

Pohybové ústrojí

Pokroky ve výzkumu, diagnostice a terapii

The 16th Prague-Lublin-Sydney-St Petersburg
Symposium

**Disorders of growth and
Defects of growth epiphysis.**

21st – 25th September 2014
in the Military University's Hospital
Lublin, Poland (Al. Racławickie 23)

Vydává

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

ročník 21 / 2014 číslo 3-4 Supplementum

EMBASE / Excerpta Medica | Bibliographia medica Českoslovac

ISSN 2336-4777

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

invite you for

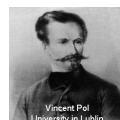
THE 16TH PRAGUE-LUBLIN-SYDNEY-ST. PETERSBURG SYMPOSIUM

Disorders of growth and Defects of growth epiphysis

**GENETICS OF GROWTH SKELETAL DISORDERS / DIAGNOSTICS
AND COMPREHENSIVE TREATMENT**

**ORTHOPAEDIC ANTHROPOLOGY, BIOMECHANICS / VARIA
& WORKSHOP HAND SURGERY**

The Symposium will be held on 21st – 25th September 2014
in the Military University's Hospital, Lublin, Poland (Al. Raclawickie 23)



SYMPOSIUM PROGRAMME

SUNDAY, SEPTEMBER 21, 2014

Arrival of participants to Lublin, Poland. Accommodation in The HUSAR Hotel, Lublin (Spadochroniarzy Street 9, bystreet of Al. Raclawickie)

MONDAY, SEPTEMBER 22, 2014

8.30 – 9.30 REGISTRATION OF PARTICIPANTS

9.30 ZBIGNIEW KĘDZIERSKI & MARIK IVO, MIKHAIL DUDIN & TOMASZ KARSKI
OPENING OF THE SYMPOSIUM

75TH ANNIVERSARY OF **PROFESSOR TOMASZ KARSKI**
& THE 65TH ANNIVERSARY OF **PROFESSOR MIKHAIL DUDIN**

10.00 – 14.00 MORNING SESSIONS

Note: In every session every lecture 20 min. (with discussion)

SESSION I – **GENETICS OF GROWTH SKELETAL DISORDERS**

Chairmen: IVO MARIK, MILOSLAV KUKLIK

ZEMKOVA DANIELA¹⁾, MARIK IVO^{2, 3)} (PRAGUE, CZECH REPUBLIC)

Development and growth of skeleton. Growth cartilage

¹⁾ Pediatric Dpt., University Hospital Motol, Prague, Czech Republic

²⁾ Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic

³⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

KUKLIK MILOSLAV (PRAGUE, CZECH REPUBLIC)

**Material properties of connective tissues across syndromology
genetic skeletal disorders and pathobiomechanics**

Genetic department Olšanská 7, Prague, Czech Republic

Department of molecular endocrinology, Institute of Endocrinology, Prague, Czech Republic

SMRČKA VACLAV^{1), 2)}, MARIK IVO^{3), 5)}, KUZELKA VITEZSLAV⁴⁾ (PRAGUE, CZECH REPUBLIC)

Congenital defects of the upper extremity – phylogenesis, ontogenesis, and tissue systems

¹⁾ ESME I.I.c. & ²⁾ Plastic surgery Clinic, University Hospital Bulovka, Prague, Czech Republic

³⁾ Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic

⁴⁾ Dpt. of anthropology, National Museum, Prague, Czech Republic

⁵⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

SESSION II – DIAGNOSTICS AND COMPREHENSIVE TREATMENT

Chairmen: KARSKI TOMASZ, VACLAV SMRČKA

MARIK IVO^{1), 5)}, MYSLIVEC RADEK^{2), 1)}, MARIKOVA ALENA¹⁾, ZEMKOVA DANIELA^{3), 1)}, PETRASOVA SARKA¹⁾, SMRČKA VACLAV⁴⁾ (PRAGUE, CZECH REPUBLIC)

Reconstructive surgery of rare upper limb congenital defects: 3 case reports

¹⁾ Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic

²⁾ Othopaedic-Traumatologic Department, Regional Hospital Píbram, Czech Republic

³⁾ Pediatric Dpt., University Hospital Motol, Prague, Czech Republic

⁴⁾ ESME I.I.c., Prague, Czech Republic

⁵⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

POPKO JANUSZ, KARPIŃSKI MICHAŁ, GUSZCZYN TOMASZ (BIAŁYSTOK, POLAND)

Clinical value of neonatal screening for congenital dysplasia of the hip: 20 years evaluation of the effectiveness of ultrasound screening

Department of Pediatric Orthopedics and Traumatology Medical University of Białystok, Poland

KARSKI TOMASZ¹⁾, KARSKI JACEK²⁾, KĘDZIERSKI ZBIGNIEW³⁾ (LUBLIN, POLAND)

"Imperfect hips" - clinical symptoms in two types of functional insufficiency with pain – after years with full signals of arthrosis

¹⁾ Vincent Pol University in Lublin,

²⁾ Medical University of Lublin,

³⁾ Military Hospital in Lublin, Poland

YEFIMOV ALEKSANDR A., STRELNIKOV ALEKSANDR V., KLEYMENOV V.N. (KALININGRAD, RUSSIA)

Anatomic and functional profile and index of therapeutic reactivity as a means of treatment and rehabilitation programme management

Federal State Institution Children's Orthopedic Sanatorium «Pionersk», Ministry of Health, Russia

POSTER SESSION – GENETICS OF GROWTH SKELETAL DISORDERS

Chairmen: DUDIN MIKHAIL, KARSKI TOMASZ

Speaker: SHASHKO ALEKSEY

DUDIN MIKHAIL, KAZEMIRSKY V., TSVETKOV T., HADZHAEV B. (ST. PETERSBURG, RUSSIA)

The question of coxarthrosis early diagnosis in teenagers by “tensometry”

Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok” St. Petersburg, Russia

KHAIMINA TATIANA¹), AVALIANI TATIANA²), KARPENKO MARINA²), DUDIN MIKHAIL¹) (SAINT-PETERSBURG, RUSSIA)

Features the right and left scoliosis

¹⁾ State Institution of Health Service Saint Petersburg Rehabilitative Centre of Pediatric Trauma and Orthopaedics “Ogonyok”, Saint-Petersburg, Russia

²⁾ Institute of experimental medicine of the NorthWest Branch of the Russian Academy of Medical Sciences, Saint-Petersburg, Russia

BITYUKOV KONSTANTIN (SAINT-PETERSBURG, RUSSIA)

Scoliosis curve effect on external respiration

State Institution of Health Service Saint Petersburg Rehabilitative Centre of Pediatric Trauma and Orthopaedics “Ogonyok”. St. Petersburg, Russia

RYBKA DINA, ARSENIYEV ALEKSEY, ARSENEVA MARINA (ST. PETERSBURG, RUSSIA)

Age differences of ultrasound features of lower limbs germ zones in children

Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok” St. Petersburg, Russia

YEFIMOV A.A., GURINOVICH Y.V. (KALININGRAD, RUSSIA)

The results of the screening diagnosis of spinal pathology in children through mobile orthopaedic laboratory in Russia and Poland in the framework of international cooperation

Federal State Institution Children's Orthopedic Sanatorium «Pionersk», Ministry of Health, Russia

KARSKI TOMASZ¹), KARSKI JACEK²) (LUBLIN, POLAND)

So called idiopathic scoliosis. Biomechanical aetiology. New classification.

Treatment and prophylaxis

¹⁾ Vincent Pol University in Lublin,

²⁾ Medical University of Lublin, Poland

FAMILY PHOTO OF PARTICIPANTS ON HOSPITAL'S STAIRS AND BEFORE HOSPITAL

LUNCH BREAK (Lunch in the HUSAR Hotel, 14.00)

SESSION III – DIAGNOSTICS AND COMPREHENSIVE TREATMENT

Chairmen: MIKHAIL DUDIN, IVO MARIK, MOHAMED ALAMELDIN

DUDIN MIKHAIL, PINCHUK DMITRY, PECHERSKY VIKTOR, AVALIANY TATYANA, KHAYMINA TATYANA
(ST. PETERSBURG, RUSSIA)

Risk group of AIS is the key to its prophylaxis

Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok“ St. Petersburg, Russia

AKIZHANOVA IRINA, KASSENOVA MADINA, SVETLICHNAYA SNEZHANNA (ALMATY, KAZAKHSTAN)

Ecchographic peculiarities of the growing zones of humerus, femur and tibia in different age of children

Department of radiological and functional diagnostics,, Institute of postgraduate education, Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan

AKIZHANOVA IRINA, ARTYKBAYEVA A.R. (ALMATY, KAZAKHSTAN)

Ultrasound visualizations of pathomorphologic changes in joints of patients with rheumatic diseases

Department of radiology and functional diagnostics, Institute of postgraduate education, Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan

MARIK IVO^{1, 3)}, MARIKOVA ALENA¹⁾, ZEMKOVA DANIELA^{1, 2)}, MYSLIVEC RADEK^{1, 4)}, KUKLIK MILOSLAV⁵⁾, SMRČKA VACLAV⁶⁾, KOZŁOWSKI KAZIMIERZ⁷⁾ (PRAGUE, CZECH REPUBLIC, SYDNEY, AUSTRALIA)

Possibilities of comprehensive care for genetic skeletal disorders at present

¹⁾ Ambulant Centre for defects of Locomotor apparatus, I.L.c., Prague, Czech Republic

²⁾ Pediatric Dpt., University Hospital Motol, Prague, Czech Republic

³⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

⁴⁾ Othopaedic-Traumatologic Department, Regional Hospital Píbram, Czech Republic

⁵⁾ Genetic department Olšanská 7, Prague, Czech Republic

⁶⁾ ESME I.L.c., Prague, Czech Republic

⁷⁾ Radiological Department of Westmead NSW 2145, Sydney, Australia

KOLESNICHENKO VERA, LITVINENKO KONSTANTIN, MA CONG (KHARKOV, UKRAINE)

Comparison of postural control in unilateral stance between healthy control and patients with lumbar disc herniation and degenerative lumbar spondylolisthesis before and after lumbar posterior fusion

SI "Sytenko Institute of Spine and Joint Pathology National Academy of Medical Sciences of Ukraine", Kharkov, Ukraine

PUGACHEVA NATALYA (ST. PETERSBURG, RUSSIA)

Conservative treatment effect on AIS progression

Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok“ St. Petersburg, Russia

ALAMELDIN MOHAMED (SOHAG, EGYPT)

Anterior cervical discectomy for one- and two-level cervical disc disease: the effect of anterior plating

Sohag faculty of medicine, Sohag, Egypt

TUESDAY, SEPTEMBER 23, 2014

9.00 – 14.00 MORNING SESSIONS

Note: In every session every lecture 20 min. (with discussion)

SESSION IV – ORTHOPAEDIC ANTHROPOLOGY. BIOMECHANICS

Chairmen: JACEK KARSKI, ALEKSEY SHASHKO

SHASHKO ALEKSEY, KURCHENKO SERGEY (ST. PETERSBURG, RUSSIA)

Study of photodynamic impact on growth plates of long tubular bones in growing animals

Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok“ St. Petersburg, Russia

ARSENIYEV ALEKSEY, KHAYMINA TATYANA, DUDIN MIKHAIL (SAINT-PETERSBURG, RUSSIA)

Asymmetrical limb growth in a patient with curtius syndrome: a case study

Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok“ St. Petersburg, Russia

KALAKUCKI JAROSLAW, KARSKI JACEK, KANDZIERSKI GRZEGORZ (LUBLIN, POLAND)

Temporary asymmetric blocking of growth plates in treatment of long bone axis and length disturbances in children.

Medical University of Lublin, Poland

PETRASOVA SARKA¹⁾, MYSLIVEC RADEK^{1, 3)}, ZEMKOVA DANIELA^{1, 2)}, MARIK IVO^{1, 4)} (PRAGUE, CZECH REPUBLIC)

Hemi-epiphysiodesis at the knee region: long-term results of Ambulant Centre for Defects of Locomotor Apparatus, Prague, CZ

¹⁾ Ambulant Centre for Defects of Locomotor Apparatus; Prague; Czech Republic

²⁾ Dept. of Paediatrics; University Hospital Motol; Prague; Czech Republic

³⁾ Orthopaedic and Traumatology Department, Hospital Pribram, Czech Republic

⁴⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

KARSKI JACEK¹⁾, KARSKI TOMASZ²⁾, KAŁAKUCKI JAROSŁAW¹⁾, OKOŃSKI MAREK¹⁾ (LUBLIN, POLAND)

“Syndrome of contractures and deformities” and its causal influence in dysplasia of hips, wry neck, Blount disease and so-called idiopathic scoliosis

1) Medical University of Lublin

2) Vincent Pol University in Lublin, Poland

OKOŃSKI MAREK, KARSKI JACEK (LUBLIN, POLAND)

Spastic hip - clinical and radiological development

Medical University of Lublin, Poland

SESSION V – ORTHOPAEDIC ANTHROPOLOGY. BIOMECHANICS

Chairmen: DMITRI TESAKOV, PYRC JAROSLAW

TESAKOV DMITRY K., TESAKOVA D.D., BELETSKY A.V., GIGKO-MIKHASEVITCH N.O. (BELARUS, MINSK)

Radiological features of bone growth of the pelvis and spine in patients with idiopathic scoliosis

Republic Scientific-Research Center of traumatology and orthopedic surgery Belarus, Minsk

CERNY PAVEL^{1, 3)}, MARIK IVO^{2, 3)}, PALLOVA IVETA¹⁾ (PRAGUE, CZECH REPUBLIC)

The radiographic method for evaluation of axial vertebral rotation – presentation of the new method

¹⁾ ORTOTIKA I.L.c., Prague, Czech Republic

²⁾ Ambulant Centre for Defects of Locomotor Apparatus I.L.c., Prague, Czech Republic

³⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

DOMAŃSKI KRZYSZTOF, KWIATKOWSKI MICHAŁ, POPKO JANUSZ (BIALYSTOK, POLAND)

Effect of bracing on the quality of life of adolescents with idiopathic scoliosis

Department of Pediatric Orthopaedics and Traumatology, Medical University of Białystok, Poland

PYRC JAROSLAW (DRESDEN, GERMANY)

Biomechanics of proximal femur due to pertrochanteric fracture

How important are accurate reduction and implant placing by treatment of proximal femur fractures

Centre of orthopaedic and trauma surgery, University Carl Gustav Carus, Dresden, Germany

KARSKI JACEK, OKOŃSKI MAREK (LUBLIN, POLAND)

