współczesnych poglądów na etiologię i patogenezę powstawania skolioz. Chirurgia Narządów Ruchu i Ortopedia Polska, 59(3), 189–197.
32. MAU HANS. (1979). Ätiopathogenese von Skoliose, Hüft dysplasie und Schiefhals im Säuglinsalter. Zeitschrift f. Orthop, 5, 601-605.
33. MAU, H. (1982). Die Atiopatogenese der skoliose, bücherei des orthopäden. enke verlag stuttgart, 1, 1–110.
34. NORMELLI, H. (1985). Asymmetric rib growth as an aetiological factor in idiopathic scoliosis in adolescent girls.
35. TYLMAN, D. (1972). Patomechanika bocznych skrzywień kręgosłupa. Państwowy Zakład Wydawnictw Lekarskich.
36. Stokes, I. A. (Ed.). (1999). Research into spinal deformities2 (Vol. 2). IOS press.
37. SEVASTIK, JA, & DIAB, KM (Eds.). (1997). Research Into Spinal Deformities1 (Vol. 37). IOS Press.
38. TYLMAN, D. (1972). Patomechanika bocznych skrzywień kręgosłupa. Państwowy Zakład Wydawnictw Lekarskich.
39. www.ortopedia.karski.lublin.pl [from 2006] Copyright: ©2023 Tomasz Karski, et al. This is an open-access article

References

www.ortopedia.karski.lublin.pl

Corresponding author: Prof. Tomasz Karski MD PhD. In years 1995–2009 – Head of Pediatric Orthopedic and Rehabilitation Department of Medical University in Lublin, Poland.

Actually – Professor Lecturer in Vincent Pol University, Lublin, Poland. Phone +48 604 933 234 – for SMS / tmkarski@gmail.com

SO-CALLED IDIOPATHIC SCOLIOSIS. HISTORICAL DATES OF DISCOVERIES. FATE AND FORTUNE OF NEW KNOWLEDGE. BIOMECHANICAL ETIOLOGY, NEW CLASSIFICATION, THERAPY AND CAUSAL PROPHYLAXIS

Karski Tomasz

Vincent Pol University of Lublin, Poland
tmkarski@gmail.com

ABSTRACT

So-Called Idiopathic Scoliosis is very frequent deformity of spine in many children and adolescents in many countries. In Lublin in years 1984/1995–2007 was described the biomechanical etiology, was given the new classification, was described the new therapy and causal prophylaxis. The etiology is connected with 1. asymmetry of movement of hips, 2/ biomechanical influences – walking and standing 'at ease' on he right leg, 3/ influence on pelvis and spine – asymmetrical growing – in result scoliosis

In paper – are presented many examples of old wrong therapy and of new proper therapy.

Key words: So-called idiopathic scoliosis. Etiology. Role of walking, standing. Therapy.

1/ Introduction

The biomechanical etiology of the so-called idiopathic scoliosis [Adolescent Idiopathic Scoliosis (AIS)] has been the subject of the author's research since 1984. Primary – during scholar ship stay in Invalid Foundation Hospital in Helsinki (1984), next in Pediatric Orthopedic University Department in Lublin (1984–2009. From 2009 till 2023 in Out Patients Clinic.

2/ Material

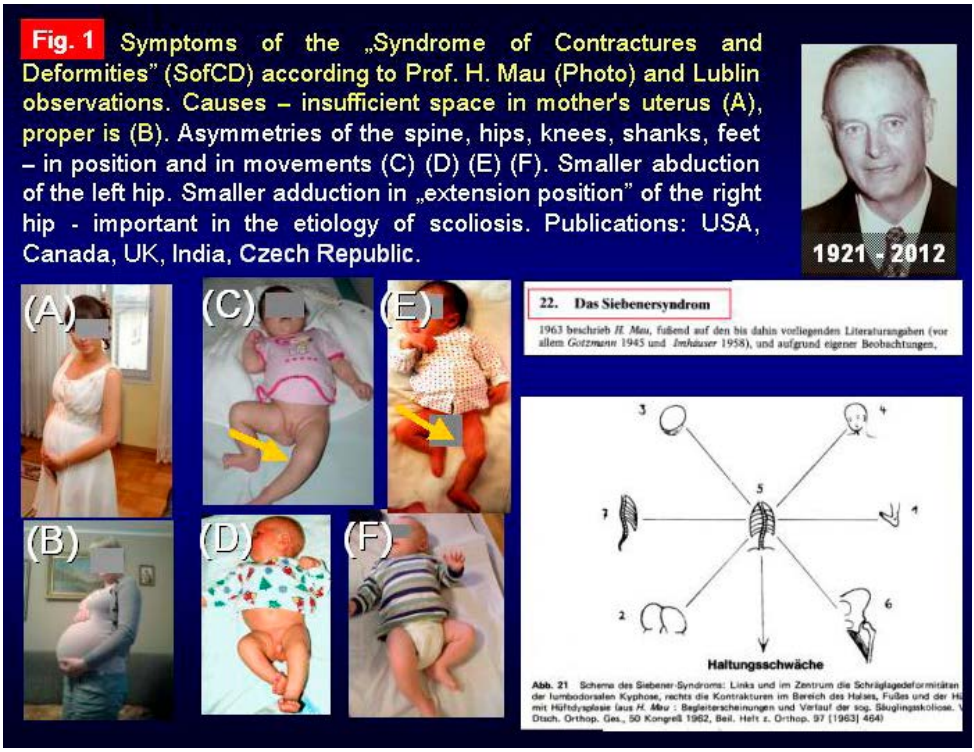
In the period from 1984 till 2023 have been observed children with scoliosis (N-3500). The principle information about the subject was found in the years 1995–2007.

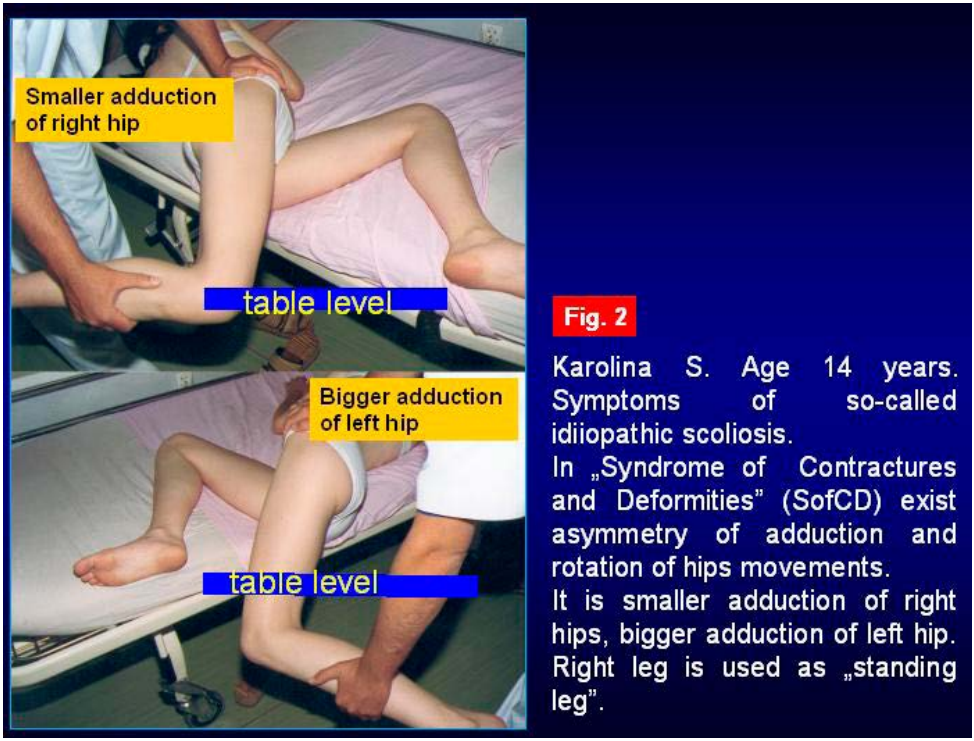
3/ Primary observations – asymmetries in various parts of the body, also in hips movement (Fig. 1).

The asymmetry of hips movement is one of the symptoms of the "Syndrome of Contracture and Deformities" (SofCD) according to Prof. Hans Mau [personal knowledge from Heidelberg and Essen 1972–1973 during my DAAD scholarship stay] and Lublin observations [1984–1988/2023]. Next – this knowledge was enlarge in personally discussions with Professor Hans Mau. SofCD develop – if the space in uterus of mother is insufficient for the fetus **(Fig. 1 (A).**

4/ The etiology of the So-Called Idiopathic Scoliosis is strictly biomechanical.

The crucial is asymmetry of hips moment **(Fig. 2, 3, 4) –** because has influence on ours function – "**standing"** and **"walking".** Scoliosis develops because of "permanent standing 'at ease' on the right leg" and in some types is connected with "gait".





As causative influence is:
1/ "standing" and "gait" is in "S" scoliosis in the 1 etiopathological group (epg),
2/ only "standing" in "C" 2nd / A epg and "S" 2nd / B epg group / type,
3/ only walking in "I" 3 rd epg group of scoliosis.

5/ Classification. Three models of hips movement and three group and four types of scoliosis (Fig. 5, 6, 7).

a) First group "S" scoliosis – the adduction movement in the right hip is limited to 0 degrees, or to (-) 5 or to (-) 10 degrees and on the left side the adduction movement is 40-50 degrees,
b) Second group "C" or "S" scoliosis – the adduction movement is only less and limited to 15-20 degrees in comparison to the left hip with the full movement of 40-50 degrees
c) Third group "I" scoliosis – the adduction of the right hip is limited to 0 or (-) 5 or (-) 10 degrees and in the left hip adduction also limited to 0 or 10 or 20 degrees.

These asymmetrical movements of the hips make the oblique position of the pelvis (X-ray) and give functional influences to the spine during walking and standing [important cumulative time of

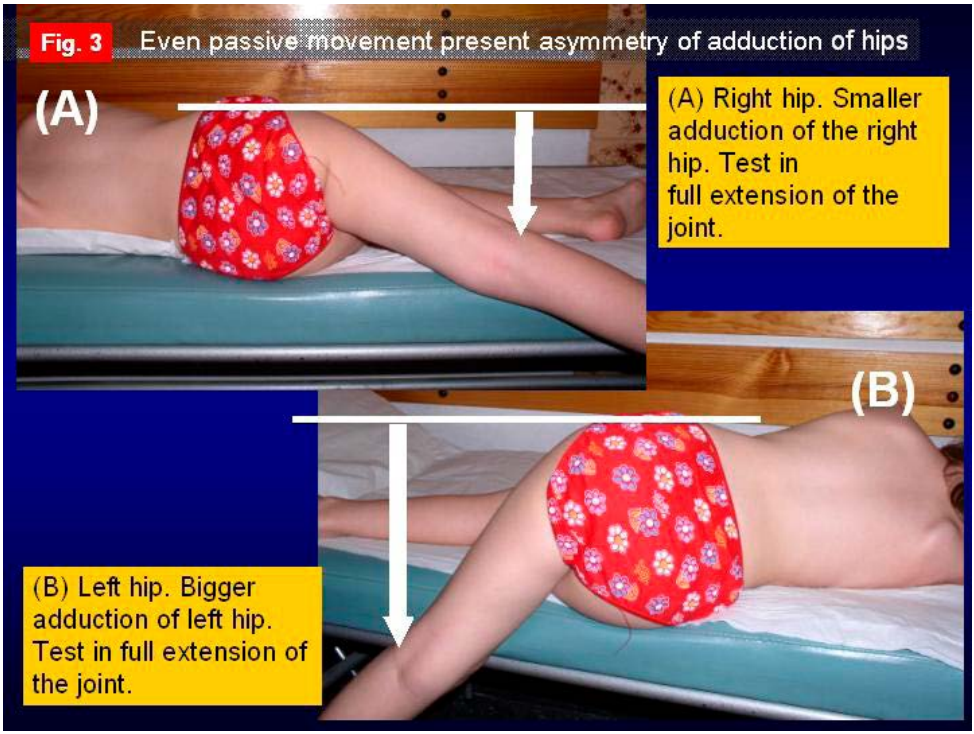
standing]. In many cases of scoliosis, we see the "functional shortening of the left leg" because of the abduction contracture of the right hip. Changes in a "form of changed movement of pelvis and spine during walking" – have an influence on anatomy of the spine and are possible to see only in "computer gait analysis".

6/ First presentation of the problem and first publication

The first presentation of the biomechanical etiology of the so-called idiopathic scoliosis was in 1995, in Hungary / Szeged during the Orthopedic Congress of Hungarian Orthopedic and Traumatology Association. First publication was in Germany in the journal Orthopädische Praxis (1996).

7/ Historical Dates of Discoveries

The dates in research of scoliosis (Karski T. 1995–2007/2020) are the following:



1/ 1995 – the first lecture about biomechanical etiology of the so-called idiopathic scoliosis during the Orthopedic Congress in Szeged, Hungary.

2/ 1996 – the first publication about biomechanical etiology of scoliosis in Orthopädische Praxis in Germany [21]: T. Karski [1996*] Kontrakturen und Wachstumstörungen im Hüft- und Beckenbereich in der Ätiologie der sogenannten "idiopatischen Skoliosen"-biomechanische Überlegungen, Orthopädische Praxis 32, 3 (1996) 155-160*

3/ 2001 and 2004 – was giving the new classification: three (3) etiopathological groups (epg) and four (4) types of scoliosis:
a/ "S" scoliosis in 1 epg.
b/ "C" and "S" scoliosis in 2nd/A/B epg.,
c/ "I" scoliosis in 3 epg. This last type – "I" scoliosis – before 2004 had not been classified as a scoliosis because this deformity consists only of "stiffness of the spine" without curves or only with small ones.

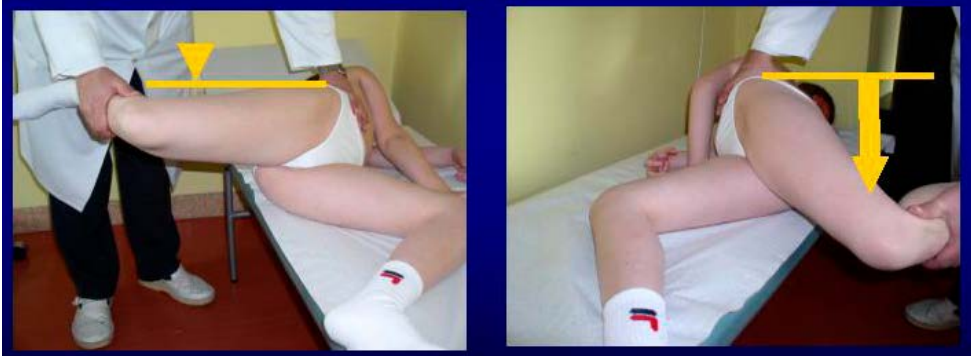
4/ 2006 – the ultimate description of the "type of hip movements" and the "type of scoliosis".

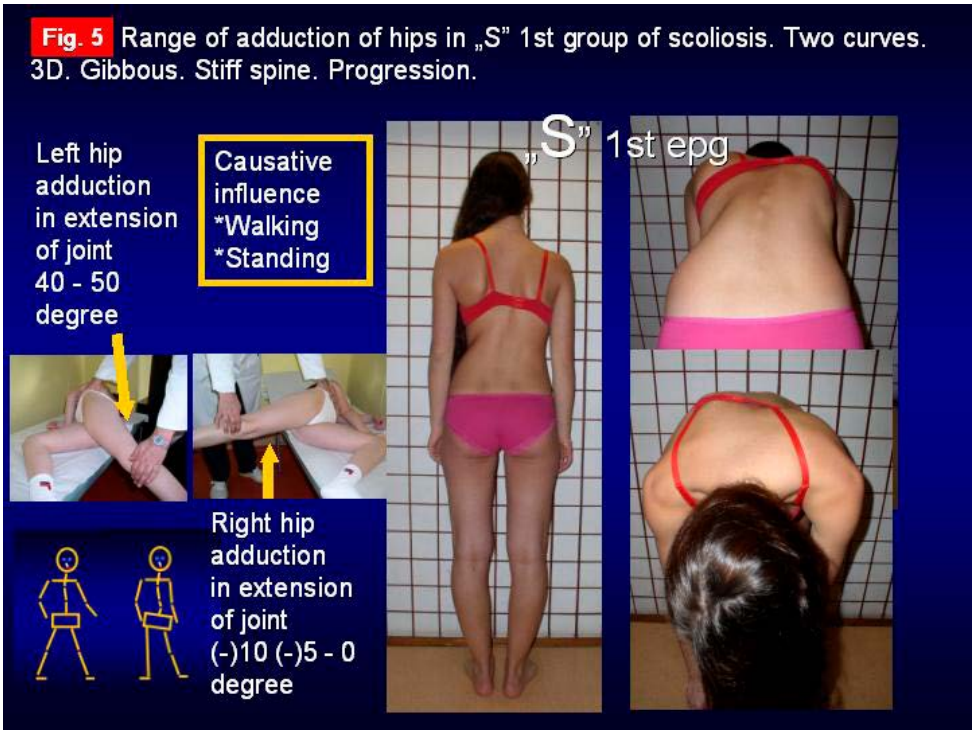
5/ 2007 – description of indirect influences to the spine going from the pathologic symptoms of Minimal Brain Dysfunction (MBD). The answer to the question "why blind children do not have scoliosis" has been found at this time as well.