Sinus tarsi – key in the treatment of flat feet

Medical University of Lublin, Poland

SESSION VI – **BIOMECHANICS**

Chairmen: MIROSLAV PETR TYL, JANA PARIZKOVA

PETR TYL MIROSLAV¹⁾, DENK FRANTISEK¹⁾, MARIK IVO^{2, 3)} (PRAGUE, CZECH REPUBLIC)

Acceleration of new bone formation in callus

¹⁾ *Laboratory of Biomechanics and Biomaterial Engineering, Faculty of Civ. Engineering, Czech Technical University in Prague, Czech Republic*

²⁾ *Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic*

³⁾ *Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic*

MYSLIVEC RADEK^{1, 3)}, MARIK IVO^{1, 4)}, PETRASOVA SARKA¹⁾, ZEMKOVA DANIELA^{1, 2)}, MARIKOVA ALENA¹⁾
(PRAGUE, CZECH REPUBLIC)

Radiographic assessment of lengthening callus strength: comparison of achondroplasia and unilateral hypoplasia

¹⁾ *Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic*

²⁾ *Paediatric Department, University Hospital Motol, Prague, Czech Republic*

³⁾ *Othopaedic-Traumatologic Department, Regional Hospital Pribram, Czech Republic*

⁴⁾ *Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic*

SESSION VII – **VARIA**

Chairmen: JANA PARIZKOVA, MIROSLAV PETR TYL

SEDLAK PETR¹⁾, PARIZKOVÁ JANA²⁾, VIGNEROVÁ JANA³⁾, DANIS ROBERT¹⁾, DVORÁKOVÁ HANA⁴⁾
(PRAGUE, CZECH REPUBLIC)

Changes of body composition and motor abilities of preschool children during last five decades

¹⁾ *Department. of Anthropology and Human Genetics, Faculty of Science, Charles University in Prague, Prague, Czech Republic*

²⁾ *Obesity Management Centre, Institute of Endocrinology, Prague, Czech Republic*

³⁾ *The National Institute of Public Health, Prague, Czech Republic*

⁴⁾ *Faculty of Education, Charles University in Prague, Prague, Czech Republic*

MICHAŁ KARPIŃSKI¹⁾, GALICKA A.²⁾, MILEWSKI R.³⁾, POPKO JANUSZ¹⁾ (BIAŁYSTOK, POLAND)

Risk factors of low-energy fractures in children from mixed rural and urban Podlasie region

¹⁾ Department of Pediatric Orthopedics and Traumatology

²⁾ Department of Medical Chemistry

³⁾ Department of Statistics and Medical Informatics, Medical University of Białystok, Poland

PAŘÍZKOVÁ JANA (PRAGUE, CZECH REPUBLIC)

Bone fractures in obese children and adolescents

Obesity Management Centre, Institute of endocrinology, Prague, Czech Republic

CSENGE SZEVERENYI (DEBRECEN HUNGARY)

Historical review of clubfoot treatment

Department of Orthopaedic Surgery, University of Debrecen, Clinical Center, Debrecen, Hungary

WAMSER-KRASZNAI WALTRUD, KRASZNAI PETÜR (FRANKFURT AM MAIN, GERMANY)

Symptoms of disease on antique figures?

DE- Butzbach / Frankfurt am Main

ROMANOWSKI RICHARD (MALMOE, SWEDEN)

Evidence Based Intermittent Pneumatic Compression (EBIPC) method

Rehabilitation Praxis. Malmoe, Sweden

23rd SEPTEMBER (TUESDAY) Banquet in HUSAR Hotel. Beginning at 19.30

WEDNESDAY, SEPTEMBER 24, 2014

8.45 – 12.00 MORNING SESSIONS

Note: In every session every lecture 20 min. (with discussion)

SESSION VIII – **VARIA**

Chairmen: ZBIGNIEW KĘDZIERSKI, IVO MARIK

OCHEN PAUL^{1), 2)} (UGANDA)

Challenges for treating and managing disabilities in Uganda (20 min.)

¹⁾ *Afaayo Child Health education and Rehabilitation Unit (ACHERU), Mukono, Uganda*

²⁾ *Bachelor of Science Physiotherapy student, University of Vincent Pol, Lublin- Poland*

NEFF GEORG (BERLIN, GERMANY)

Orthopaedics, Prosthetics and Orthotics in the Third World Countries (45 min.)

Berlin, Germany

10.00 – 12.00 WORKSHOP HAND SURGERY

APPLICATION DURING THE SYMPOSIUM REGISTRATION

Chairmen: KARSKI JACEK

Lecturer: SMRCKA VACLAV (PRAGUE, CZECH REPUBLIC)

ESME I.L.c. & Plastic surgery Clinic, University Hospital Bulovka, Prague, Czech Republic

Titles of lectures:

1. Flexor Tendon Repair
2. Extensor Tendon Repair (with Mallet Finger, Swan-neck Deformity and Boutonnière Deformity)
3. Skin Loss Defects and Replantation
4. Carpal Tunnel Syndrome/Release,
5. Tendinitis
6. Dupuytren's Disease.

EXCURSION TO KOZŁÓWKA BY BUS AT 12.00.

Visiting of two museums Maybe it will not be possible!

On back journey lunch / dinner at DWÓR ANNA (16.00 – 19.00).

UNCEREMONIOUS CLOSING OF THE SYMPOSIUM

About 19.30 back travel to Lublin / Hotel.

NOTES FOR ALL PARTICIPANTS

Lectures and text slides will be presented in English. Time of the individual lectures contains time for discussion – about 20 min! A list of lectures (posters) and chairmen of sessions can be changed!

Conference fee 10 Euros will be paid during registration. Payment for Banquet in HUSAR Hotel approximately 44 Euros and for Dinner / Supper in Dwor Anna approximately 20 € also paid during registration. Accommodation in Hotels everybody pays independently.

Abstracts of lectures will be published (electronic edition) in the Supplement of the journal Locomotor System 3–4/2014 (<http://www.pojivo.cz/en/newsletter>).

Participants will receive the Symposium programme and Certificate of Attendance

THURSDAY, SEPTEMBER 25, 2014 – DEPARTURE

ADDITIONAL INFORMATION

The HUSAR Hotel is located within a walking distance from the Symposium venue (8–10 minutes on foot, approx. 350 meters)

The cost of the stay in the Husar Hotel is: Double room – 22 € / Single room – 31 €

Coffee & tea during Symposium in the Hospital

Secretary of the Symposium

Associate Professor Ivo Marik, MD, PhD.

Prague, Czech Republic, E-mail: ambul_centrum@volny.cz

&

Jacek Karski MD PhD.

Lublin, Poland, E-mail: jkarski@vp.pl

VÝVOJ A RŮST SKELETU. RŮSTOVÁ CHRUPAVKA. DEVELOPMENT AND GROWTH OF SKELETON. GROWTH CARTILAGE.

Zemkova Daniela ¹⁾, Marik Ivo^{2), 3)} (Prague, Czech Republic)

Development and growth of skeleton. Growth plate

¹⁾ Pediatric Dpt., University Hospital Motol, Prague, Czech Republic

²⁾ Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic

³⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

E-mail: dezem@email.cz

In the last 20 years, considerable progress was made in our genetic and molecular understanding of the process of skeletal development, chondrogenesis, joint formation, and osteogenesis. This review is focused on endochondral ossification, especially on the growth plate. Understanding of the processes running on the growth plate allows us to elucidate a large part of both primary and secondary growth disorders and skeletal deformities and helps us to search for the appropriate treatment.

Growth plate is an avascular structure occupying a narrow space at each end of the expanding bone. Within the growth plate the various subpopulations of chondrocytes, resting, proliferating, and hypertrophic, are arranged in columns, representing the entire sequence of cell differentiation. The zone of hypertrophic chondrocytes deserves special attention because 90% of bone growth is attributable to increase in cell size and deposition of extracellular matrix and these hypertrophic chondrocytes prepare conditions for removal by bone. In this zone provisional calcification occurs. Hypertrophic chondrocytes died through apoptosis, after vascular invasion cartilaginous ECM is replaced by a bone ECM secreted by osteoblasts.

Extracellular matrix presents not only "building material" but also regulates the chondrocytes differentiation. In the resting and proliferating zones the main components of ECM are collagen II, IX and XI and glycosaminoglycans, in hypertrophic zone collagen X. Mutation in collagen II produces a wide range of systemic (intrinsic) growth disorders with typical clinical and rentgenological manifestation which place to various nosological entities according to type and localization of the mutation: from lethal achondrogenesis, spondyloepiphyseal dysplasia, Kniest dysplasia, spondyloperipheral dysplasia, Stickler syndrome, spondyloepiphyseal dysplasia with short metatarsals (former Czech dysplasia). Mutations damaged further components of cartilaginous ECM result in multiple epiphyseal dysplasia, pseudoachondroplasia (COMP), diastrophic dysplasia (SLC25A2). Mutations in various genes could have very similar clinical picture, but on the other hand mutations in one gene can cause different nosological entities (i.e. genetic heterogeneity and/or genetic variability). Disruption of hypertrophic zone development cause mainly metaphyseal changes (e.g. Schmid dysplasia, COL X) Collagen I is the overriding organic component of bone ECM. Mutations in this gene are the most frequent cause of osteogenesis imperfecta. The development of chondrocytes and bone cells is influenced by a number of factors which control their proliferation and maturation whereas these processes are tightly counterbalanced. Transcription factor SOX9 (among others) plays a major role during nonhyperthrophic chondrocyte differentiation and stimulates together with SOX6 and SOX5

the synthesis of cartilaginous ECM. The consequence of mutation in this gene is campomelic dysplasia. On the other hand RUNX2/Cbfa1 stimulates the development of osteoblasts and is required for hypertrophic chondrocytes differentiation. Haploinsufficiency of this gene leads to cleidocranial dysplasia. Indian hedgehog (IHH) stimulates chondrocyte proliferation and together with RUNX2 also osteoblast differentiation, on the other hand indirectly (through TGF beta, PTHrP) slowing down the process of chondrocyte hypertrophy. FGFR3 reduces the cell proliferation rate and negatively regulates chondrocytes hypertrophy. On the other hand FGF signaling positively regulates osteoblast proliferation. Gain-of-function mutations in FGFR3 in man are the causes of achondroplasia, hypochondroplasia and thanatophoric dysplasia. SHOX gene is a transcription factor regulating the expression of further genes and through SOX5 and SOX6 regulates aggrecan expression. Haploinsufficiency or mutation of this gene are the main causes of short stature in Turner syndrome, dyschondroosteosis Leri Weil and Langer dysplasia and some cases of idiopathic short stature. In addition to FGF and Ihh signaling, one other growth molecular C-type natriuretic peptide (CNP) has been shown to affect chondrocyte proliferation. CNP favors chondrocyte proliferation and longitudinal growth of fetal bone. Homozygous mutations of the transmembrane natriuretic peptide receptor (NPR-B) gene (NPR2) caused acromesomelic dysplasia type Maroteaux and heterozygous mutation manifested by idiopathic short stature. How this pathway relates to the FGF, TGF or Ihh pathways has not yet been elucidated. New studies suggest that CNP analogues may provide a novel therapeutic approach to growth disorders. Growth hormone produced by the pituitary gland and IGF1 produced by proliferating and hypertrophic chondrocytes, appear to act largely independently to control the rate of chondrocyte proliferation. They appear to be the major regulators of linear bone growth and body size in mammals. Lower expression of IGF1 due to malnutrition and chronic inflammation is the cause of secondary growth failure in number of chronic diseases. Thyroidal hormones also participate in the processes of chondrocyte maturation through wnt signaling. In the past, vitamin D dependent rickets was one of the frequent causes of growth failure. The disorders of calciophosphate metabolism may be congenital or accompanying some chronic diseases. Apart from mentioned genetic, hormonal and metabolic influences, the resulting shape and architecture of the skeleton is determined by intermittent cyclic supraliminal loading that stimulates osteoresorption or osteoformation through RANKL-RANK-OPG pathway (that is coupled to the dual action of tumour growth factor beta -TGF-beta) and by effect of periosteal membrane and perichondrium (in the region of growth plates). The global thickening of the bone tissue includes the sequence of biomechanical-chemical processes (i.e. biochemical reactions and steady states) whose result is the increase of density in the bone tissue.

The review is documented on patients diagnosed and in the long term treated in the Ambulant Centre for Defects of Locomotor Apparatus.

Key words: growth plate, growth failure, skeletal biology, bone dysplasia

Literature

1. DIVALL SA and RADOVICK S. Deciphering the Genetics of Stature—Another Piece of the Puzzle. JCEM, 2006, 91(4); 1218-1219

-
2. HALL BH. Bones and Cartilage: Developmental and Skeletal Biology. San Diego: Elsevier Academic Press. 2005, 760pp. ISBN 0-12-31906-06
 3. HERMANUSSEN M (ed.). Auxology. Studying Human Growth and Development. Stuttgart: Schweizenbart, 2013, 324 pp. ISBN 978-3-510-65278-5
 4. GLORIEUX F H (ed.). Pediatric bone. Biology and Diseases. Amsterdam, Boston: Academic Preses, 2003, 758 pp. ISBN 0-12-286551-0
 5. KARSENTY G, WAGNER E F. Reaching a Genetic and Molecular Review
 6. Understanding of Skeletal Development. Developmental Cell, 2002, Vol. 2, 389–406
 7. KLIKA V, MARŠÍK F, MAŘÍK I. Dynamic Modelling, chapter Influencing the Effect of Treatment of Disease Related to Bone Remodelling by Dynamic Loading. Vienna, INTECH, 2010, p. 123–149. ISBN 978-953-7619-68-8, [online] <http://sciyo.com>
 8. MARŠÍK F, MAŘÍK I, KLIKA V. Chemical kinetics of bone remodeling based on RANK – RANKL – OPG biology. Pohybové ústrojí, 11, 2004, No. 3+4 Suplementum, p. 266-269. ISSN 1212-4575
 9. MAŘÍK I. Systémové, končetinové a kombinované vady skeletu: diagnostické, terapeutické a biomechanické aspekty – 1. část. Monografie. In: Pohybové ústrojí, 7, 2000, č. 2–3, s. 81–215. ISSN 1212-4575
 10. MAŘÍK I, MAŘÍKOVÁ A, HUDÁKOVÁ O, KOLÁŘ J. Kostní genetické choroby, nádory kostí a pojivových tkání. In: Revmatologie, ed. Pavelka K, Vencovský J, Horák P, Šenolt L, Mann H, Štěpán J a kolektiv, Praha: Maxdorf Jessenius, 2012, s. 640– 653. ISBN 978-80-7345-295-7
 11. SU N, SUN Q, LI C et al. Gain-of-function mutation in FGFR3 in mice leads to decreased bone mass by affecting both osteoblastogenesis and osteoclastogenesis. Hum Mol Genet. 2010 Apr 1;19(7):1199-1210
 12. ULICI V, HOENSELAAR KD, GILLESPIE J R, and BEIER F. The PI3K pathway regulates endochondral bone growth through control of hypertrophic chondrocyte differentiation. BMC Dev Biol. 2008; 8: 40.
 13. WARMAN ML, CORMIER-DAIRE V, HALL CH, KRAKOW D, LACHMAN R, LEMERRER M. et al. Nosology and Classification of Genetic Skeletal Disorders – 2010 Revision&. Am J Med Genet A. 2011 May ; 155A(5): 943–968.