6/ 2000-2020/2023 – presentation of many lectures abroad in the following countries: Slovak Re public, Czech Republic, Hungary, Germany, England, Spain, Belgium, Cuba, China-Hong Kong, China-Beijing, Egypt, Turkey, Morocco, Byelorussia, Finland.

Fig. 4

Adduction of hips test – shown the difference in range of movement. Tests to recognize the danger of scoliosis. Because of this asymmetry - standing on the right leg is stable, easy, conformable – but with the time is the cause of scoliosis in form of lumbar left convex curve.





8/ The Biomechanical Etiology of the So-Called Idiopathic Scoliosis Answers to All Questions Directed to the Problem [Literature 8-29, 43].

In research of etiology of the so-called idiopathic scoliosis everybody will answer the question: what is "the etiology?" – must answer all the questions about scoliosis.

These Are the Following Questions and Answers:

[1] The etiology – is strict biomechanical – asymmetry of the anatomy of the body and the asymmetry movements of the hips. All these asymmetries are symptoms of a "Syndrome of Contractures and Deformities" (SofCD) according Prof. Hans Mau (original in German "Siebenersyndrom" – see Literature) and Lublin observations [2006-T. Karski]. In SofCD exist:

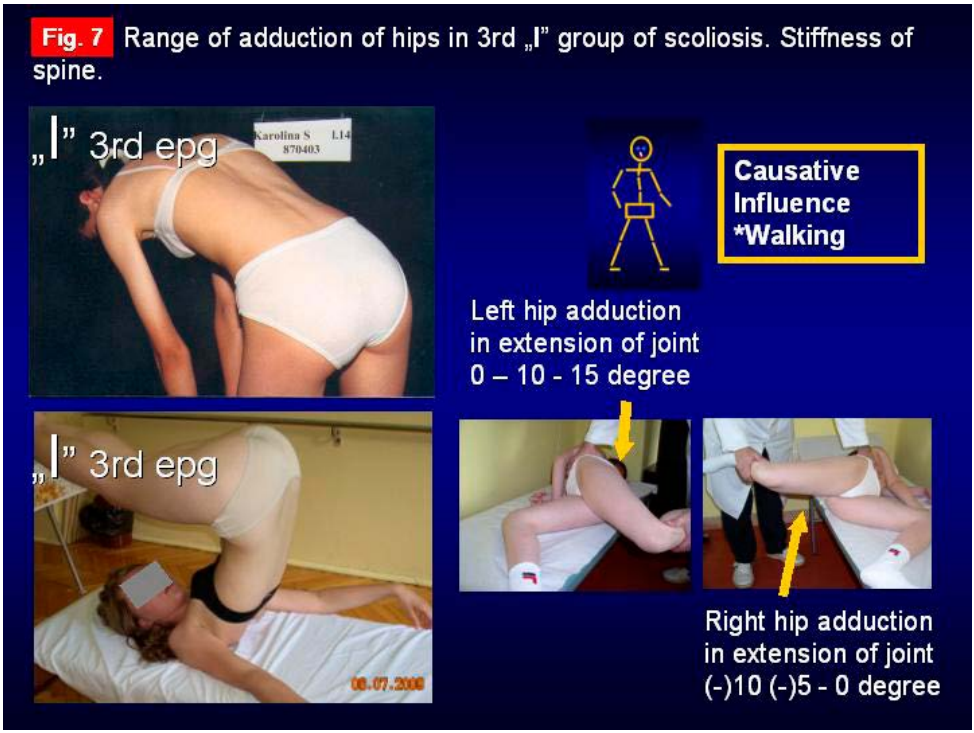
a) asymmetry of loading during gait,
b) asymmetry of time of standing on the left or right leg more on the right (!),
c) asymmetry in development and growth of the spine,
d) In result scoliosis as three etiopathological groups and four types.

[2] Why girls have more frequent scoliosis? Answer – SofCD appears mostly in girls.

[3] Why lumbar left convex curve? Answer: The SofCD is mostly "left sided" (90-95 % of Pregnancies – Prof. Jan Oleszczuk / Lublin and all gynecologists) and asymmetries in children are similarly – left sided. In the right hip limited adduction – easy standing on the right leg.

[4] Why the thoracic curve is right convex? Answer: The SofCD is mostly "left sided" as told above. Permanent standing on the right leg makes lumbar left convex curve and secondary right convex thoracic curve in 2nd / B etiopathological group (epg). Some cases in "S" 2nd / B epg scoliosis are "kiphoscoliosis".

[5] Why is there one curve or two curves scoliosis? The answer: one curve scoliosis is "C" lumbar left convex deformity is in 2nd / A epg group connected with standing 'at ease' on the right leg. Double curve is "S" 2nd / B epg scoliosis – the spine is flexible. Cause – standing and laxity of joints or previous incorrect therapy. Two curves scoliosis in form of "S" deformity is also in 1 epg group – the spine is stiff, some cases "lordoscoliosis".



Causes – standing and gait.

[6] Why is the rib hump on the right side? The answer: The SofCD is mostly left sided. In "S" 1 epg scoliosis is the permanent standing on the right leg and gait male secondary right thoracic convex curve and rib hump on the right side of the thorax – connection with gait.

[7] In which year of a child's life does scoliosis start to develop? Every type of scoliosis starts to develop when the child starts to "stand" and "walk" – at the age of two – three years.

[8] What kind of classification is proper? The proper classification is based on biomechanical etiology / influences connected with "the specific model of the hip movements" (T. Karski, 2006):

a) 1 epg – "S" scoliosis – 3D – with stiffness of spine connection with gait and with permanent standing 'at ease' on the right leg, Some cases "lordoscoliosis".
b) 2nd/A "C" scoliosis-connection with permanent standing 'at ease' on the right leg,
c) 2nd/B "S" scoliosis-connection with permanent standing 'at ease' on the right leg-plus laxity of the joints and / or incorrect exercises

d) 3 epg "I" scoliosis – small curves or none, small gibbous or none – only stiffness of the spine. This group of scoliosis is connected with gait.

[9] Why is there a rapid progression of scoliosis in the period of accelerated growth of a child? Answer: bones grow, contracted soft tissue in the region of the right hip and shortened tissue in the concave side of scoliosis do not grow and its influence becomes to be bigger (!), the deformity progress.

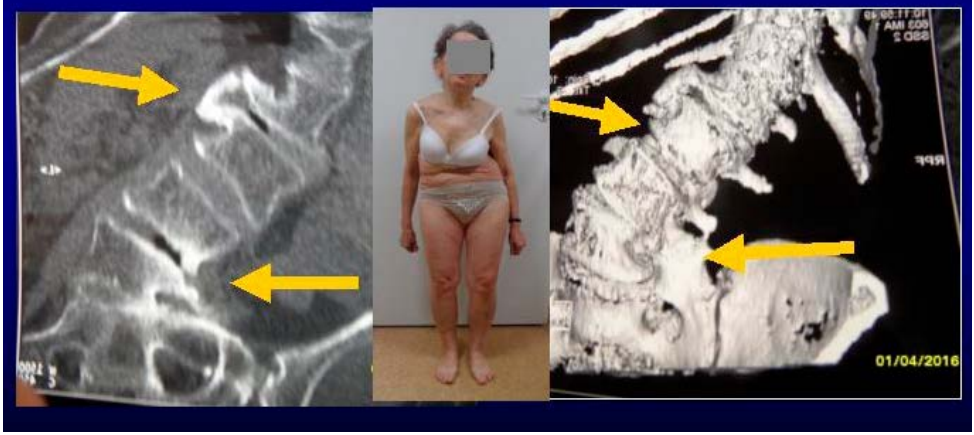
[10] Which type of scoliosis progresses most? The progression is in the 1 epg "S" scoliosis, Other types of scoliosis – progress small or when the therapy was / is incorrect,

[11] Which type of scoliosis, does not progress? The "C" 2nd/A epg, "S" 2nd/B epg scoliosis and "I" scoliosis in 3 epg type are without progression, or without big progression.

[12] Why do blind children not have scoliosis? The gait of blind children protects before scoliosis – their walk is without the lifting of the legs and every step is very carefully taken. They also stand carefully – symmetrical on both legs (observation of ophthalmologists). Do not exist biomechanical influences leading to scoliosis.

Fig. 8 Example of incorrect therapy. Patient Felixa 74 y. old. In childhood incorrect exercises and corset many years. In age of 15 operation. According to „the model of hips movement" should be only one curve scoliosis - „C" 2nd / A epg. After improper therapy iatrogenic huge deformity. Stiffness of spine. Gibbous. Pain. Internist consultation: heart and circulation function in norm, lungs and breathing in norm. Orthopedic consultation (2016): normal gait, no sign of legs paresis. In X-ray – huge arthrotic deformity – see Fig. 9.

Fig. 9 The same patient like in Fig. 7. Felixa 74 y. old. Big deformity in X ray because of improper therapy – wrong exercises and surgery. Spondylo-arthrosis visible in X-ray. Scoliosis from 2 years of life. Full adaptation of nerves, bones and blood vessels. All years easy gait every distance. Normal function of lungs. No dyspnoe. All years active. She works at home. Now in Age 74 y. come for consultation because of pain.

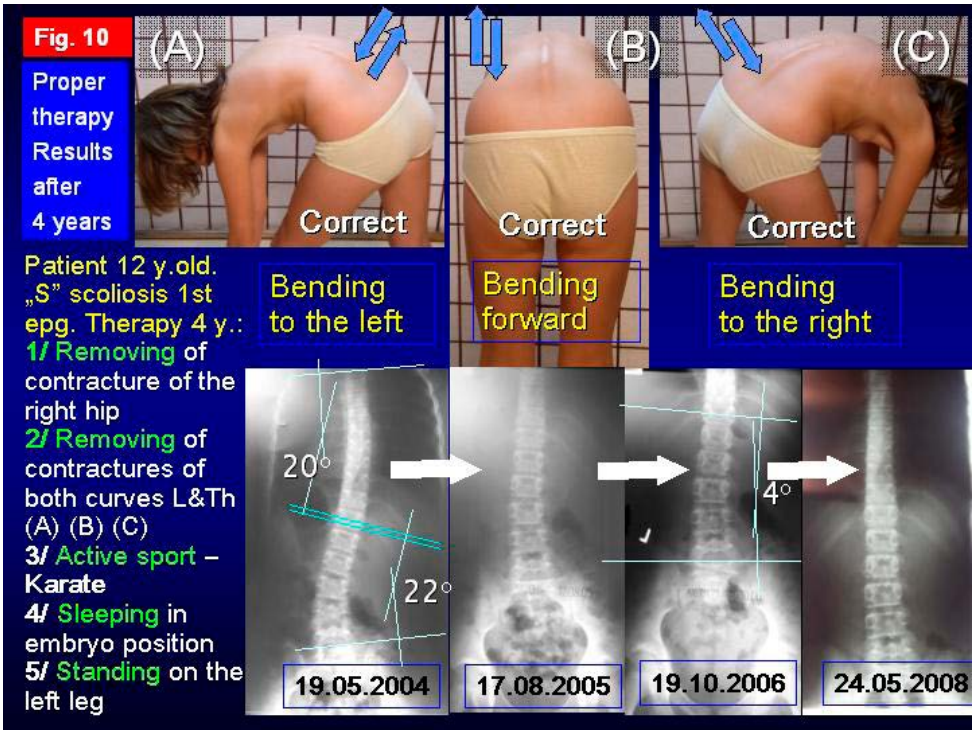


[13] Are there any influences of CNS in the development of scoliosis? Yes – there are indirect influences in children with Minimal Brain Dysfunction (MBD) or with Attention Deficit Hyperactivity Disorder (ADHA) – [according to the author – MBD and ADHD is equal]:

a) Extension contracture of the trunk – because of spastic (semi spastic) contracture of trunk extensors – make easy development of scoliosis.
b) Anterior tilt of the pelvis – because of spastic (semi spastic) contracture of m. rectus (part of m. quadriceps) and other flexors of hips – both sides – make easy development of scoliosis.
c) "laxity" of joints – because of the changed properties of collagen – make easy development of scoliosis.

[14] What kind of therapy – conservative or operative should be applied in the treatment? Answer: only conservative therapy. In material from 1995–2009, only 13 % of children needed surgery and there were children previously treated by wrong, or incorrect exercises. In the years 2010–2020/2023 the number of children needing surgery in my material is maximally low – 3%.

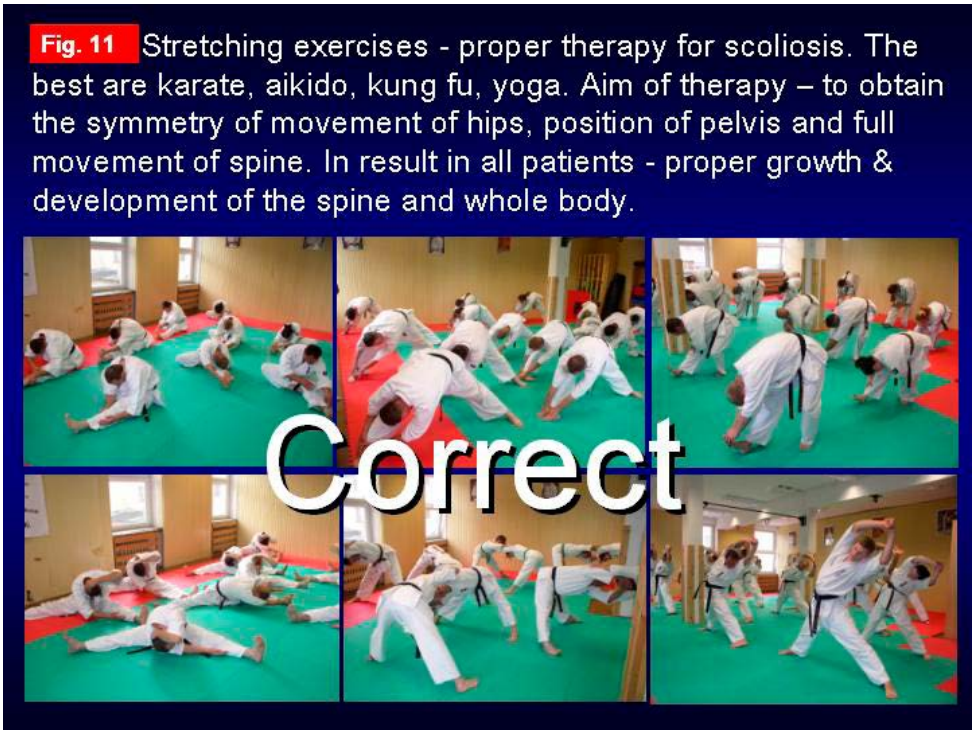
[15] Are extension exercises correct? No – such exercises are wrong – they cause "iatrogenic deformity" – bigger curves, bigger rib hump, stiffer spine.



[16] What kind of rehabilitation exercises should be applied? Only stretching exercises – giving symmetry movements of the hips, of the spine, proper position of the pelvis and next enable symmetry growth and development. Important – "symmetrical time of standing on the left / right leg". In such a situation scoliosis never develops. The proper sports are: karate, taekwondo, aikido, kung fu, yoga

[17] Corset treatment – yes or no? I had to use the corset in years 1984/1995–2007 in 20% of children in "S" 1 epg scoliosis and in 5–10% of children in "S" 2nd / B epg scoliosis. Now this percentage is much lower.