REVIEW ARTICLE

MATERIAL PROPERTIES OF CONNECTIVE TISSUES ACROSS SYNDROMOLOGY GENETIC SKELETAL DISORDERS AND PATHOBIOMECHANICS

Kuklík M¹⁾, Tothova M²⁾, Helesic V²⁾, Marík I³⁾, Tajtlova J²⁾, Kajanova P²⁾, Vlckova Z⁴⁾, Krkavcova M²⁾, Novotna D⁴⁾, Malikova M⁴⁾, Krepelova A⁴⁾, Marikova A³⁾, Drabova D⁴⁾ (Prague, Czech Republic)

¹⁾ Genetic department Olsanska 7, Prague, Czech Republic,

²⁾ Genvia s.r.o, genetic laboratory, Prague, Czech Republic

³⁾ Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic Ustav

⁴⁾ Institute of biology and medical genetics, University Hospital Motol, Prague, Czech Republic

E-mail: honza.kuklik@volny.cz

Introduction

The material properties of connective tissues (skeleton, tendons, joints) at the genetic skeletal disorders (inborn and connective tissue diseases, bone or skeletal dysplasias and congenital limb defects) are important as for abnormal development of musculoskeletal system as for results of symptomatic comprehensive treatment i.e. physiotherapy, orthotic treatment and prosthetic fittings, surgical therapy (e.g. endoprostheses, transplantations, reconstructive surgery of bone and joints, etc.) and administration of calciotropic drugs. Surgeons should respect pathophysiological changes of connective tissue and individually abnormal pathobiomechanics of musculoskeletal system.

Methods and patients

The genetic analysis explains changes of tissues material properties on the basis of molecular genetic examination, genealogy, biochemical investigation, rentgenology, nuclear magnetic resonance, ultrasound picture and on the basis of somatoscopy, anthropology and biometrics including dermatoglyphic picture and craniometry.

We describe the material properties at disproportional bone dysplasias – e.g. achondroplasia, hypochondroplasia, diastrophic dysplasia, pseudoachondroplasia, mesomelic bone dysplasias, metaphyseal dysplasias, multiple epiphyseal dysplasias and some collagenopathies like osteogenesis imperfecta (OI), Marfan syndrome. Further diseases with chaotic growth of connective tissues as multiple cartilaginous exostoses and enchondromatosis are mentioned. Congenital isolated defects of extremities are in many cases a part of typical symptomatology, e.g. proximal femoral focal dysplasia (PFFD), femur-fibula-ulna syndrom (FFU, fibular hemimelia), femur-tibia-radius syndrom (FTR). All these limb defects have a scale of very peculiar abnormalities of tissue material properties which are important for course of skeletal and joints pathobiomechanics.

Results

We described a few nosologic units where on mutational changes basis are present aberrant genes products determining connective tissue material properties aberration with many primary or secondary biomechanical effects on musculoskeletal system.

The achondroplasia (ACH) is characterised by rhizomelic shortening of extremities and typical spondylo-metaphyseal changes and deformities at X-rays. The cause is abnormal endochondral ossification due to FGFR3 gene mutation. The gene is located to the 4p (short arm) region. Primarily, the upper segments of all extremities are symmetrically shortened (it is called rhizomelic dwarfism) and vertebral bodies of thoracic and lumbar region are wedged.

Biomechanical changes of extremities and spine and hypermobility lead to abnormal ventral position of pelvis and flexion contractures of hips and elbows. Toddlers with achondroplasia (ACH) have more pronounced problems with locomotion. Auxologic biometric changes determine atypical and retarded motor development.

The abnormal biomechanical changes of skeleton and disproportionality determine predisposition to osteoarthritis and spondylarthritis. The achondroplastic patients suffer from spine stenosis (due to defect of endochondral ossification) and are candidates for spine surgery. Endoprostheses of big joints are usually not indicated. There is a problem with a size of acetabular and femoral components. The material tissue properties of long bones are not deteriorated and lengthening procedures can be individually indicated. Lengthening of extremities in achondroplastic patients leads to improve stature proportionality.

Similar problems are presented at hypochondroplasia (a mild form of ACH from another mutation position in the gene FGFR 3).

Diastrophic dysplasia (DD) is rhizomelic bone dysplasia with radiological dysplastic changes of epi-, metaphyses and vertebrae. The bone growth is more affected as at above reported ACH. The shortening of long bones is accompanied by torsion. Typical is a progressive kyphoscoliosis with growth. The term diastrophicus is derived from Greek and indicate skeletal torsion changes, which are described mathematically. From etiopatogenic point of view (genetic cause) cartilage and bone disturbances arise from insufficient sulfatation of proteoglycans. The sulfatation is very important and necessary for metabolic pathways (heparansulfate, dermatansulfate and chondroitinsulfate). Etiology of the disease is gene mutation for enzyme sulfate transporter. The mutation is autosomal recessive character (the metabolic disease sui generis). The most affected chondrocytes are both in joint and growth cartilage. So deteriorated growth gives to severe skeletal deformities and preliminary osteoarthritic changes. The patients are candidates for reconstructive surgery of clubfeet, corrective osteotomies and endoprostheses in early age. Material properties of bone tissue are not basic problem for lengthening but joint contractures are contraindication of this procedure. Therapeutic philosophy resulted from constitutional cartilage undersulfatation and medicament repair.. Pharmacological compensation with chondroitinsulfate administration is very difficult, dubious, controversial and problematic.

Pseudoachondroplasia (PSACH): disproportional changes and growth retardation develop in first 2 years of life when the clinical picture is expressed. Symptomatology of bone dysplasia is not highlighted prenatally and after birth. The causative mutation has autosomal dominant (AD) character and it has impact on production and polymerisation of cartilage oligomeric matrix protein (COMP). The finally gene product is posttranslation homopentamer (similar composition as immunoglobuline M). COMP is compound from identical chains (in the normal conditions without mutation). AD mutation cause posttranslation disturbances in the polymer composition. According to combinatoric laws only 3 % pentamers are normal polymers and 97 % included mutations. The gene is located to the 19p (short arm) region, near to the receptore gene for apolipoprotein E. The primary gene product – monomer COMP is expressed in joint cartilage and tendons. The macromolecule COMP is visible in electron microscopy.

Leri – Weill disease is caused SHOX gene mutation in pseudoautosomal Xp PAR 1 region. The gene (gene product respectively) called short stature homeobox gene regulates via FGFR 3 pathway bone ossification and determine previously mesomelic skeletal shortening of extremities. The term mesomelic means shortening of middle segments of extremities. Second one sign typical for Leri – Weill syndrome are deformities and radioulnar synostoses. We talk about pseudorheumatic and osteoarthritis changes. The gene mutation is obviously in heterozygote

allelic configurations. Homozygotes represent more severe form of disease, allelic form for the same gene is called Langer dysplasia.

Metaphyseal dysplasia, type Schmid is collagenopathy, especially for the triple helix of collagen X (homomeric triple helix of collagen X). Phenotype of Schmid dysplasia is the typical disproportional shortening of the lower body segment and genua vara. Metaphyseal dysplastic radiographic features are a little similar to hypophosphatemic rickets but markers of calcium-phosphate metabolism are normal. Collagen X is expressed previously in the metaphyseal area of bones. The gene expression situation is well documented with help of histochemical staining of collagen X mRNA (silver staining).

Genetically determined material bone tissue changes express as the varosity of legs. Asymmetrical pressure and forces gives disposition to pre-osteoarthritis of knee joints. Corrective osteotomies in childhood are a method of choice.

Multiple epiphyseal dysplasia is from the genetic and etiopathogenetic point of view – heterogenic disease. It is typical pre-osteoarthritis caused by mutation of collagen II or COMP and sulphate transporter (autosomal recessive form). Epiphyseal dysplastic radiographic features and bone maturation retardation have diagnostic value. From the pathogenetic point of view there are important the collagen II solvations envelope changes. The collagen II mutation affection leads to the pre-osteoarthritis. The abnormal pressure in arthrotic joints is determined via cell membrane minor gene activation for another types of collagene in the joint cartilage (e.g. IX, X, XI). The non obvious collagen types have little solvation water envelope again and do not provide sufficient protection of joint cartilage.

The children have painful locomotion and in this situation is necessary protection before locomotion stress. Adults are candidates for early endoprostheses.

We know the overlapping syndromes to the pseudoachondroplasia in many cases COMP mutations (we talk about heterogeneity).

Osteogenesis imperfecta – is the group very heterogenous diseases. Osteogenesis imperfecta (OI) is very heterogenous, but in most cases (previously) determined mutation in the $\alpha 1$ or $\alpha 2$ chain for bone collagen, type I. Genetic determined disease osteogenesis imperfecta is widespread and common in all populations of the world. We don't know the predilection for some ethnical groups. The frequency of disease is unclear and many cases fade the diagnostics. The mild cases are diagnosed as osteoporosis at an advanced age. It is impairment (or defect) of osteoblasts and or from the osteoblastic lines derivated cells. The disease is previously advanced from the collagen I (bone collagen). The diagnostics on the molecular level is important and facilitates the treatment. Bone is present as non mature tissue, typical is liability to fractures and or microfractures with tendency to skeleton deformities.

Sillence (1979) recognised according to different phenotypes of OI, type I, II, III and IV, which are determined by collagen mutations. The other very rare (11 types OI) are the results of genes mutations for non – collagen proteins. The mutations in the $\alpha 1$ chain are most often, the second one are $\alpha 2$ chain mutations. Because other 11 types are very rare, our aim is detection the point mutations $\alpha 1$ and $\alpha 2$ collagen I chains. The heredity is mostly autosomal dominant (AD). Some cases are autosomal recessive (AR) type, namely at non – collagenous pecuniary types of OI. This is the order pathobiomechanical consequences leading to instability triple helix collagen and insufficient ossification and calcification. The mutations caused lower melting

temperature (Tm) DNA – lower termoresistance double helix DNA. Contemporary is noted the lower melting temperature of collagen macromolecules heterotrimers. The macromolecule stability is totally affected.

From the methodic point of view DNA isolation and their analysis from peripheral blood samples were carried out in the accredited molecular laboratory GENVIA. In years 2010 – 2013 DNA samples of 36 probands were analysed with using PCR methods and following direct PCR products sequencing. The investigation was focused on the causative mutation detections in coding gene regions for COL1 alfa-1 and alfa-2 chains that are responsive for OI type I, II, III and IV. The methods are provided according to Gajk-Galicka et al. 2002 and Politts, R., 2006.

Results of a cohort of 36 OI patients. The causative mutations were detected at 32 patients and negative were 4 patients (which are probably non collagenous types). The most common are mutations in glycine triplets – 12 cases and each one mutation is located to the alfa 1 chain. At 24 from 32 positive patients mutations are displaced at alfa-1 chain, only 8 cases at alfa-2 chain.

There were described (Marini et al. 2007) about 832 causative mutations up to date 2007, which cause OI type II, III and IV. More obvious are variants in the alfa-1 chain: 1352 variants including 790 substitutions, 107 non sense and 171 frame shift mutations. The interpretation of variants is not clear, yet. The variants in the alfa-2 chain are not so numerary as in the previously alfa-1 chain.

The clinical – anthropological classification is used so far for the orientation. There are the intrafamilial relatively variable expresivity and penetrance in the families with multiple incidence and there are different suffering patients in the same family. It is very difficult to estimate the connection between mutation and therapy ability and its efficiency.

The amino acid glycine is most obvious in the collagen linear sequency and correlate with frequency of targeted mutations which were founded. All from detected mutations were in heterozygotes composition. Another mutations changes were detected in codons for prolin, asparagin, arginin, glutamin and tyrosin. Accidentally we found suspected splicing error.

All mutations result from mentioned lower melting temperature for the triple helix and damage its thermo resistance as well as this phenomena correlate with the lower melting temperature for double helix DNA. In these directions the posttranslations changes at compound triple helix collagen I macromolecules are disturbed.

Dysplasia cleidocranialis – is heterogenic group of diseases, most often AD type of heredity. CBFA gene mutation determines low density of skeleton from disturbance of ossification. CBFA gene is the regulatory gene. There are demonstrated systemic changes of skeleton (previously at bones which have desmogenic origin).

Osteopetrosis – heterogenous group of the diseases with mendelian type of the inheritance. There is high density of skeleton from the failure of osteoclastic function and with bone fragility. Sclerotic bones are very hard but fragile.

Marfan syndrome is autosomal dominant, heterogenous disease of connective tissue previously caused by fibrillin mutations.

There is high laxity of connective tissues and hypermobility of joints with many dangerous symptoms as rupture of aortal aneurysma, progressive scoliosis, lens dislocation, etc.

Multiple cartilaginous exostoses (MCE) belong to the group of chaotic growth of connective tissues. There are isolated defects the glykosyltransferases exostosin 1 – 8q, exostosin 2 – 12p and 3 (19p).

Enchondromatosis like to the MCE belongs to the group of chaotic growth of connective tissues, but another character. Obviously is known as fresh AD somatic mutation, so-called hemimelic forms (morbus Ollier). Although we talk about the autosomal dominant mendelian inheritance, the mutation is not able to go through germinal lines to the next generation. Variant of the disease when signs included the presence hemangiomatosis is designed as Maffucci syndrome. Both mentioned disorders have high disposition to malignant degeneration.

Longitudinal extremities defect are known as femur-fibula-ulna (FFU) or femur-tibia – radius (FTR) syndrome. Both syndromes are biomechanically important from the point of leg length discrepancy and joint instability view. The prosthetic fitting and/or lengthening procedures are methods of symptomatic therapeutical choice in the most of cases FFU, FTR and PFFD.

Discussion

Common pathology of the connective tissue diseases are contractures, hyperlaxity, osteoporosis, osteosclerosis, premature osteoarthritis, spondylosis and spondyl-arthritis. The basic knowledge of genetic skeletal disorders (inborn and connective tissue diseases, bone or skeletal dysplasias and congenital limb defects) is very important for physicians and surgeons who are interested in comprehensive treatment of musculoskeletal and neuronal diseases. Each nosologic unit is characterised by genetically programmed specific tissue material properties that influence development of skeleton, tendons, joints and their biomechanics. Abnormal material tissue properties significantly influence and direct application of the most appropriate methods of treatment. Physiotherapy, orthotic treatment, prosthetic fitting, surgical treatment, transplantation and bone and joint reconstructive surgery must respect this tissue pathology and pathobiomechanics of musculoskeletal system.

Key words: material tissue properties – epigenetic signs – mendelian and polygenic inheritance – osteoporosis – osteoarthritis – bone and joint pathobiomechanics

ABSTRACT

CONGENITAL DEFECTS OF THE HAND – ONTOGENESIS, PHYLOGENESIS AND TISSUE SYSTEMS

Smrčka Václav^{1), 2)}, Marik Ivo^{3), 5)}, Kuzelka Vítězslav⁴⁾ (Prague, Czech Republic)

1) ESME I.I.C. & 2) Department of Plastic Surgery, 1st Medical Faculty of Charles University in Prague, Hospital Na Bulovce, Prague, Czech Republic

3) Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic

4) Dpt. of anthropology, National Museum, Prague, Czech Republic

5) Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

E-mail: sedlcany1@seznam.cz

The findings of palaeontology point to the phylogenetic evolution of the hand. The findings of palaeopahtology help to find the origin of congenital deformities.

For ontogeny we used embryologic diagrams of Wolpert and 30 palaeopathological specimens of extremities from the 19th century.

Untreated palaeopathological cases served us as a model for clinical insufficiencies, for example for aplasias of the metacarpi.

Drafts of the algorithms with techniques in congenital deformities from the point of view of the affected system of flexors, extensors, ligaments and bone system are presented.

The affection of the flexor system manifests itself by contractures which appear with acceleration of the bone growth, in the period of the growth acceleration, especially around the 7th and 15th years of age. We talk about retarded congenital deformities.

Affection of the flexor system by a congenital deformity can be solved in surgical manner and by splinting, the extensor system usually by splinting. Bone system affected by a congenital deformity must be treated in surgical way.

To treat congenital deformities of the hand a co-operation of plastic surgeon, orthopaedist, anthropologist and geneticist is suitable.

Key words: Congenital defects, upper extremity, hand, ontogenesis, phylogenesis, comprehensive treatment

ABSTRACT

RECONSTRUCTIVE SURGERY OF RARE UPPER LIMB CONGENITAL DEFECTS: 3 CASE REPORTS

Marik Ivo^{1), 5)}, Myslivec Radek^{2), 1)}, Marikova Alena¹⁾, Zemkova Daniela^{3), 1)}, Petrasova Sarka¹⁾, Smrčka Václav⁴⁾ (Prague, Czech Republic)

1) Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic

2) Orthopaedic-Traumatologic Department, Regional Hospital Píbram, Czech Republic

3) Pediatric Dpt., University Hospital Motol, Prague, Czech Republic

4) ESME I.I.C., Prague, Czech Republic

The main objective is to present rare congenital differences of the upper extremity that belong to Category II of the modified classification of congenital hand deformities by Ogino et al. (1986). This classification was adopted by the Japanese Society for Surgery of the Hand in 1996. Category II includes incomplete formation of the joint, contracture and deformities due to failure of differentiation of parts and tumor-like conditions. It may result in synostosis, ankylosis and congenital dislocation.

We present

1. Proximal radioulnar synostosis and ulnar hypoplasia

Radioulnar synostosis can take 2 forms: congenital (described by Sandifort in 1793) and posttraumatic (described first by Gros in 1864).

Congenital forms occur:

- By itself (in isolation)
- In association with problems of the heart, kidneys, nervous or GIT system
- In association with certain skeletal abnormalities and genetic syndromes (e.g. Holt-Oram syndrome, fetal alcohol syndrome – about 1/3 cases)

It affects both arms about in 60 %. Boys and girls are equally affected.

Embryological pathogenesis

The humerus, radius, and ulna become visible at 37 days. Initially, the cartilaginous humerus, radius, and ulna are connected before segmentation. For a short time, the radius and ulna share a common perichondrium. Abnormal events at this time can lead to a failure of segmentation.

Two congenital cases are presented and the results of surgery documented. Conclusion: The method of choice is derotative osteotomy in the place of synostosis aimed to correction of hyperpronation or supination. Separation of synostosis is not indicated.

In suitable cases lengthening of distal ulna to prevent pseudo-Madelung deformity is carried out or partial radial epiphyseodesis to correct this one (and/or corrective OT of radius when growth is finished).

2. Partial ulnar deficiency associated with dislocation of radial head and humeroulnar synchondrosis

Ulnar ray deficiency is rare and has a variable presentation. The developmental biology of the anomaly is still not fully understood.

By T. Ogino (1988) the degree of ulnar arrest was closely related to the severity of deficiency of the fingers and also to abnormalities of the elbow joint. Ulnar deficiency was induced by busulfan in rat fetuses. The critical period of ulnar deficiency was earlier than that of other anomalies and it corresponds to the period of a high mortality rate of fetuses.

We present step by step surgical treatment of this rare deficiency and long-term result.

Conclusion: Resection of ulnar fibrocartilago as soon as possible to prevent radial bowing and Madelung deformity (the same approach as in cases of fibular hemimelia). Individual comprehensive treatment (physiotherapy, orthotic fitting). Corrective OT of radius when growth is finished.

3. Humero-radial and humero-ulnar synostoses, partial aplasia of scapula, humerus, radius and ulna and ankylosis of metacarpo-phalangeal joints associated with cleft hand.

No similar case was described. The functional rudimental of upper extremity is the aim of comprehensive treatment. Orthotic and prosthetic fitting should prevent a static scoliosis (due to uneven weight of upper extremities). Conclusion: a partial correction of the shape of the partial defect of upper extremity can improve its working capacity.

Conclusion

Individual comprehensive treatment of rare upper limb congenital defects needs close cooperation of paediatric orthopaedic and plastic surgeons with anthropologist and physiotherapist.

Note this lecture was presented at:

1. The 12th Congress of the Czech Society for Hand Surgery and The 1st Congress of the Czech Society for Hand Rehabilitation, 14. – 16. 11. 2013, Mountain Hotel Sepetná, Beskydy, CZ
2. The 19th Kubat's day, 7. – 8.3.2014, Domus Medicorum, Prague, CZ

Key words: proximal radioulnar synostosis, ulnar ray deficiency, humero-radial and humero-ulnar synostoses

ABSTRACT

CLINICAL VALUE OF NEONATAL SCREENING FOR CONGENITAL DYSPLASIA OF THE HIP: 20 YEARS EVALUATION OF THE EFFECTIVENESS OF ULTRASOUND SCREENING

Popko Janusz, Karpiński Michał, Guszczyn Tomasz (Białystok, Poland)

Department of Pediatric Orthopedics and Traumatology Medical University of Białystok, Poland

Background Developmental dysplasia of the hip (DDH) is a term describing a hip abnormalities from a shallow acetabulum to a dislocated hip. The reported incidence of DDH varies (among countries, regions and races). In central Europe and Poland it is more common and it can be as high as 4%. Early diagnosis is the basis for the good outcome of treatment. Ultrasonography is now a standard procedure in the diagnosis of DDH. Together with the clinical examination it

can certainly determine the status of the development of the hip joint. Since the introduction of ultrasound to the study of the hip of newborns a variety of screening programs have been recommended. Starting from clinical screening of neonatal and further study of children at risk only, to clinical and ultrasound screening of all newborns.

Material and methods

At the Department of Children Orthopedics of Medical University of Białystok, hip ultrasound for newborns began in 1991. On average, 1,000 tests per year is performed. Particular attention is paid to children with risk factors such as breech birth, female gender, positive family history, congenital deformities of the lower limbs or intrauterine crowding syndrome. As a rule, a first ultrasound is performed in the first month of life (on average 4-6 weeks) and then after completing three months of age. During the first visit, we teach parents the proper care of a child with special attention to maintain abduction position of hips. In the case of hip dysplasia tests are carried out more frequently, until cure. For the study of newborn and older children we are using a linear probe 7.5 – 9 MHz.

Results

Features of immaturity (type IIa hips according to Graf) was found in 2.8 % of hip joints. Hip dysplasia (type IIb – IV according to Graf) were present in 2.3% of children. Only 20.3% of hip dysplasia occurred were in a high risk group. Treatment of dysplasia was dependent on the degree of immaturity of the hip and the age of the child, in which the diagnosis of hip dysplasia was made. In the treatment of low degrees of dysplasia we are using wide diapers, Frejka pillow and Pavlik harness. For higher grades especially with dislocation overhead traction, casting and surgical treatment are used. Surgical treatment was restricted gradually to 2–3 cases per year, and now we are forced to surgery only in rare cases (in the last 5 years, 2 cases). As compared to the period before introduction of screening, there is more than 10-times decrease in severe surgery of dislocated hips.

Conclusions

The results support the aim of performing hip screening in all newborns in the proposed scheme. The examination of children at risk only could pose a risk of increase in number late recognition of dysplasia and hip dislocation. The proposed scheme of study in just 4-6 weeks of age and after completing three months of age is valued as effective, which confirms the decrease in the number of operated patients. We found ultrasound to be the test of choice in the infant (< 6 months) as the proximal femoral epiphysis has not yet significantly ossified. The costs of screening the whole population of children seems disproportionately low compared to the cost of the surgical treatment of congenital hip dysplasia resulting in disability and early osteoarthritis.

Key words: neonatal screening, hip congenital dysplasia, ultrasound screening

ABSTRACT

“IMPERFECT HIPs” – CLINICAL SYMPTOMS IN TWO TYPES OF FUNCTIONAL INSUFFICIENCY WITH PAIN – AFTER YEARS WITH FULL SIGNALS OF OSTEOARTHRITIS

Karski Tomasz¹⁾, Karski Jacek²⁾, Kędzierski Zbigniew³⁾ (Lublin, Poland)

¹⁾ Vincent Pol University in Lublin,

²⁾ Medical University of Lublin,

³⁾ Military Hospital in Lublin, Poland

tmkarski@gmail.com

Introduction

The presentation is based on the material from Paediatric Orthopaedic and Rehabilitation Department, from Out-Patient Clinic of authors and from Policlinic of Military Hospital in Lublin from the years 1995 – 2013. The authors presented the clinical and radiological features of hips, literature to these themes, methods of prevention and treatment. The lecture presents problems of pain syndrome as first sign of illness in left hip as results not full cured dysplasia, or in right hip as result of “Syndrome of standing on the right leg”.

Newborns, babies and small children with hips problems. The beginning of treatment of hips should be performed as early as possible, the best in 1st – 3rd week of life (Ortolani, Vizkelety, Bjerkreim, Papp, Rigo, Szepesi, Meszaros, Dega, Szulc, Piatkowski, Karski and others). Only such early treatment of hips can protect against “imperfect hips”.

What’s mean “imperfect hips”. In our orthopaedic praxis we see patients with various symptoms as pain, limited movement of hips, temporary limping. The X-ray examination in such patients shows us “almost normal joints”. Exactly investigation of their X-ray pictures show normal Wiberg’s angle, normal CCD angle, normal AT angle and even good or almost good roof (covering of the femoral head) but the congruence of “femoral head in acetabulum” is not proper – the distance from femoral head to bottom of acetabulum is much bigger then distance of femoral head to the roof. Such hips are permanent overstressed during gait (in lecture is presented mathematical rules of function of hip joint) and the first symptoms are pain and later full sign of arthrosis. The arthrosis of left hip is mostly connected with primary hip dysplasia, not sufficient treated in childhood period. The arthrosis of right hip is connected with “the syndrome of standing on the right leg” over years. The first symptoms of “imperfect hips” appear in age of 35 – 45 (90%). Only in few cases in age of 16 – 25 (10%).

Material

The patients with incidence “of pain syndrome in hip” in material of all authors are in the years 1995 – 2013 (N) 552. Age of patients 16 – 85 years.

Clinic of “imperfect hips”

Every of adult people lose with years of life – abduction, internal rotation and extension of the hips. Some patients present „such limitation of movements” of left side (30%) others of right side (70%). The pain syndrome of the left hip as the first sign of illness is result of not full cured dysplasia, or of the right hip as result of “Syndrome of standing on the right leg”. The first symptoms of insufficiency of hips are: pain – very often on beginning of day, only temporary, pain after long wandering, after sport. Sometimes patients present limping – in beginning period only temporary. The pain is in inguinal region, sometimes on lateral side of hip, at some patients in lateral upper part of femur.

The prophylaxis and treatment of “imperfect hips”

The aim of treatment and prophylaxis (in many cases it is equal) is to restore the full movement of hips and changes the direction of loading during standing and gait for every day. The lecture present exercises (kinesiotherapy elaborated in 25 years, method of physiotherapy and exercises in geothermal waters (the best in Hungary).

Conclusions

- 1) The hips in newborn, babies and small children must be cured in 100 % (restitutio ad integrum)
- 2) Not fully treated hips with years will be only worse (imperfect hips)
- 3) Remember about “Syndrome of standing on the right leg – and change loading in life of every patient for the same percentage – on left, on right and on both legs
- 4) Proper physiotherapy can protect before coxarthrosis for many years.

Literature in authors and in www.ortopedia.karski.lublin.pl

ABSTRACT

ANATOMIC AND FUNCTIONAL PROFILE AND INDEX OF THERAPEUTIC REACTIVITY AS A MEANS OF TREATMENT AND REHABILITATION PROGRAMME MANAGEMENT

Yefimov Aleksandr A., Strelnikov Aleksandr V., Klyemenov V.N. (Kaliningrad, Russia)

Federal State Institution Children's Orthopedic Sanatorium “Pionersk”, Ministry of Health, Russia

E-mail: sanpionersk@mail.ru, ortosan@inbox.ru

The issue of assessing the quality of healthcare provision is an important professional and social problem. This problem is multi-factorial and includes a number of elements. One of such elements is the assessment of the actual medical interventions aimed at correcting and restoring malfunctions of the patient body. These interventions must be of a systematic nature, take

into account the complex and multi-dimensional relationships, and may be called treatment and rehabilitation programs (TRP).