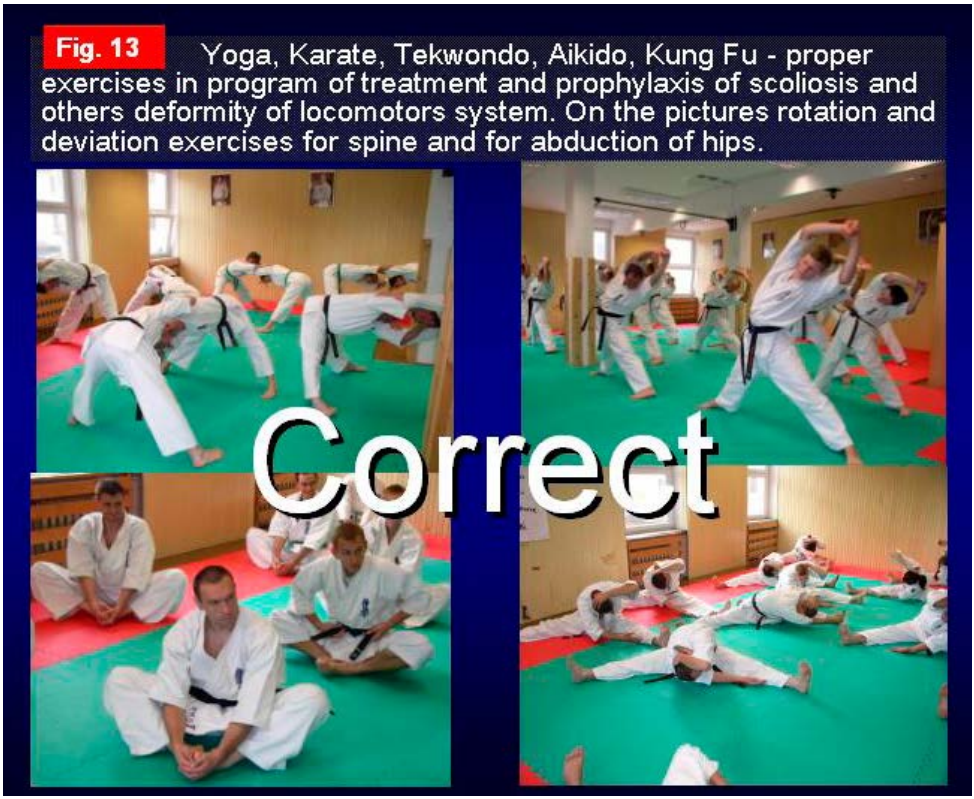
[18] Is causative prophylaxis possible? Yes, the causative prophylaxis is possible. Should be introduced to children in the ages of 5–8 years. Exercises leading to symmetry movements and symmetry function of the hips and spine are important in prophylaxis and therapy. Also it is very important to inform parents of young children about the correct position of standing – all children should stand 'at ease' only on the left leg. Here, it is my moral obligation to inform you all, that "flexion exercises" in therapy of scoliosis in Poland during the years 1960–1970 were introduced by Professor Stefan Malawski from Warsaw/Otwock.



[19] Conclusions about etiology, classification and therapy (Literature 1–43). Before our observations of problem of scoliosis (AIS) the therapy was based on conviction – *"the muscles are week – because of this develop scoliosis – in therapy we must strengthened muscles".* Results of such therapy was only bad. In Lublin we changed such meaning in years 1984 / 1995–2007. In years 1995–2007 was described the biomechanical etiology, was given new classification and elaborated the new therapy. In all years of observation and therapy of scoliosis children – 1984–2023 the biomechanical etiology was confirmed in all scoliosis cases. In first and third group of scoliosis the spine is stiff, in second group the spine is flexible. The stretching exercises in treatment were in all years very proper methods. On pictures are presented the wrong **(Fig. 8, 9)** and the proper exercises and its results (**Fig. 10, 11, 12, 13, 14).** Unfortunately the new knowledge about so-called idiopathic scoliosis is not admitted and not used in Poland and no also in other countries, It is question – why ?

REFERENCES

1. BURWELL G, DANGERFIELD PH, LOWE T, MARGULIES J (2000) Spine. Etiology of Adolescent Idiopathic Scoliosis: Current Trends and Relevance to New Treatment Approaches 14: 324.
2. DANGERFIELD PH, DORGAN JC, SCUTT D, GIKAS G, TAYLOR JF (1995) Stature in Adolescent Idiopathic Scoliosis (AIS) 1995: 210.
3. GREEN NE, GRIFFIN PP (1982) Hip dysplasia associated with abduction contracture of the contralateral hip. J.B.J.S. 64: 1273-1281.
4. GRUCA A, TYLMAN D (1995) Patomechanika bocznych skrzywień kręgosłupa, Wydawnictwo Severus, Warszawa, 1995: 167.
5. HEIKKILÄ E (1984) Congenital dislocation of the hip in Finland. An epidemiologic analysis of 1035 cases, Acta Orthop. Scandinavica 55: 125–129.
6. HENSINGER RN (1979) Congenital dislocation of the hip. Clinical Symp 31: 270.
7. HOWORTH B (1977) The etiology of the congenital dislocation of the hip, Clin. Orthop 29: 164–179.



8. MALAWSKI S (1994) Własne zasady leczenia skolioz niskostopniowych w świetle współczesnych poglądów na etiologię i patogenezę powstawania skolioz, Chir. Narz. Ruchu i Ortop. Pol. 3: 189–197.
9. MALAWSKI S – personal information.
10. MAU H (1979) Zur Ätiopathogenese von Skoliose, Hüftdysplasie und Schiefhals im Säuglinsalter. Zeitschrift f. 294 Orthop 5: 601–605.
11. MAU H (1982) Die Atiopatogenese der Skoliose, Bücherei des Orthopäden, Band 33, Enke Verlag Stuttgart 1982: 1–296.
12. MAU H – personal information and letter (published in USA)
13. HAWES M – personal information and letters
14. NORMELLY H (1985) Asymmetric rib growth as an aetiological factor in idiopathic scoliosis in adolescent girls, 298 Stockholm 1985: 1–103.
15. RĄPAŁA K, TYLMAN D (1995) Patomechanika bocznych skrzywień kręgosłupa, Wydawnictwo Severus, Warszawa 1995: 167.
16. STOKES IAF (1999) Studies in Technology and Informatics, Research into Spinal Deformities 2, IOS Press 1999, Amsterdam, Berlin, Oxford, Tokyo, Washington DC, 59: 1–385.

17. STOKES J – personal information and letters
18. SEVASTIK J, DIAB K (1997) Studies in Technology and Informatics, Research into Spinal Deformities 1, IOS 300 Press 1997, Amsterdam, Berlin, Oxford, Tokyo, Washington, DC 37: 1–509.
19. SEVASTIK J – personal information.
20. TYLMAN D (1995) Patomechanika bocznych skrzywień kręgosłupa, Wydawnictwo Severus, Warszawa 1995: 167.
21. KARSKI T (1996) Kontrakturen und Wachstumstörungen im Hüft- und Beckenbereich in der Ätiologie der sogenannten "idiopatischen Skoliosen"-biomechanische Überlegungen, Orthopädische Prax is 3: 155–160
22. KARSKI T (2002) Etiology of the so-called "idiopathic scoliosis". Biomechanical explanation of spine deformity. Two 272 groups of development of scoliosis. New rehabilitation treatment. Possibility of prophylactics, Studies in 273 Technology and Informatics, Research into Spinal Deformities 91: 37–46.
23. KARSKI T, KALAKUCKI J, KARSKI J (2006) "Syndrome of contractures" (according to Mau) with the abduction contracture of the right hip as causative factor for development of the so-called idiopathic scoliosis. Stud Health Technol Inform 123: 34–39
24. KARSKI T (2010) Explanation of biomechanical etiology of the so-called idiopathic scoliosis (1995-2007). New 276 clinical and radiological classifications in "Pohybove Ustroji" [Locomotor System] Czech Republic 17: 26–42.

25. KARSKI T (2010) Factores biomechanicos en la etiologia de las escoliosis dinominadas idiopaticas. Nueva 282 clasificacion. Nuevos test clinicos y nueavo tratamento conservador y profilaxis", Cuestiones de Fisioterapia 39: 144–152.
26. KARSKI T (2010) Biomechanical Etiology of the Socalled Idiopathic Scoliosis (1995-2007). New Classification: 285 Three Groups, Four Sub-types. Connection with "Syndrome of Contractures", Pan Arab J. Orth. Trauma 14: 69–79.
27. KARSKI T (2011) Biomechanical Etiology of the So-Called Idiopathic Scoliosis (1995–2007)-Connection with 279 "Syndrome of Contractures"- Fundamental Information for Pediatricians in Program of Early Prophylactics / Journal of US-China Medical Science, USA 8: 78.
28. KARSKI T (2013) Biomechanical Etiology of the So-called Idiopathic Scoliosis (1995–2007). Three Groups and 288 Four Types in the New Classification, Journal of Novel Physiotherapies, OMICS Publishing Group, USA S2: 6.
29. KARSKI J, KARSKI T (2013) So-Called Idiopathic Scoliosis. Diagnosis. Tests Examples of Children Incorrect Treated. New Therapy by Stretching Exercises and Results, Journal of Novel Physiotherapies, OMICS Publishing Group 2013: 9, Int J Ortho Res, 2020 www.opastonline.com Volume 3 | Issue 3 | 139
30. KARSKI T (2014) Biomechanical Aetiology of the So-Called Idiopathic Scoliosis. New Classification (1995-2007) in Connection with "Model of Hips Movements". Global Journal of Medical Research, Orthopedic and Musculoskeletal System 14: 12.
31. KARSKI T (2014) Biomechanical Etiology of the So-called Idiopathic Scoliosis (1995-2007)-Connection with "Syndrome of Contractures"-Fundamental Information for Pediatricians in Program of Early Prophylactics. Surgical Science 5: 33–38.
32. KARSKI T, KARSKI J (2015) "Syndrome of Contractures and Deformities" according to Prof. Hans Mau as Primary Cause of Hip, Neck, Shank and Spine Deformities in Babies, Youth and Adults American Research Journal of Medicine and Surgery 1: 26-35.
33. KARSKI T, KARSKI J (2015) Biomechanical etiology of the so-called Idiopathic Scoliosis (1995-2007). Causative role of "gait" and "permanent standing 'at ease' pn the right leg". New classification. Principles of new therapy and causal prophylaxis. Canadian Open Medical Science & Medicine Journal 1: 1–16
34. KARSKI JK, KARSKI T, PYRC J, KULKA M (2016) Deformations of the feet, knees, hips, pelvis in children and adults with minimal brain dysfunction. Causes. Treatment. Prophylaxis. Locomotor System 23: 2
35. KARSKI T (2017) Physiotherapy- Correct, or Incorrect, Based on 'Wrong Principles of Treatment'. Example for Spine, Hip, Knee, Shank and Feet, Crimson Publishers 1: 1–6.
36. KARSKI T, KARSKI J, KARSKA K, KARSKA K, MENET H (2018) Pediatric Prophylaxis Program of Motor System Deformations and Illnesses in Children. Problems of Spine, Hips, Knees and Feet, EC PAEDIATRICS 7: 704–714.
37. KARSKI T, KARSKI J, KARSKA K, KARSKA K, MENET H (2018) Prophylactic Rules for Newborns, Babies, Children and Adults in problems of Hip, Knee, Shank, Feet and Spine, Online Journal CRIMSON PUBLISHERS 2: 110–112.
38. KARSKI T, KARSKI J (2016) Bóle krzyża-problem neurologiczno-ortopedyczny. Objawy. Przyczyny. Leczenie. Back pain-neurology-orthopedic problems. Clinic, causes, therapy and prophylaxis. Postępy Neurologii Praktycznej, Wydawnictwo Czelej 4: 9–16
39. KARSKI J, KARSKI T (2016) "Imperfect hips" As a Problem at an Older Age. Early and Late Prophylactic Management before Arthrosis. Jacobs Journal of Physiotherapy and Exercises 1: 7
40. KARSKI T (2018) Biomechanical Aetiology of the So-called Adolescent Idiopathic Scoliosis (AIS). Lublin Classification (1995–2007). Causative Influences Connected with "Gait" and "Standing 'at ease' on the Right Leg", Journal of Orthopaedics and Bone Research (USA), Scholarena 2018:10.

41. KARSKI T (2019) Biomechanical Etiology of the So-Called Idiopathic Scoliosis. Connection with "Syndrome of Contractures and Deformities", Role of Gait and Standing 'At Ease' On the Right Leg in the Development of Spine Deformity. New Treatment. Causal Prophylactics, International Journal of Orthopaedics Research, OPAST 2: 1–5.
42. KARSKI T (2020) Biomechanical Factors in Etiology of the So-Called Idiopathic Scoliosis (Adolescent Idiopathic Scoliosis [AIS]). Dates of Discoveries. Classification. Rules of Therapy and Prophylaxis. International Journal of Orthopaedics Research, OPAST 3: 64–69.
43. www.ortopedia.karski.lublin.pl (from 2006).

Acknowledgement

The Presentation of the Lecture during 25 Prague – Lublin Symposium is based on publication in **International Journal of Orthopaedics Research, USA, Kansas (2020)** under the title: "So-Called Idiopathic Scoliosis. Historical Dates of Discoveries. Fate and Fortune of New Knowledge".

The paper actually sent to Locomotors System Journal is fully rebuild and changed.

Authors address:
Prof. Karski Tomasz MD PhD
Professor Lecturer in Vincent Pol University in Lublin, Poland
Email: tmkarski@gmail.com

SO-CALLED IDIOPATHIC SCOLIOSIS. HISTORICAL DATES OF DISCOVERIES. FATE AND FORTUNE OF NEW KNOWLEDGE. OPINION OF SPECIALISTS FROM MANY COUNTRIES

Karski Tomasz

Professor Lecturer in Vincent Pol University in Lublin, Poland, tmkarski@gmail.com

ABSTRACT

So-Called Idiaopthic Scoliosis–other description–Adolescnet Idiopathic Scoliosis (AIS) is very frequent deformity of spine at many children and adolescents in many countries. In material in Lublin in 1984–2023 we had treated 3500 children and adults with scoliosis. In years 1984/1995–2007 (T. Karski) was described the biomechanical etiology, was given the new classification, was described the new therapy and given rules of causal prophylaxis. In paper – are presented positive opinion of many doctors and prefessors from abroad and also two from Poland. We wait for the time of introducing of the new knowledge about scoliosis for therapy and causal prophylaxis of children on the world (Literature 1–43).

Key words: so-called idiaopthic scoliosis, etiology, opinions of many specialists.

1/ Scoliosis and it's "fortune and fate".
New knowledge about the biomechanical etiology of the So-Called Idiopathic Scoliosis had the various fate and fortune. Abroad had mostly positive reasons / understanding. It was so during my lectures in Congresses – in Hungary, Czech Republic, Germany, England/UK, Cuba, China, Morocco, Egypt, Turkey, Finland.

2/ Totally inverted and contrary was during my lectures in Poland.
The "orthopedic opposition" of my Polish colleagues was very active, doing / making hard actions against new knowledge. It was so in the years 1995 to 2005. In these years my colleagues started with full blockage of mine, of my presentations / lectures and publications. In the years 2005–2010 my colleagues had fully ignored and omitted the new knowledge.

3/ In the years 1995–2023 the articles and lectures were accepted in USA, UK, Czech Republic, Italy, Asia countries, but not in Poland. Regarding my theory of etiology and the new knowledge of the So-Called Idiopathic Scoliosis my orthopedic colleagues were hard against "the new knowledge" during the Polish Orthopedic Congresses in Łódz (1998), in Szczecin (2004) and in Poznan (2012) and partially (only soft) during 16th SICOT Trainee's Meeting 7–9th May 2009–Kolobrzeg, Poland.

4/ Confirmation of the New Knowledge by Doctors and Professors Abroad and by Two Professors in Poland. It was and it is a big pleasure for me to admit / to receive the written confirmations letters of many professors, orthopedic surgeons from abroad.

In the article I present the opinion of Prof. Franz Grill – Austria, Prof. Henry Bensahel – France, Prof. Martha Hawes – USA, Prof. Jan Stokes – USA, Prof. John Sevastik – Sweden, Prof. Viktor Bialik – Israel, Prof. Kenneth Cheung – China – Hong Kong, Prof. Stephen Eisenstein – England, Prof. Georg Neff – Germany, Prof. Ivo Mařik – Czech Republic, Dr Peter Tisovsky – Slovakia, Prof. Stefan Malawski – Otwock, Poland, Prof. Ignacy Wosko – Lublin, Poland.

Here I present these Opinions:

5/ Letter from Prof. Hans Mau / 2003. Confirmation of Lublin research about so-called idiopathic scoliosis. Prof. Hans Mau confirmed–the first cause is – Syndrome of Coctractures and Defornities (SofCD)–in German *Siebenersyndrom* (Hans Mau–1960–1970). Primary is – asymmetry of movemet of hips joints (connection with SofCD)–limited movement in right hip – next – influence on standing and walking-in result scoliosis.

6/ Letter / Email from Prof. Franz Grill, Chief of Orthopedic Department Austria, Vienna, 2000. Dear Tomasz, many thanks for your letter. I was happy on your coming (info-to Vienna, 2000) and it was really interesting discussion (info-after my lecture about so-called idiopathic scoliosis), long time, mostly by Scholarship participants. Many of the Scholarship participants told me that your lecture was the best one. Many thanks for invitation to Symposium in Lublin. I will look to my Congress calendar and I will contact you. With best greetings. Franz

8/ Letter / Email from Prof. Kenneth Cheung, Hong Kong, 2004. "Dear Prof. Karski. I have been examining patients with scoliosis in the Clinic yersterday. I also agree that the majority of them seem to have an abductor contracture in the right side. Will keep you informed".

Dr. Kenneth M. C. Cheung, Associate Professor and Honorary Consultant, Deputy Chief Division of Spine Surgery, Department of Orthopaedics and Traumatology, Universitet of Hong Kong, Medical Centre, Pokfulam Road, Hong Kong.