Currently, the standards of healthcare provision developed by the Ministry of Healthcare and Social Development of Russia can serve as an example of such programs. However, despite all the advantages of such standards their application to each specific patient is quite a challenge, for they do not fully take into account the individual characteristics. To manage the development of treatment and rehabilitation programs computer technologies have been increasingly employed. Solution to this problem in the PION-SE system is based on the most accurate and objective description of the initial state of the patient using formalized protocols of examination by specialists, as well as laboratory and instrumental methods of examination. From this raw data Anatomic and Functional Profile of the Patient (AFPP) is created, which serves as the basis for tracking the dynamics of the patient in the course of implementation of an individual TRP.

For better monitoring of the patient's condition and evaluation of efficiency of the activities being implemented the system tracks the dynamics of indicators by means of generating additional AFPPs revealing positive or negative parameter changes resulting from the set of undertaken interventions. The dynamics of these indicators allows to evaluate the effectiveness of interventions and to conduct their timely correction. This allows calculate the index of therapeutic reactivity of a patient (ITRP). The frequency of AFPP generation is decided upon by the doctor in charge depending on the obtained data, severity of the patient's condition and requirements of the standards. ITRP is an important indicator, since it can serve as the basis for assessing the rehabilitation potential, which solves the complex and urgent problem of a short-term forecast of interventions effectiveness. In addition, this approach makes it possible to conduct the TRPs in a well-documented manner, make them transparent for monitoring and assessment, and, due to good visualization and a high degree of automation allows facilitate the work of medical staff at all stages of management.

Key words: quality of healthcare, index of therapeutic reactivity, treatment and rehabilitation programs

POSTER SESSION

Chairmen: Dudin Mikhail, Karski Tomasz

Speaker: Shashko Aleksey

ABSTRACT

THE QUESTION OF COXARTHROSIS EARLY DIAGNOSIS IN TEENAGERS BY "TENSOMETRY"

Dudin Mikhail, Kazemirsky V., Tsvetkov T., Hadzhaev B. (St. Petersburg, Russia)

Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok"

St. Petersburg, Russia

E-mail: ogonek@zdrav.spb.ru

Introduction

Because of unexpressed X-ray-signs and clinical manifestations of coxarthrosis in the early stages of the disease in adolescents is a delay of the adequate treatment.

Objective coxarthrosis early diagnosis in teenagers by "tensometry"

Materials and Methods

The study was carried out using measuring platform tensor „MIN ^ EMED". 5 measurements were performed for each foot. Total 670 measurements were performed. For the analysis of measured data was used appropriate software (Novel-win v.95121 & Novel-orto v. 95121). The control group included well-known 48 healthy adolescents – research data in the control group was used to determine variant of norm. Then the survey was exposed a group of 49 adolescents diagnosed with coxarthrosis using other research methods.

Results

Adolescents with coxarthrosis have significantly less ($\leq 15\text{N}/\text{CM}^2$) pressure on the heel and increased substantially while relying on the anterior part of the metatarsals and toes on the affected side. There is different behavior of the velocity of the center of pressure of time. For healthy curve of these changes has one or two maxima: the first one 0 – 50 – 70% of the time rolling when the heel of the foot and the average loaded, followed by a very short period of minor changes 88 – 94% of the time rolling when driving only the anterior part of the metatarsal and fingers. The second one – the end of reliance on the fingers. For teenagers with coxarthrosis velocity of the center of pressure oscillates near the midline. Path of the center of pressure on the affected side is more than a „healthy" side.

Conclusion

Initial signs of coxarthrosis in adolescents can be identified on the basis of the pressure distribution on the sole much earlier than with traditional methods of research.

Key words: coxarthrosis early diagnosis, "tensometry", center of pressure

ABSTRACT

FEATURES THE RIGHT AND LEFT SCOLIOSIS

Khaimina Tatiana¹⁾, Avaliani Tatiana²⁾, Karpenko Marina²⁾, Dudin Mikhail¹⁾ (Saint-Petersburg, Russia)

¹⁾ State Institution of Health Service Saint Petersburg Rehabilitative Centre of Pediatric Trauma and Orthopaedics "Ogonyok", Saint-Petersburg, Russia

²⁾ Institute of experimental medicine of the North West Branch of the Russian Academy of Medical Sciences, Saint-Petersburg, Russia

E-mail: htv80@mail.ru

The features of neurohumoral regulation in children with right and left-scoliosis. With left-sided scoliosis in serum have higher levels of oxytocin than in right-sided scoliosis. The ratio of vasopressin to oxytocin in children depends on the degree and severity of scoliosis.

Introduction

Movement disorders of central origin, stroke due to ischemia or injuries alter tonic muscle reaction is usually preferably at the same side.

These movement disorders accompanied by synthesis in the hypothalamic-pituitary system and release into the cerebrospinal fluid and blood of bioactive peptide substances. Abnormalities in the muscle of the right extremities accompanied by arginine vasopressin synthesis and by sinistral disorders reveal an increased content of oxytocin (3). Scoliosis violation anatomical relations between the longitudinal dimensions of the bone of the spine and spinal cord also occurs due to failure of functional regulatory units on the hypothalamic-pituitary level (2). We hypothesized that children with right and left-scoliosis in serum are present peptide factors causing bioassay with serum (SC) models motor disturbances on the same side as that of the sick child, and the relationship of these factors will depend on type of scoliosis.

Aim

To identify the features of neurohumoral regulation in children with right and left-scoliosis.

Methods

Blood serum was examined in a cohort of 121 children (age from 6 to 13 years) with diagnosed scoliosis, 70 of them with right-and left-hand 51. Bioassay SK model (Wistar rats): analysis of changes in EMG responses in antagonist muscles of the hind limbs in spinalizirovanny thoracic rats after administration of 0.1 ml SC donor in lumbar spinal cord. The level of vasopressin and oxytocin was determine by ELISA in the serum of children (1).

Results

The method of bioassay recipients revealed changes tonic reactions (70–150% increase from baseline) primarily in the flexor muscles on the affected side and a violation reciprocal value between flexor and extensor muscles on the same side as that of the donor. Also, irradiation of excitation in muscle lesions in hand muscle stimulation opposite conditionally healthy limb. Total fertility (in basis points) on 24 indicators (spontaneous and evoked EMG, reciprocity, irradiation of excitation in muscle electrostimulation at the opposite side, etc.) depend on the degree of abnormality of the patient and the type of flow of idiopathic scoliosis (progressive, indolent, nonprogressive form). In right-sided scoliosis EMG change indicators were more pronounced than in left-sided scoliosis of the donor. The ratio of vasopressin to oxytocin in the UK children with right scoliosis was equal to 0.439, and with left-sided scoliosis – 0,219

Discussion

Character changes in posture due to violation of the recipients of the interaction of muscle groups under the action of neurohumoral factor donors – children with the right-and left scoliosis. Bioassay results indicate precedence violations side, allows define and predict the development of scoliosis. As with other motor disorders of central origin, revealed differences in the groups in the level of oxytocin and vasopressin: in children with left-sided scoliosis have higher levels of oxytocin in the blood serum than in children with right scoliosis.

Conclusion

Scoliosis in the UK children is present by neurohumoral factors peptide (vasopressin and oxytocin). Level and the ratio of these peptides depend on lateralization of motor disorders in scoliosis and severity of motor disorders. The data obtained should be used in the selection of treatment strategy.

Keywords: scoliosis, vasopressin, oxytocin

References

1. CREGG N, MANNION D, CASEY W. Oliguria during corrective spinal surgery for idiopathic scoliosis: the role of antidiuretic hormone. *Paediatr Anaesth.* 1999, 9 (6):505-14.
2. DUDIN M.G., PINCHUK D.YU. Idiopathic scoliosis: neurophysiology, neurochemistry. St. Petersburg, the „Mar“ in 2013. 304p.
3. VARTATYAN GA, BI Klement'ev Chemical symmetry and asymmetry of the brain. Leningrad: Nauka, 1991, 151p.

ABSTRACT

SCOLIOSIS CURVE EFFECT ON EXTERNAL RESPIRATION

Bitiyukov Konstantin (Saint-Petersburg, Russia)

State Institution of Health Service, Saint Petersburg, Russia

Rehabilitative Centre of Pediatric Trauma and Orthopaedics "Ogonyok", St. Petersburg, Russia

E-mail: kabtiu@mail.ru

Keywords: scoliosis, external respiration

The aim of this study was to examine the scoliotic arch influence on respiratory function in children with idiopathic scoliosis (IS).

Materials and methods

Were examined 46 patients from 11 to 18 years with IS or dysplastic scoliosis of II – IV degrees without the presence of chronic respiratory diseases in case history. Patients were divided into groups according to the degree of scoliosis as follows: a group of children with II IS grade – 18 patients; with III grade – 20, with IV grade – 8 patients.

The study was carried out with the help of multifunction diagnostic complex „Valenta“, which possesses also the function of a spirometer. Before the start of the study were recorded the following patients' data: passport and diagnosis, as well as anthropometric data – height and weight. During the study was estimated the maximum volume of air exhaled by the patient after a full expiration expressed in liters, as well as a percentage of average calculated values for patients with these anthropological indicators called „vital capacity of lungs“ (VCL). Was also estimated „forced VCL“ or volume of air that can be exhaled as quickly as possible in full exhalation after maximal inspiration.

Results

In the group of children with the II IS degree the minimum values for VCL and FVCL amounted to 64 and 69% with maximum – 103 and 102%. Average values – 87.8/89.1%. In patients more often were recorded minimal deviations from the age/gender standards. Significant reductions – less than 75% of the VCL/FVC L were noted in two patients (11% of the entire group).

In the group of children with the III IS degree the minimum values amounted to 48/55% of standard, maximum – 109/109%. Average values – 85.2/86.3%, which was regarded as the minimum deviation from the age/gender standards. Significant data reductions were observed in four patients (20% of the entire group).

In the group of children with the IV IS degree the minimum values amounted to 45 and 44% of standard, maximum – 96 and 113%. Average values were equal to 79.6/74.4%, which was regarded as the minimum deviation from the age/gender standards. Significant reductions were observed in three patients (37.5% of the entire group).

Conclusion

Scoliosis arch affects the respiratory function of the patients worsening it. Such deterioration was clearly determined in patients with the IV IS degree.

ABSTRACT

AGE DIFFERENCES OF ULTRASOUND FEATURES OF LOWER LIMBS GERM ZONES IN CHILDREN

Rybka Dina, Arsenev Aleksey M., Arseneva Marina S. (St. Petersburg, Russia)
Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok”
St. Petersburg, Russia
E-mail: dolspb@mail.ru

Abstract

Objective is evaluation of germ zones of lower limb bones in children, especially in part of their functional activity that is necessary for the treatment of a number of orthopedic diseases. We studied ultrasound features of the germ zones in 124 children of both sex aged 3 to 16 years. The obtained results show that the thickness and structure of the germ zones depend on the age and sex of children.

Keywords: germ zones of low limbs, ultrasound diagnosis, age features.

Introduction

Ultrasonic method has been successfully applied in the diagnosis of diseases and injuries of the musculoskeletal system. An extensive experience of the survey of the spinal column, large and small joints, tendon-muscle structures is accumulated. The anatomical and physiological age features of these structures are identified. At the same time, significantly less attention is paid to ultrasound imaging of germ zones of bones. Meanwhile, the objective assessment of the germ zones of lower limb bones in children, especially in part of their functional activity, is necessary for the treatment of a number of orthopedic diseases. Nowadays this problem in practical medicine is solved using classical radiological diagnostic techniques (radiography, magnetic resonance imaging, computed tomography, scintigraphy of the skeleton).

Our experience in this field has shown promising application of ultrasonic diagnostic imaging of germ zones. The advantages of this method are: security, non-invasive, high information content, accessibility for widespread use, no special requirements for the preparation of the child to study the possibility of multiple patient studies in dynamics, safety and efficiency in the delivery of information.

Given the fact that the generally recognized criteria for assessing ultrasonic germ zones of lower limb bones are missing, we performed the study to determine the ultrasound patterns of germ zones.

Material and methods

As a diagnostic ultrasound device we used ALOKA SSD-1100 (high linear ultrasound probe with a frequency of 7.5 MHz scanning) that allows to evaluate the structures, permeable to X-rays: surface of the bone cortex, cartilage, tendons, ligaments, muscles.

Germ zones of the femur and tibia in all studied patients were presented as hyperechoic plates between the metaphyseal and epiphyseal part of the bone (subchondral layer) and were studied by two main criteria: width (mm) and ultrasound structure (density, looseness).

124 children were examined. The children were divided into six groups according to their sex and age (Table 1).

Table 1

Age group	Boys	Girls
3-5 years	15 people	21 people
9-11 years	20 people	29 people
14-16 years	17 people	22 people

Results

The obtained results of the survey indicate that the width of the germ zones is rather constant. At the age of 3-5 years and 9-11 years it is $2\pm0,3$ mm. And only in children of 14-16 years the width of the germ zones decreases in almost 2 times – $1\pm0,5$ mm. Such changes occur in girls for 2-3 years earlier then in boys. More differences were noted by the second criterion – the structure of the germ zones. At the age of 3-5 years the structure was not changed. At the age of 9-11 years a looseness of subchondral layer was observed. At the age of 14-16 years the structure of the subchondral layer was varied (depending on the growth and the onset of puberty). If the rates in the first and the second age group were the same for boys and girls, in the third one they differed. The closing of germ zones in girls usually occurred earlier then in boys (Table 2).

Table 2

Age group	Average width of the subchondral layer	Looseness of subchondral layer
3-5 years	$2,0\pm0,3$ mm	Unremarkable
9-11 years	$2,0\pm0,3$ mm	Increased looseness
14-16 years	$1\pm0,5$ mm	Various picture

Discussion

1. Ultrasound features of germ zones differ depending on age and sex.
2. Functional activity of germ zones may be indirectly estimated by a set of ultrasound criteria.
3. The ultrasonic method allows to evaluate the efficiency of treatment when exposed to germ zones.

PERPECTIVE ORIGINAL ARTICLE

THE RESULTS OF THE SCREENING DIAGNOSIS OF SPINAL PATHOLOGY IN CHILDREN THROUGH MOBILE ORTHOPAEDIC LABORATORY IN RUSSIA AND POLAND IN THE FRAMEWORK OF INTERNATIONAL COOPERATION

Yefimov Aleksandr A., Gurinovich E.V. (Kaliningrad, Russia)

Federal State Institution Pediatric Orthopedic Sanatorium "Pionersk", Ministry of Healthcare, Russia 89062192149,

E-mail: sanpionersk@mail.ru, ortosan@inbox.ru

In 2006 sanatorium „Pionersk” concluded a cooperation agreement with the Voivodeship rehabilitation hospital for children in Ameryka settlement, Poland. Within the framework of that cooperation, as of today we have implemented 5 international projects aimed at improving the health of children in border areas and the Kaliningrad region and Warmia and Mazury, as well as significantly developed the two partner institutions. At the moment sanatorium “Pionersk” and the hospital in Ameryka settlement are implementing a large-scale project „Programme for the prevention of postural disorders and scoliosis in children from small towns and rural areas” within Lithuania-Poland-Russia ENPI Cross-border Cooperation Programme 2007-2013. This is rather a large-scale project in terms of the volume of survey work, reach of child population and the number of units of equipment employed in the screenings. According to our information no such surveys have been carried out in Russia and Poland before.