9/ Letter / Email from Prof. Prof. Stephen Eisenstein, 2004 / UK. "Dear Tomasz, during the very antagonistic session (Info-Congress of Polish Orthopedic and Traumatology Association in Szczecin, 2004) it became evident that shouting (info-against me) – by your colleagues and personality – were not going to resolve anything. Your concepts (info-of scoliosis) are controversial because they are not part of the universal perceptions at present. The only way to escape controversy is through a randomized controlled trial of sufficient number of subjects...". Stephen Eisenstein PhD FRCS Director, Centre for Spinal Studies / The Robert Jones and Agnes Hunt Orthopaedic Hospital Oswestry, Shropshire, SY10 7AG / Tel: 01691 404481 / Fax: 01691 404054 / Email: s.m.eisenstein@keele.ac.uk Stephen.Eisenstein@rjah.nhs.uk

10/ Letter / Email from Prof. V. Bialik, 2002. "I fully agree with you, that as the surgery in DDH (using sonography for early diagnosis followed by correct early treatment) and clubfoot (using Ponseti method) is today minimalized for these conditions, a similar way could be found for scoliosis. God help you in your efforts. Hope to meet you in good health in January in Bratislava. With best regards" / Sara & Viktor from Haifa. Israel.

11/ Letter / Email from Prof. Ivo Marik, Prague, Czech Republic, 2004. Dear Professor Tomasz Karski, dear friend, we are planning The 5th Prague-Sydney Symposium in October 13, 2004 and with Alena we will take part at the Paediatric and Biomechanical Congresses in Czech Republic. I go on (with my co-workers) with the region education courses "Deformities of the spine" for practical paediatricians (still Brno, Plzeň, Hradec Králové) where I will again mention the explanation of biomechanical influence onto the development of the so-called "idiopathic scoliosis" and its prevention and a method of treatment according to Karski (Lublin/Poland). Best greetings from Prague. Sincerely Yours, Ivo Mařík

9/ Letter / Email from Prof. Henry Bensahel, France, Paris, 2004. I thank you very much for your book upon scoliosis. I have had the opportunity to read some papers from you on this topic. As yourself, I believe in physiotherapy, including in the spine deformities in children. Hence I congratulate you for this invaluable study. I do hope that we'll have opportunity to meet again in the near future. With my best regards. Henry Bensahel.

11/ Letter / Email from Dr Peter Tisovsky, 2005. "Dear Professor, for now, I am sending you copy of my study, which I made on 680 children with scoliometer, you can see how can be valuable using the quantification of Adams forward bending test, or [Karski] side bending test (increasing sensitivity and specificity of the tests), especially in reducing referral rate to orthopaedic examination, or reducing false positive cases, and therefore reducing unnecessary spine radiograph". Best regards to you, your wife, all in your Department, dr Peter Tisovský (Slovakia, Bratislava)

12/ Letter / Email from Prof. John Sevastik, Stockholm, 2008. "Dear Tomasz, Many thanks for your recent mail. It is always nice receiving news from old friends; not so many left nowadays. Your heart adventure did concern me but it seems that everything has turned out the right way. I really hope that you shall return to your scoliosis job with unbroken intensity. Physiological approaches to the scoliosis complexity is a necessity to compensate the increasing fanatism with the extensive surgical interventions. Exchange of thoughts from time to time with Geoffrey Burwell on scoliosis matters of mutual interest is the only source giving some kick in life. Not to forget the support provided by the family in these old and difficult days. Again thank you dear Friend for not forgetting me. Best wishes to your wife, the Karski family and your grand daughter in particular. I have been lucky in life to see my first, soon one-year-old, great grand daughter. All best wishes". John /

Prof. John Sevastik-Stockholm / Solna / Sweden

13/ Letter / Email from Prof. Georg Neff, Berlin, 2007. Dear Tomasz, many thanks for your Email, which now I can answer… The problem / Subject – I listened your lecture in Regensburg (2007) and

I am surprising that nobody before you had to see and described the combination –stand position on right leg and scoliosis. It is question – as before by yours finding of the "abduction contracture of the right hip" – what was the first? Your answer – was proper to showing / directed to the "Seven Contracture" [Syndrome] described by my dear Chief Prof. Hans Mau… Georg and Sigi.

15/ Letter / Email from Prof. Martha Hawes sent to me in 30th May 2013. "Tomasz, Good to hear your voice! As usual, I agree with all your points. All those poor frustrated med techs, trying so hard to find new ways to make money on all those scoliosis patients while they watch and wait for surgery! Hope all's well with you". Prof. Martha Hawes, Arizona, USA.

13/ Letter / Email from Prof. Ian Stokes, 2008. "The 3rd etiopathological group (info-of scoliosis) is very interesting since it refers also to doctors of other specialist like internist, neurologist, gynecologist and may help in differential diagnosis of "back pain". I hope that your work on hip contracture and scoliosis will be seen by those clinicians who take care of children with scoliosis and I hope that these insights will be helpful in identifying those at risk for progression. Ability to make a good prognosis of progression would evidently be a huge advance. With best wishes for the new year! Yours sincerely", Ian Stokes, University of Vermont Department of Orthopaedics and Rehabil. Burlington, VT 05405-0084, USA. Phone: (+1) 802 656 2250 fax: (+1) 802 656 4247

16/ Personal confirmation from Prof. Stefan Malawski. Warsaw and Otwock / Poland, 1995-2004 Prof. Malawski was the Head of Orthopedic Department in Otwock. He told me - "I fully confirm all about biomechanical factors in development of the so-called idiopathic scoliosis, about causes, explanation of classification, new therapy and causal prophylaxis".

17/ Personal confirmation from Prof. Ignacy Wośko, Lublin, 1995. Prof. Wosko was the Head of Pediatric Orthopedic and Rehabilitation Department of Medical University in Lublin, Poland in the years 1970-1995 [at this time I was an assistant to Prof. Wośko]. He told me: "I understand your conception about biomechanical factors in the development of the so-called idiopathic scoliosis. I fully confirm every point of your explanation about etiology, classification and therapy".

18/ Discussion (references 1–43, see pages 81–85).

The biomechanical etiology answers all questions concerning the so-called idiopathic scoliosis. All what is described about this spine deformity in years 1995 till 2007 is confirmed in every day orthopedic practice till 2023. In many orthopedic and rehabilitations centers in Poland the new knowledge and new treatment of scoliosis were "step by step" introduced personally by general doctors, orthopedic surgeons, physiotherapists, but officially - by professors and directors / heads of departments is not recognized nor admitted. Over the years I see - that mostly scientists in USA, in Czech Republic are interested about the biomechanical etiology of scoliosis. In the years 2009–2023 I published in the USA 49 articles about scoliosis and 12 about Syndrome of Contractures and Deformitues (SofCD) and Minimal Brain Dysfunction (MBD), some articles in the Czech Republic, in Canada and in Spain. Together in 2009 – 2023 – were published 80 articles. I hope the "new

knowledge about scoliosis" will spread from USA, Canada and Czech Republic to other countries in the world and the causal prophylaxis will be introduced to all patients in all countries.

CONCLUSIONS

1. In all the years of my observations (T. Karski, 1984–2020/2023), the biomechanical etiology of the so-called idiopathic scoliosis was in every case-confirmed.
2. Development of scoliosis and the types of spine deformity are connected with pathological "model of the hip movements" – limited adduction of the right hip (T. Karski, 2006) and function – "standing 'at ease' on the right leg" and "walking".
3. Restricted range of movements in the right hip is connected with the "Syndrome of Contractures and Deformities" according Prof. Hans Mau and Lublin observations.
4. Every type of scoliosis starts to develop at the age of 2-3.
5. There are three groups and four types of scoliosis:
   a. "S" scoliosis 1st epg, 3D. Stiff spine. Some cases lordoscoliosis. Causative influence: standing and gait.
   b. (B1) "C" scoliosis 2nd / A epg, 1D. Causative influence: standing. (B2) "S" scoliosis 2nd / B epg, 1D or 2D. Causative influence: standing, plus, - laxity of joints and/or incorrect exercises in previous therapy. Some cases kiphoscoliosis.
   c. "I" scoliosis 3rd epg, 2D or 3D. Clinically only stiffness of the spine. Causative influence: gait. The symptom of this deformity is: sport problems in young age and "spine pain" in adults.
6. The proper therapy for scoliosis - are only stretching exercises to receive full movements of the right hip, the proper position of the pelvis and full movement of the spine.
7. The causal prophylaxis of scoliosis is possible and should be introduced in every country.
8. The rules in prophylaxis – are – standing 'at ease' on the left leg, sitting relaxed, sleeping in the embryo position, active participation in sport – especially beneficial are karate, taekwondo, aikido, kung fu, yoga and other similarly.

Acknowledgement and Information

I would like to express my many thanks to David Poynton for the correction of the English written articles.

Author's address:
tmkarski@gmail.com
www.ortopedia.karski.lublin.pl

A LIST OF SPEAKERS AND CO-AUTHORS OF PAPERS

Al-Kaissi Ali Abdul Salam, Professor, MD, DSc *(Viena, Austria)*
Amlang H Michael, MD, PhD *(Dresden, Germany)*
Braun Martin, Dr, PhD *(Prague, Czech Republic)*
Carda Martin, MD *(Pardubice, Czech Republic)*
Dilý Matej, Eng *(Ostrava, Czech Republic)*
Drastichová Klára, BSc *(Olomouc, Czech Republic)*
Hojný Jan, Dr, PhD *(Prague, Czech Republic)*
Holinka Martin, MD, PhD *(Karviná, Czech Republic)*
Hyánek Josef, Professor, MD, DSc. *(Prague, Czech Republic)*
Kaňa Martin, MD *(Prague, Czech Republic)*
Karska Klaudia, MD *(Lublin, Poland)*
Karski Jacek, Assoc. Professor, MD, PhD *(Lublin, Poland)*
Karski Tomasz, Professor, MD, PhD *(Lublin, Poland)*
Kraus Josef, MD, Ph.D. *(Prague, Czech Republic)*
Krawczyk Petr, MD, PhD *(Ostrava, Czech Republic)*
Kroupa Jan, BCs *(Pilsen, Czech Republic)*
Krulišová Veronika, MD, PhD *(Prague, Czech Republic)*
Kutílek Štěpán, Assoc. Professor, MD, PhD *(Klatovy, Czech Republic)*
Mařík Ivo, Professor, MD, PhD *(Prague, Czech Republic)*
Maříková Alena, MD *(Prague, Czech Republic)*
Michalovská Renata, MSc, PhD *(Prague, Czech Republic)*
Musilová Zdeňka *(Letovice, Czech Republic)*
Myslivec Radek, MD *(Prague – Pribram, Czech Republic)*
Ohnůtková Petra, Eng *(Ostrava, Czech Republic)*
Piet, J. M. van Loon, MD (Deventer, Netherlands)
Pompach Martin, MD, PhD *(Pardubice, Czech Republic)*
Povýšil Ctibor, Professor, MD, DSc *(Prague, Czech Republic)*
Smit T.H., Professor, Eng, PhD *(Amsterdam, Netherlands)*
Smrčka Václav, Professor, MD, PhD *(Prague, Czech Republic)*
Soeterbroek, Andre M, Dr. *(Oosterbeek, Netherlands)*
Svačina Štěpán, Professor, MD, DSc *(Prague, Czech Republic)*
Vlčková Zděnka, MD *(Prague, Czech Republic)*
Zapletal Vít, *(Prague, Czech Republic)*
Zemková Daniela, Dr, PhD *(Prague, Czech Republic)*
Zwipp Hans, Professor, MD, DSc *(Dresden, Germany)*

ORLING

ZALOŽENO ROKU 1992

BIOAKTIVNÍ KOLAGENNÍ PEPTIDY REGENERUJÍ

Kolagen je nezbytný pro pohyblivost kloubů, stabilitu kostí, odolnost a pevnost vazů a šlach a také pro zdravé svaly a hojně se vyskytuje i v cévách, meziobratlových ploténkách, hematoencefalické bariéře a rohovce, dentinu a střevní stěně – kolagen je životně důležitá složka celého těla.

Kolagenní peptidy zvyšují syntézu kloubního kolagenu a proteoglykanů

Nejen sportovci jsou ve zvýšené míře náchylní ke kloubním problémům a léčba se u nich nijak neliší od jejího zvládání u běžné populace. Hlavním cílem je minimalizovat bolestivost a zlepšit funkčnost kloubů. Klinická studie provedená v Penn State University testovala účinek kolagenních peptidů na studenty sportovních škol, kteří trpěli kloubními problémy v důsledku mechanické zátěže. V porovnání s kontrolní skupinou došlo u studentů, kteří užívali kolagenní peptidy, k **výraznému snížení kloubních potíží a také ke zlepšení pohyblivosti.** Tyto pozitivní účinky byly patrné zejména u účastníků s problémy kolenních kloubů pocházejících z mechanické zátěže. *(Clark K. , Sebastianelli W., Flechsenhar K., Aukermann D., Meza F., Millard R., Deitch J., Sherbondy P., Affiliations A., 24-Week study on the use of collagen hydrolysate as a dietary supplement in athletes with activity-related joint pain, Curr Med Res Opin, 2008 May;24(5):1485-96)*

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

V této studii se řešil „Vliv suplementace kolagenními peptidy, vápníkem a vitaminem D, resp. Calcidrinkem® na úbytek kostní hmoty a remodelaci kosti u postmenopauzálních žen s osteopenií“ *(Ortopedie 2010, Gabriela Šimková, Revmatologická ambulance 1. PP Kladno)*. Výsledky byly velmi nadějné. U žádné pacientky se nevyskytly během sledovaného období jednoho roku žádné nové nízkozátěžové zlomeniny. Cílem bylo prokázat účinek pravidelného užívání přípravku Calcidrink (vitamin D, kalcium a kolagenní peptidy) na snížení úbytku kostní hmoty u postmenopauzálních žen s osteopenií. Výsledky studie tento efekt potvrdily.

Doplňky stravy Geladrink® a Calcidrink® s vysokým obsahem ověřených kolagenních peptidů Gelita®

Kolagenní peptidy Gelita® jsou obsaženy ve fyziologicky účinné dávce v originálních produktech české firmy Orling, s využitím všech nových poznatků ohledně jejich působení.

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

Prof. MUDr. Milan Adam, DrSc. Dr.h.c.
český revmatolog, zakladatel kloubní výživy Geladrink®

GELADRINK® a CALCIDRINK®
- PRO LEPŠÍ KVALITU ŽIVOTA

VYVINUTO A VYROBENO V ČESKÉ REPUBLICE

Více informací na WWW.ORLING.CZ

Právní služby poskytovatelům zdravotních služeb:

- obchodní právo - založení společnosti, transformace soukromé ordinace na společnost, registrace poskytovatele zdravotních služeb,
- konzultace v oblasti medicínského práva – školení personálu ve věcech vedení a nakládání se zdravotnickou dokumentací, informovaný souhlas pacienta,
- smluvní agenda – nájemní smlouvy, kupní a úvěrové smlouvy, smlouvy o službách,
- smlouvy se zdravotními pojišťovnami – úprava smluvních dokumentů, korekce plateb,
- otázky náhrady škody na zdraví a z titulu zásahu do osobnostních práv – konzultace vznesených nároků, jednání s pacienty, zastupování v soudním řízení,
- a všechny další otázky, s nimiž se poskytovatelé zdravotních služeb v praxi setkávají

V případě zájmu o nezávaznou konzultaci a poskytnutí bližších informací nás neváhejte kontaktovat.

SVOBODA & KUČERA | ADVOKÁTI

AK Kučera s.r.o. | Stavitelská 1099/6, 160 00 Praha 6 | T +420 222 965 861 | M +420 731 510 675 | E kucera@sk-advokati.cz | W www.sk-advokati.cz

PROTEOR CZ s. r. o. – nestátní zdravotnické zařízení
Ostrava | U Parku 2/2720 | 702 00 Ostrava | tel.: 596 139 259, 596 139 295
Provozovna Olomouc | Mošnerová 7/1184 | 779 00 Olomouc | tel.: 585 414 776, 585 414 823
Provozovna Brno | Milady Horákové 50 | 602 00 Brno | tel. 733 184 083
E | ostrava@proteorcz.cz | olomouc@proteorcz.cz | brno@proteorcz.cz | **www.proteorcz.cz**

lékařská péče v oborech ortopedie a ortopedická protetika ● zdravotní péče v ortotice a protetice ● konsilia pro zdravotnická zařízení ● výjezdová pracoviště v kraji ● zakázková činnost pro zdravotnická zařízení ● skoliotická poradna pro léčbu skolióz páteře mladistvých ● aplikace a výroba individuálních ortopedických vložek pro sport ● výroba individuálních zdravotnických prostředků – protéz končetin, ortéz, ortopedických vložek ● podologická poradna pro pacienty s problémy nohou (syndrom diabetické nohy, bolesti nohou) ● specializované centrum pro aplikaci a výrobu myoelektrických protéz horních končetin