According to statistical data, over 40% of children in the Russian Federation have postural disorders and nearly 9% – scoliosis (Sadovoy M.A. et al, 1997, 2004, Novosibirsk CRITO), according to Professor Ulrih E.V. („Private vertebrology”, 2006), the prevalence of idiopathic scoliosis in the population reaches 15.3%. In Poland, 50-60% of the total child population have incorrect posture, including scoliosis – 5.19% of child population aged 0-18 („Prevention of postural disorders in children and youth in the learning environment and education”, Warsaw 2009 recommendation by Prof., MD Andrzej Gerecki – national consultant in orthopedics and trauma of the organs of movement). Taking into account the fact that the official statistics reflects morbidity level based on visits to doctors, which to some extent depends on accessibility of medical care and socio-economic conditions, we can assume that the true incidence rate is even higher. Scoliosis is a progressive disease, but when it is diagnosed early in pre-clinical stage of development and addressed through treatment and prevention activities the disease can be stopped by modern healthcare. Diagnosed in later stages of its development the process becomes irre-

versible, and in 50-75% of cases results in permanent disability (Haybulina D.H., Kazan Medical University, 1998).

To date, in Russia and in Poland there are no government programs aimed at the reduction of morbidity level related to diseases of the spine in children. We are experiencing an increase in incidence rates and acceleration of growth rates of disability of the child population in Russia and in Poland. The quality and standard of living of affected children decreases. Government spending aimed to support people with disabilities, ensure their rehabilitation and social benefits inevitably increases, whereas fewer young men of conscription age are fit for service in the armed forces.

Therefore, a comprehensive treatment and prevention program for the prevention of postural disorders and scoliosis among school-age children developed by the authors of the project is justified from medical, social and economic points of view, is timely and relevant. The comprehensiveness of the program is in the planning and implementation of 2 consecutive interconnected modules: a diagnostic module and a treatment and prevention module with emphasis on prevention undeservedly forgotten today, that will create sufficient conditions for improvement of children's health and effective prevention of child disability.

As part of the diagnostic module of the program a massive diagnostic examination of school students of the Kaliningrad region and the region of Warmia and Mazury is currently underway. Screening tests will cover at least 9500 people (equally split between Russia and Poland). The main objective of the survey is the identification of spinal pathology, such as pre-clinical stages of development of scoliosis. The survey is conducted primarily among 10-15 year-old students, as idiopathic scoliosis is practically nonexistent in younger children, whereas at older age scoliosis is usually established and early screening is not expedient.

To be able to carry out the mass screenings, we have created a mobile orthopedic diagnostic laboratory. The architecture of the laboratory presents a vehicle equipped with 4 units of medical diagnostic and treatment equipment: a computer optical topograph, a plantoscope, a stabilometric complex and an electroneuromyograph.

The diagnostic laboratory is staffed with international crews of medical personnel: an orthopedic surgeon and a functional diagnostics doctor from Russia, two physiotherapists from Poland and medium-level staff from the two countries. Work of the diagnostic laboratory crews is implemented in monthly sessions: screening examinations in the course of 1 week followed by 3 weeks of processing of the obtained statistical data. The mobile laboratory operates in the Kaliningrad region for 1 month, which is followed by 1 month of work in Warmia and Mazury. The overall duration of planned operation of the laboratory is 19 months. The average monthly workload is 500 examined children (around 100 people in 1 working day at 5-day working week). The screenings are conducted in district secondary schools.

Prior to performing the screenings we had developed and installed in sanatorium "Pionersk" and in the hospital in Ameryka settlement a medical information system – an electronic database. It records data obtained in the course of the diagnostic examination. The capabilities of the information system are extensive and have great potential for development in terms of diagnosing accompanying pathology and the possibility of constructing the functional profile of a patient. The system allows one to create statistical sampling by almost 100 parameters and present

them in different combinations. In addition, all parameters can be chosen for target groups of a particular age and place of residence with the possibility of rapid changes of parameters.

As part of the second (medical and preventive) module of the program, children with pathology of the spine from the Kaliningrad region receive appointment cards to undergo inpatient treatment at pediatric orthopedic sanatorium „Pionersk“, and children from the Warmian-Mazurian voivodeship – at rehabilitation hospital for children in Ameryka settlement. The treatment is carried out at the expense of the project budget.

To date, nearly 9000 students have passed through the screenings. All data have been processed for statistical analysis:

Table 1a

Date of the screening	Place	Overall no. of people examined	Orthopedic traumatologist no. 1				Orthopedic traumatologist no. 2			
			Postural disorder		Scoliosis		Postural disorder		Scoliosis	
			%	Number of people	%	Number of people	%	Number of people	%	Number of people
11-15.02.13	Russia	536					14.0	75	7.8	42
11-15.03.13	Poland	421					7.6	32	16.6	70
08-12.04.13	Russia	498	16.0	80	15.6	78				
20-24.05.13	Poland	540	18.9	102	1.5	8				
10-14.06.13	Poland	521					12.2	64	10.1	53
09-13.09.13	Russia	472					16.1	76	30.9	146
07-11.10.13	Poland	629	22.9	144	0.0	0				
21-25.10.13	Russia	485	28.2	137	0.4	2				
11-15.11.13	Russia	476					14.9	71	34.8	166
09-13.12.13	Poland	524					8.2	43	29.9	157
20-24 & 31.01.14	Russia	522	40.2	210	20.9	109				
17-21.02.14	Poland	579	26.3	152	0.0	0				
11-14.03.14	Russia	488					13.9	68	15	74
31.03-04.04.14	Poland	534					5.9	32	32.9	176
21-25.04.14	Russia	487					16.1	79	23.8	116
19-23.05.14	Russia	682	9.1	62	8.2	56				
05-11.06.14	Poland	594	17.0	101	6.57	39				
Total		8988								

Table 1b

	Kaliningrad region (Russia)		Warmian-Mazurian voivodeship (Poland)	
Total examined	4646 people	4342 people		
	%	No. of people	%	No. of people
Scoliosis detected	17%	789	11,6%	503
Postural disorders detected	18,5%	858	15,4%	670

At first glance, the obtained results correlate with each other and with the data of the official statistics. But a closer analysis of the data obtained by different doctors in the course of the screenings returned the following results:

Table 2

			Orthopedic traumatologist no. 1				Orthopedic traumatologist no. 2				
			Postural disorder		Scoliosis		Postural disorder		Scoliosis		
Date of the screening	Place	Overall no. of people examined	%	No. of people	%	No. of people	Overall no. of people examined	%	No. of people	%	No. of people
11-15.02.13	Russia						536	14,0	75	7,8	42
11-15.03.13	Poland						421	7,6	32	16,6	70
08-12.04.13	Russia	498	16,0	80	15,6	78					
20-24.05.13	Poland	540	18,9	102	1,5	8					
10-14.06.13	Poland						521	12,2	64	10,1	53
09-13.09.13	Russia						472	16,1	76	30,9	146
07-11.10.13	Poland	629	22,9	144	0,0	0					
21-25.10.13	Russia	485	28,2	137	0,4	2					
11-15.11.13	Russia						476	14,9	71	34,8	166
09-13.12.13	Poland						524	8,2	43	29,9	157
20-24 & 31.01.14	Russia	522	40,2	210	20,9	109					
17-21.02.14	Poland	579	26,3	152	0,0	0					
11-14.03.14	Russia						488	13,9	68	15,0	74
31.03-04.04.14	Poland						534	5,9	32	32,9	176
21-25.04.14	Russia						487	16,1	79	23,8	116
19-23.05.14	Russia	682	9,1	62	8,2	56					
05-11.06.14	Poland	594	17,0	101	6,57	39					
	Total	4529	21,8	988	6,5	292	4459	12,0	540	22,4	1000

As one can see, of all the examined population orthopedic traumatologist no. 1 diagnoses scoliosis in just 6.5% of cases, and postural disorders in almost 22%. Orthopedic traumatologist no. 2 diagnoses scoliosis in 22% of cases, and postural disorders in only 12%.

Even more interesting data can be observed after analyzing separately the screening results obtained by different doctors for the Kaliningrad region and for Poland:

Table 3

Russia		Orthopedic traumatologist no. 1					Orthopedic traumatologist no. 2				
		Postural disorder		Scoliosis				Postural disorder		Scoliosis	
Date of the screening	Overall no. of people examined	%	No. of people	%	No. of people	Overall no. of people examined	%	No. of people	%	No. of people	
11-15.02.13						536	14,0	75	7,8	42	
08-12.04.13	498	16,0	80	15,6	78						
09-13.09.13						472	16,1	76	30,9	146	
21-25.10.13	485	28,2	137	0,4	2						
11-15.11.13						476	14,9	71	34,8	166	
20-24 & 31.01.14	522	40,2	210	20,9	109						
11-14.03.14						488	13,9	68	15,0	74	
21-25.04.14						487	16,1	79	23,8	116	
19-23.05.14	682	9,1	62	8,2	56						
	2187	22,4	489	11,2	245	2459	15,0	369	22,1	544	
Total number of people with pathology of the spine		734 people or 33,6%					913 people or 37,1%				

After analysis of the obtained data it was found that in the course of the screenings orthopedic traumatologist no. 1 was guided by the accepted standard of diagnosis of scoliosis – frontal curvature in excess of 100Cobb. All cases of up to 100Cobb were qualified as postural disorders, whereas those of over 100Cobb – as scoliosis.

Orthopedic traumatologist no. 2 was oriented towards the earliest possible diagnosis of scoliosis and cases of a 3-plane deformation of the spinal column, even with the frontal arc of less than 100Cobb were diagnosed as scoliosis. He interpreted such cases as a pre- or subclinical stage of development of scoliosis. Accordingly, all cases with frontal curvature of up to 100Cobb with no 3-plane deformation of the spinal column were diagnosed by him as postural disorder.

We can say that orthopedic traumatologist no. 1 is inherently for under-diagnosis, whereas orthopedic traumatologist no. 2 is in favor of overdiagnosis.

We do not insist on our findings and assumptions, and only describe what and how happened within our organization internally, and how we tried to handle this.

Table 4

Poland		Orthopedic traumatologist no. 1				Orthopedic traumatologist no. 2					
		Postural disorder		Scoliosis			Postural disorder		Scoliosis		
Date of the screening	Overall no. of people examined	%	No. of people	%	No. of people	Overall no. of people examined	%	No. of people	%	No. of people	
11-15.03.13						421	7,6	32	16,6	70	
20-24.05.13	540	18,9	102	1,5	8						
10-14.06.13						521	12,2	64	10,1	53	
07-11.10.13	629	22,9	144	0	0						
09-13.12.13						524	8,2	43	29,9	157	
17-21.02.14	579	26,3	152	0	0						
31.03-04.04.14						534	5,9	32	32,9	176	
05-11.06.14	594	17,0	101	6,57	39						
	2342	21,3	499	2,0	47	2000	8,6	171	22,8	456	
Total number of people with pathology of the spine		546 people or 23,3%				627 people or 31,4%					

Despite the fact that the obtained data are the data of the screenings, while the final diagnosis is made at the point of admission of the child for inpatient treatment through R-diagnostics, preliminary analysis of the data allows us to draw some conclusions:

1. The actual prevalence rate for scoliosis is greater than that reflected in statistical data. The situation in the Kaliningrad region is worse than in Warmia and Mazury. In order to prevent further deterioration of the situation it is necessary to continue the launched comprehensive intervention program involving public and private funds, and to extrapolate the lessons learned to other regions of the Russian Federation.
2. During the screening diagnostics the preliminary diagnosis made by the orthopedic traumatologist largely depends on his/her subjective assessment. Interpretation of the same problem by different specialists may result in different outcomes for a particular patient. It is essential to minimize the subjective component of a physician's work through the development of unified forms of screenings, standardization of application of the diagnostic equipment, and approval of the algorithms of screening diagnostics. This needs to be performed with the fullest possible involvement of the medical community.
3. As of today, we have developed a piece of medical computer software that allows one to solve almost all of the above problems and standardize processes. And by analogy with the above we can offer standardization of diagnostic and treatment processes not only in traumatology and orthopedics, but also in other branches of medicine.

ABSTRACT

SO-CALLED IDIOPATHIC SCOLIOSIS. BIOMECHANICAL AETIOLOGY. NEW CLASSIFICATION. TREATMENT AND PROPHYLAXIS

Karski Tomasz¹⁾, Karski Jacek²⁾ (Lublin, Poland)

¹⁾ Vincent Pol University in Lublin, Poland, tmkarski@gmail.com

²⁾ Paediatric Orthopaedic and Rehabilitation Department of Medical University in Lublin, Poland, jkarski@vp.pl

Introduction

The biomechanical aetiology of so-called idiopathic scoliosis called AIS is described in Polish, English, German and in Spanish Journals in years 1995 – 2007 (T. Karski) and presented since 1995 in many Congresses and Symposia.

Material

In 2012 the whole material gathered 1950 cases. Patients were 2 to 60 years old. Explanation of biomechanical aetiology of scoliosis in points. (1) "Syndrome of contractures" [SofC] (Siebenersyndrom) according to Prof. Hans Mau. In 2006 called also "Syndrome of Contractures and Deformities" (SofCD – T. Karski and J. Karski) because to the seven contractures (H. Mau) we added the extensive varus deformity of shank also connected with the "foetus period of life". (2) Asymmetry in movement of hips connected with SofCD. In all scoliosis children the adduction of right hip is limited (smaller than in left hip – examination in straight position of hip joint). In some children there is even abduction contracture of right hip, plus external rotation and flexion contracture (see later – in I epg). (3) Influence on spine comes by walking (gait) and because of habit of permanent standing 'at ease' on the right leg. (4) Every type of scoliosis starts to develop in 2 – 3 year of life of children.

New classification as important information for physiotherapy. There are three groups and four types of scoliosis (T. Karski 2001 – 2004). (1) "S" I etiopathological (epg) scoliosis. Double curves. Influenced by the "gait" and the permanent "standing at ease on the right leg". Stiff spine. 3D. Progression. (2A) "C" II/A epg scoliosis. Influenced by the permanent "standing at ease on the right leg". One curve. Flexible spine. 1D. No or slight progression. (2B) "S" II/B epg scoliosis. Influenced by the permanent "standing at ease on the right leg", plus – laxity of joints or/and incorrect exercises in previous treatment. Flexible spine. 2D or mix. Moderate progression. (3) "I" III epg scoliosis. Influenced by the "gait" only. Stiff spine. No curves or small. No progression.

Physiotherapy

All previous extensions, its mean "muscles strengthening exercises" were incorrect and caused only bigger curves and made more stiff spine. Because of this the orthopaedic surgeon used to speak about "Natural History of Scoliosis". All stretching exercises for spine and hips are proper for treatment and for prophylaxis. They lead to symmetry of movements and symmetry of function.

Conclusions

(1) All scientists and all Institutions engaged with scoliosis should learn about “biomechanical reasons in development of scoliosis”. (2) All orthopaedic surgeons, rehabilitations and physiotherapists should be introduced to the new conception of treatment and of causal prophylaxis in children with so-called idiopathic scoliosis on own material in own countries.

Key words: idiopathic scoliosis, biomechanical aetiology, new classification, treatment, prophylaxis

Literature www.ortopedia.karski.lublin.pl

ABSTRACT

RISK GROUP OF AIS IS THE KEY TO ITS PROPHYLAXIS

Dudin Mikhail, Pinchuk Dmitry, Pechersky Viktor, Avaliany Tatyana, Khaymina Tatyana (St. Petersburg, Russia)
Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok”, St. Petersburg, Russia
e-mail: ogonek@zdrav.spb.ru

Introduction

One of the fundamental properties of typical AIS is its monomorphism. The C-shaped scoliosis is a “pure” 3D deformation, while S-shaped form consists of two 3D curves, etc. Mathematical modeling has shown a steady sequence of forming units of 3D deformation. Real clinical manifestations in the initial period of development of typical AIS are identical to changes, predicted by mathematical modeling on the basis of identified consistent patterns.

Objectives

To define the sequence of clinical symptoms and their importance in the transition of a healthy spinal column to „scoliotic” one, that will determine criteria for risk group. It allows us to develop a treatment at the preclinical stage of typical AIS, that is the basis for its prophylaxis.

Material and Methods

During 2012-2013 we observed 600 children of both sexes, aged 9 to 13 years, residing in one settlement. The group included children without signs of AIS. During this period physical and instrumental examination of all these children were carried out every 8-12 months. The instrumental examination included: CDOT, EMG, stabilometry and immunoferment analysis of of neuropeptides (oxytocin and arginine-8-vasopressine) level, as posture asymmetry factor.

Results

1. The following sequence of clinical symptoms at risk group of typical AIS was defined: normal spine → flat-back (sagittal plane) → flat-back + torsion of all trunk from spine lumbar zone (the first stage of horizontal plane). It is the pre-clinical development of the typical AIS (risk group of typical AIS).

But “flat-back + torsion of spine lumbar zone” leads to detorsion of the shoulder girdle or upper part of the trunk (the second stage of horizontal plane). The projection of the spinal canal is straight (not deformed), while in the column of vertebral bodies can be seen two “anticircuits” (opposite direction twisting), which finish the emergence of 3D deformation. It is the beginning of the clinical development of the typical AIS.

2. The obtained data of instrumental examinations were completely identical to described above sequence of clinical symptoms. The greatest interest was aroused by the results of neuropeptides investigation. The altering of their levels was observed even at the end of flat-back formation.

Conclusion

On the basis of obtained data the complex of therapeutical interventions was created to prevent typical AIS. Currently the clinical testing of this complex is carried out in a representative group of the child population and preliminary results (only for 2013) are encouraging.

ABSTRACT

ECHOGRAPHIC PECULIARITIES OF THE GROWING ZONES OF HUMERUS, FEMUR AND TIBIA IN DIFFERENT AGE OF CHILDREN

Akizhanova Irina, Kassenova Madina, Svetlichnaya Snezhanna (Almaty, Kazakhstan)

Department of radiological and functional diagnostics,, Institute of postgraduate education, Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan

E-mail: ak_ir_ortoped@mail.ru

This pilot study reflects the results of the ultrasound examination of the musculoskeletal system (MSS): the epiphyses of the shoulder, hip, and tibias of healthy 125 children of various age from 1 month to 18 years. Echographic features of the growing zones of the limb's bones in children of different age from position of histological concept of the structure of epimetaphyseal areas of the skeleton are identified, and ultrasound characteristics of the different layers of the growth zones are given.

The aim

Determine the echographic age peculiarities of the growing zones of limbs in children from position of histological concept of the structure of epimetaphyseal areas of the skeleton.

Materials and methods

The study was conducted by the regulations of the ethics committee, providing guarantee for ethnicity of research and maximum safety for the participants, includes analysis of echograms of growth zones of shoulder's proximal epiphysis, hip's proximal and distal epiphysis and tibia's proximal epiphysis of 425 children of various age from 1 month to 18 years. All patients were divided into 5 groups according to the stages of skeletal ossification by Sadofyeva V.I. [5]:

- the first group – children under 1 year old – 135 patients;
- the second group – children aged from 1 to 5 years old – 88 patients;
- the third group – children aged from 5 to 10 years old – 32 patients;
- the fourth group – children aged from 10 to 15 years old – 70 patients;
- the fifth group – children aged from 15 to 18 years old – 100 patients.

According to all echograms of the shoulder, hip and knee joints in all age groups at the same echogenicity and ultrasound were let in the following structures: fibrous cartilage, joint capsule, perichondrium, intermuscular fascia, ligaments.

Results of research and conclusions

On the contrary, the epiphyses with adjacent metaphysis were areas with varying echo-characteristics not only among the five proposed groups, but also directly to the „inside“ age groups. We refer the complex „growth zone“ as we believe should be also included the secondary center of ossification and its surrounding epiphyseal cartilage, and also a layer of growth plate where mature and growing bone is remodeled.

This new ultrasound concept of visualization on epimetaphyseal area where the hypertrophic zone of cartilage component without radiation exposure is the most vulnerable part of the growth zone has a distinct clinical significance. We consider the epiphysis including the ossification nucleus, epiphyseal cartilage and growth plate over a long period from birth until ossification is being a „growth area“ and its growth is due to two areas : 1) the vascularized area of cartilage, which is responsible for the growth “inside the join” and 2) the epiphyseal plate which is responsible for bone growth in length. Using this new ultrasound concept can give important criteria of the growth zone and beginning of synostosis in epimetaphyseal and apophyseal growth zones of the limb's bones in children without radiation exposure. In this connection, we consider it reasonable and promising further research in this area.

ABSTRACT

ULTRASOUND VISUALIZATIONS OF PATHOMORPHOLOGIC CHANGES IN JOINTS OF PATIENTS WITH RHEUMATIC DISEASES

Akizhanova Irina, Artykbayeva A.R. (Almaty, Kazakhstan)

Department of radiology and functional diagnostics, Institute of postgraduate education, Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan

E-mail: ak.ir_ortoped@mail.ru

Key words: ultrasound, rheumatic diseases, rheumatoid arthritis, ultrasonic protocols, screening technology, joints

Aims & Objectives

The aim to optimize the musculoskeletal ultrasound of upper and lower extremities for rheumatologists, and to leads to faster diagnoses in different rheumatic diseases for quicker initiation of early treatment.

Patients and Methods

Our own patented ultrasonic screening technology to study joints of the upper and lower extremities – “MSS -FAST – rheuma – 12 steps” was performed in 1455 patients at the age from 15 to 68 during the period from 2007 to 2013. This patients were with early arthritis, they had inflammation of the different joints. Ultrasonography (US) of the musculoskeletal system (MSS) have done in B-mode on the multifunctional US-diagnostic high class system Voluson 730 PRO (“Kretz” Austria) with a multi-frequency transducer 5-12 MHz and 10-12 MHz, on US-scanner SSI-I000 SonoScape Company (transducer L742), on US-scanner “SONOACE-8000 SE” “MEDISON” company. Application of portable SSI-I000 US-scanner (SonoScape Company) with applying transducer L742 made it possible to implement US of joint of patients who was “on the bed”.

A determination of sensitivity and specificity for all patients has not done in our research report due to the fact that the momentary MRI more than 2-large joints of the extremities at the individual patients not routinely performed.

The object of the study were periarticular tissues, capsule, synovium, synovial fluid, articular cartilage and subchondral bone of shoulder, elbow, wrist, metacarpophalangeal (MCP) joints, hip, knee, ankle, metatarsophalangeal joints. In order to create comfortable conditions for the patient and to optimize the ultrasound examination this proposed protocol involves study of a patient in a caudal direction of „top-down“, with the starts the scanning from the position of the patient sits on the bed, then the back, then to the abdomen. All scans of contralateral side are displayed on the double screen, on the first field – right sonogram scans, on the second field – left sonogram scans.

- First step (scan) – a longitudinal scan of the of shoulder joints for visualization subacromial space and subdeltoid bursa, at the beginning of examination a patient initially sits on the bed, arms down along the body. After that the transducer is moved distally.

-
- Second step (scan) – a longitudinal scan of the olecranon for visualization of the olecranon-bursa.
 - Third step (scan) – a longitudinal scan of the radiocarpal joints (**Fig. 1**).
 - Fourth step (scan) – a longitudinal scan of the metacarpophalangeal (MCP) joints to produce images of the heads of the metacarpal bones, the most presentable localization of the pathological process in RA.
 - Fifth step (scan) – a longitudinal scan of the hip joint for the visualization of the bony rim, bony roof, cartilage roof, neck space, due to the frequent complaints of patients on pain in this area
 - Sixth step (scan) – a longitudinal projection of the knee (**Fig. 2**) – is investigated because there are frequent clinical manifestations in this area in patients with rheumatic diseases – arthritis, synovitis of the knee
 - Seventh step (scan) – a transverse scan of the knee, the transducer is located above the superior pole of the patella
 - Eighth step (scan) – obliquely transverse scan of the knee for visualization of the medial meniscus of the right and left knee
 - Ninth step (scan) – a longitudinal scan of the ankle joints. A transducer is transferred distally, this longitudinal scan is performed along the median line of ankle joints
 - Tenth step (scan) – a longitudinal scan of the metatarsophalangeal joints (**Fig. 3**). These scans are included in US-screening due to the pathognomonic of joint involvement in gout
 - Eleventh step (scan) – a longitudinal scan of the medial meniscus posterior horn of the knee.
 - Twelfth step (scan) – a longitudinal scan of the Achilles tendon is included in the screening due to the commonly observed Achilles bursitis in rheumatic patients.

Time of evaluation varied from 15 to 30 min and increased with the degree of the disease. According to the research, a determination about all findings during ultrasound screening, preliminary nosological form is established considering patterns and evaluation of the joints involved. Also allocated the area with the most expressed exudative components, subsequently scanning the area is to be used for monitoring rheumatic process the patient with therapy.

Results

The most significant ultrasound patterns included the presence of a pathological effusion, intra-articular chondral bodies, tophi, erosion, pathological hypervascularization.

A formal RA diagnosis was made owing to ultrasound scoring systems of ultrasound patterns before laboratory issues in 41 patients – 2.8% from all patients. A formal goal diagnosis was made before laboratory issues owing to the visualization of fluid hyperechoic inclusion in the periarticular tissues (tophus) of the I metatarsophalangeal in 38 patients – 2.6% from all patients. The degree of protrusion of the medial meniscus is perfect to detect the degree of the osteoarthritis in 989 patients – 67% from all patients. The visualization of fluid in the neck space at the longitudinal scan of the hip joint helped for early detecting aseptic necrosis of head femur in 18 patients with pain in the knees – 1.2% from all patients.

A longitudinal scan of the of shoulder joints detected abnormalities at these sites such of the rotator cuff tears in 6 patients – 0,41% from all patients. After that this patient were need for surgery for arthroscopic versus open repair, subacromion impingement was in 16 patients – 1,09%, bursitis was in 14 patients 0,96%, but more often we detected loss the rotator cuff subacromion) interval in 568 patients- 39,03% from all patients.

The visualization only of fluid in the rotator cuff space without other ultrasound patterns was in 160 patients – 10,9% from all patients, but it was provided that an objective criteria report about the status the musculoskeletal system of this patient.

As a reference method for some patients was performed MRI of 796 joints: knee, hip, wrist, and the ultrasound findings were confirmed in 784 cases (98,4%) from all performed MRI.

Conclusion

The different main criteria have been widely described in this protocol “MSS FAST – rheuma – 12 steps”. This tool provides more comprehensive information about different arthritis, connective tissue diseases and RA. At suspicion on rheumatic disease protocol “MSS FAST – rheuma – 12 steps” has allowed the radiologist to focus on main ultrasound scans and patterns, pathognomonic for different rheumatic diseases and demonstrate ultrasound scoring systems of ultrasound patterns, not only ultrasound scoring systems of synovitis (GLOSS). The proposed ultrasound screening of joints and periarticular soft tissues of the musculoskeletal system allows to quickly visualize „control points” provide an objective criteria report about the status the musculoskeletal system of the patient, to determine the activity of the inflammatory process, to establish a differential diagnosis. The next stage of US may be stage the most carefully multiply scanning or monitoring of joints and periarticular soft tissues or MRI.

References

1. Imaging in Rheumatology, Editors: Isenberg, David A.; Renton, Peter 1st Edition Copyright B©2003 Oxford University Press p.28-32.
2. ESPERANZA NAREDO, MARIA DAGOSTINA. Reliability of a consensus-based ultrasound score for tenosynovitis in rheumatoid arthritis J. Annals of the Rheumatic Diseases, august 2013 Volume 72 Issue 8, p13281333
3. IRINA AKIZHANOVA (1), NG NIGAI (1) EUROSON 2010-22-25 AUGUST SS37.04 Ultrasound monitoring of the clinical response of xefocam for synovitis, bursitis of various causations.

ABSTRACT

POSSIBILITIES OF COMPREHENSIVE CARE FOR GENETIC SKELETAL DISORDERS AT PRESENT

Marik Ivo^{1),3)}, Marikova Alena¹⁾, Zemkova Daniela^{1),2)}, Myslivec Radek^{1),4)}, Kuklik Miloslav⁵⁾, Smrčka Václav⁶⁾, Kozłowski Kazimierz⁷⁾ (Prague, Czech Republic, Sydney, Australia)

¹⁾ Ambulant Centre for defects of Locomotor apparatus, I.L.c., Prague, Czech Republic

²⁾ Pediatric Dpt., University Hospital Motol, Prague, Czech Republic

³⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

⁴⁾ Orthopaedic-Traumatologic Department, Regional Hospital Píbram, Czech Republic

⁵⁾ Genetic department Olšanská 7, Prague, Czech Republic

⁶⁾ ESME I.L.c., Prague, Czech Republic

⁷⁾ Radiological Department of Westmead NSW 2145, Sydney, Australia

E-mail: ambul_centrum@volny.cz

The lecture summarizes longstanding experience of the authors with comprehensive treatment and care for the Genetic Skeletal Disorders (GSD). The authors are familiar so with treatment of bone metabolic disorders as with common reconstructive orthopaedic surgical procedures orthotic therapy and prosthetic fitting of disabled children and adults.

GSD are distinguished as Primary Skeletal Dysplasias (SD) resulting from mutated genes that are expressed in chondro-osseous tissue and Secondary SD that are caused by abnormalities of extraosseous factors with secondary effects on skeletal system i.e. metabolic, enzymatic and hormonal disorders. Incidence is estimated 0.30 – 0.45 per 1000 live birth.

The final shape of skeleton of GSD patients is consequence of genetic defects, mechanical stimuli and functional adaptation of bones (according to Utah paradigm defined by H. Frost in 1994). Skeletal and joint deformities are pathognomonic symptoms for concrete GSD which lead to biomechanically severe deformities of skeleton with consequence of premature osteoarthritis, spondylarthritis and osteoporosis and/or osteosclerosis.

Symptomatic treatment of skeletal dysplastic deformities in childhood is early correction of both bone deformities and joint contractures (by physiotherapy, bracing, surgical procedures, prosthetic fittings etc.) with the aim to achieve an optimal growth, function of joints and spine and the anatomical shape and structure of the skeleton. Last but not least goal of comprehensive treatment is to correct bone metabolism (using calciotropic drugs) and biomechanical properties of the skeleton and to reach an individually ideal peak bone mass in adulthood.

Credo of the authors is the biomechanical aspects of orthotic and surgical treatment and physiotherapy. Some results of comprehensive treatment are demonstrated as concise case reports.

Key words: genetic skeletal disorders, diagnosis, comprehensive treatment

ABSTRACT

COMPARISON OF POSTURAL CONTROL IN UNILATERAL STANCE BETWEEN HEALTHY CONTROL AND PATIENTS WITH LUMBAR DISC HERNIATION AND DEGENERATIVE LUMBAR SPONDYLOLISTHESIS BEFORE AND AFTER LUMBAR POSTERIOR FUSION

Kolesnichenko Vera, Litvinenko Konstantin, Ma Cong (Kharkov, Ukraine)

SI "Sytenko Institute of Spine and Joint Pathology

National Academy of Medical Sciences of Ukraine", Kharkov, Ukraine

E-mail: veakol@rambler.ru

Objectives

1. examine postural sway in healthy control and patients with lumbar disc herniation and degenerative lumbar spondylolisthesis before surgery;
2. study the effect of lumbar posterior fusion, correcting the spine sagittal contour, on the postural sway in patients with lumbar disc herniation and degenerative lumbar spondylolisthesis in the early and long-term follow-up.

Methods

Group B – 42 patients with lumbar disc herniation aged 20-40 years (mean age $33,4 \pm 4,8$ years), group C – 10 patients with lumbar degenerative spondylolisthesis L4 with small (1-2) degrees at the age of 46-65 years ($55,4 \pm 7,8$ years); a comparison group A - 30 healthy volunteers aged 20-30 years ($22,4 \pm 2,6$ years). All patients had unilateral sciatica. Patients were examined before and after 3 months, 6 months, 1 year or more after surgery with a mean follow-up of $1,2 \pm 0,8$ years (6 months – 2 years). All patients was made lumbar posterior fusion L4-L5-S1 and L5-S1 segments ($n=32$ and $n=20$ respectively) using transpedicle constructions in the SI "Sytenko Institute of Spine and Joint Pathology NAMS" vertebropogy clinic.

Subjects performed unilateral stance tasks on a force plate. Three repetitions of a 10 s unilateral stance test were performed on each leg. Postural sway amplitude was determined.

Results and discussion

Before surgery in both groups B and C magnitude of the lumbar lordosis (LL) and the sacral slope (SS) were significantly less compared to volunteers in group A ($p < 0,001$). The maximum amplitude of the postural sway was observed in the group B while relying on the pace with the sciatica pain, and in patients of the group C, while relying on the intact leg ($p < 0,01$ and $p < 0,05$, respectively). 3 months later after surgery in both groups B and C were significantly increased depth of lumbar lordosis ($p < 0,05$), and a statistically significant decrease in the degree of sacrum verticalization ($p < 0,05$) compared with these same parameters preoperatively. However, after operation GLL and SS values in each of the patients group remained lower than normal. There were no significant changes in the parameters of unilateral postural sway in groups B and C on postoperatively.

In the preoperative period in patients with lumbar disc herniation and degenerative lumbar spondylolisthesis revealed spinal-pelvic imbalance, as well as the change of postural control impaired. After posterior instrumental lumbar fusion improving the spinal sagittal alignment was not accompanied by the restoration of postural control. Therefore the functional outcome in these patients at the stages surgical treatment characterized by the imbalance and energy-intensive of vertical posture regulation mechanisms.

Keywords: postural control, unilateral stance, posterior instrumental lumbar fusion, the spine sagittal contour.

ABSTRACT

CONSERVATIVE TREATMENT EFFECT ON AIS PROGRESSION

Pugacheva Natalya (St. Petersburg, Russia)

Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok“

St. Petersburg, Russia

The new approach to conservative treatment of adolescent idiopathic scoliosis (AIS) in children was developed. It is composed of Schroth-Weiss program, apparatus physiotherapy and Chêneau brace. The long-term treatment results of 91 patients with a high risk of deformity progression were analyzed. The analysis of 91 patient's treatment results with a high risk of deformity progression has been carried out. The positive results suggest that early beginning of comprehensive treatment significantly reduces the probability of deformity progression and decrease the symptoms of the disease.

Key words: Idiopathic scoliosis, Schroth-Weiss “Best practice” program, Chêneau brace, conservative treatment.

ABSTRACT

ANTERIOR CERVICAL DISCECTOMY FOR ONE- AND TWO-LEVEL CERVICAL DISC DISEASE: THE EFFECT OF ANTERIOR PLATING

AlamEldin Mohamed (Sohag, Egypt)

Sohag faculty of medicine, Sohag, Egypt

Over a 5-year period, 60 patients with cervical spondylotic myelopathy were treated surgically with a one or two-level anterior cervical discectomy and fusion. 36 patients had cervical plates, whereas 24 had fusions with no plates. The followup period ranged from 16 to 40 months. Clinical and radiographic follow-up data were obtained. The pseudarthrosis rates were 4% for

patients with plating and 12% for patients with no plating.. There was no statistically significant correlation between pseudarthrosis and gender, age, level of surgery., the plating procedure resulted in preserving overall lordosis. Accelerated degenerative changes at the levels adjacent to fusion were seen in 12% of patients with plating compared to 9% in patients without plating. According to Odom,s criteria the overall result was excellent to good in 95% of patifnts with plating compared to 75% in patients without plating.

Conclusions

The addition of plate fixation for one and two-level anterior cervical discectomy and fusion is a safe procedure and does not result in higher complication rates. The use of plate fixation successfully maintains cervical spine alignment. Patients treated with cervical plating had overall better results when compared with those of patients treated without cervical plates.

Keywords: cervical spondylotic myelopathy, cervical discectomy, anterior plating

ABSTRACT

STUDY OF PHOTODYNAMIC IMPACT ON GROWTH PLATES OF LONG TUBULAR BONES IN GROWING ANIMALS

Shashko Aleksey, Kurchenko Sergey (St. Petersburg, Russia)

Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok“, St. Petersburg, Russia

E-mail: shravan@mail.ru

Address: St. Petersburg, Strelna, Sankt-Peterburgskoye shosse 101

Introduction

The photodynamic impact (PDI) is based on the combination of laser irradiation and photosensitizers (PS). PS can accumulate selectively in intensively proliferating tissues and have selective sensitivity to certain light wavelengths of the optical range. The absorption of light quanta of PS molecules in the presence of oxygen leads to a photochemical reaction, resulting in a triplet molecular oxygen transformation into a singlet one, as well as a large amount of highly active radicals arising, that cause to necrosis and apoptosis of target cells.

PDI is able to supress tissues proliferating. It is used in treatment of cancer, as well as juvenile arthritis and degenerative diseases in children and adolescents. As shown earlier in the study of histological preparations, PDI on the growth plates of bones (which are tissues with high proliferative activity) causes their decreasing and reducing of the chondrocytes total number in them.

Objectives

This research is devoted to the studying of the effects of PDI on growth plates at a macroscopic level by measuring the dynamics of growth of long bones of growing animals. The aim of this study is to prove that PDI with a transcutaneous administration of PS to the area of the growth plates inhibits the growth of long bones in growing animals.

Material and methods

70 rats (males and females) were subjected to the single procedure of PDI on the knee joints area with transcutaneous PS (Chlorine-E6) administration in the age of 4, 4.5, 5, 5.5, 6, 7 and 8 months (10 in each age). The weight, body length and the length of the thighs and shanks (on radiographs at standard conditions) of all the animals were measured before the experiment and until the age of 8.5 months with an interval of 2 weeks. The results were compared with similar measurements of animals of the same age who were not exposed to PDI.

Results

Comparison of the results convinced that the animals of the experimental group showed a slowdown in the hips and legs for 1.5 months after PDI, followed reclaimed normal growth.

Conclusion

Thus PDI with a transcutaneous administration of PS to the area of the growth plates inhibits the growth of long bones in growing animals. The obtained results allow to expect a similar effect after PDI on the growth plates of the vertebral bodies, which offers the prospect of managing the growth of the spinal column at the AIS.

Keywords: PhotoditazinR, Chlorine E6, laser, chondrocytes, photosensitizer, growth

ABSTRACT

ASYMMETRICAL LIMB GROWTH IN A PATIENT WITH CURTIUS SYNDROME: A CASE STUDY

Arsenev Aleksey, Khaymina Tatyana, Dudin Mikhail (Saint-Petersburg, Russia)
Children's Rehabilitation Center of Orthopedics and Traumatology „Ogonyok”
St. Petersburg, Russia
E-mail: stivamat@rambler.ru

A patient with Curtius syndrome has been under our supervision for 8 years. The main clinical manifestation is progressive unilateral hemihypertrophy and the leading orthopedic

defect – different length of the lower extremities. At the time of initial treatment in our Center the child's age was 8 months. Observation time – 8 years.

Keywords: Curtius syndrome, hemihypertrophy, lower extremities different length.

Introduction

Curtius syndrome is a rare genetic abnormality, first described in 1925 by German physician F. Curtius. Type of inheritance is unknown. Frequency in the population is not defined. The disease is characterized by the following clinical manifestations: one-half face local hypertrophy (mainly the upper jaw) or a separate limb's segment huge growth, endocrine disorders. The hypodontia, underdevelopment of tooth enamel and syndactyly (1) can be also observed. The leading clinical manifestation of the syndrome observed in the patient was a progressing unilateral hemihypertrophy, to the maximum manifested in the lower extremities. The child was born in the first pregnancy, childbirth term by cesarean section (indication of the mother), birth weight – 4190 grams, length – 54 cm. The left-sided hemihypertrophy and the difference in legs' length about 1–2 cm were marked at birth. The first stated diagnose – Wiedemann – Beckwith syndrome, which in the follow-up course was changed to Curtius syndrome.

At the time of initial treatment in our Center the child's age was 8 months. The difference in legs' length – 2.5 cm, the volume difference between the left and the right thigh was 4 cm, in shin – 2 cm. Thus, rapid hemihypertrophy progression, along with the overall growth of the child (+19 cm) was observed for eight postnatal months.

Material and methods

An individual treatment plan was carried out for the patient: magnetic therapy to inhibit the functional activity of the germ zones in „giant „ limb and stimulation in the other one – lagging behind in growth (2), procedures to improve blood flow in germ zones of a short limb, dosed cuff axial traction of a short limb at the time of the day and partly night sleep, asymmetric differentiated massage, exercise and restorative therapy. As diagnostic techniques were applied anthropometry and radiography. The obtained results were subjected to statistical processing and mathematical modeling.

Results

As it has been already noted, the leading and most clinically significant manifestation of the syndrome was the difference in length of the lower extremities progressing. Therefore, the main objectives of supervision of the patient were:

1. To stop the progression in the length difference of the lower extremities.
2. To insure adequate compensation to the already existing defect by using orthopedic shoes.
3. To prevent the spinal column deformation.
4. To inhibit/decrease the growth difference in limbs' volume.

An individual plan of treatment and observation was created for the patient. It consisted of several components: selective magnetic therapy to inhibit the functional activity of the germ zones of a „giant“ limb (Patent RF № 2212258, 28.11.2001), the procedures/manipulation treatment/ to improve blood flow in germ zones of a short limb, based on the Gueter-Volkman law, dosed axial cuff traction of a short limb in the daytime and partly during night's sleep, the asymmetric differentiated massage, exercise and restorative therapy. During the observation period the patient has already received more than 20 of such courses (up to 4 – 5 times a year).

Discussion

In mathematical modeling of the defect's slew rate, along with the case history (at birth the difference – 1 cm, in 8 months – 2.5 cm), the expected difference in the length of the lower limbs was evaluated in more than 7 cm.

As a result of therapeutic interventions it became possible to „slow down“ the left-sided hemihypertrophy progression and for the present moment the difference in lower extremities length is 5 cm (the increase is not more than 2.5 cm for 7 years, with a general increase in growth during the period – more than 50 cm). The treatment course is being continued.

References

1. MEZHENINA E.P. et al. Dictionary of eponymous names of diseases and syndromes. Kiev: High School, 1982, 184 p.
2. ARSENEV A.V., DUDIN M.G., SOKOLOV G.V. Process for the treatment of different-sized limbs in children and adolescents. The patent for invention number 2212258. (19) RU (11) 2212258 (13) C2 (51) IPC A61N2/00. Date of publication of application: 28.11.2001. Published: 20.09.2003.

ABSTRACT

TEMPORARY ASYMMETRIC BLOCKING OF GROWTH PLATES IN TREATMENT OF LONG BONE AXIS AND LENGTH DISTURBANCES IN CHILDREN.

Kalakucki Jarosław, Karski Jacek, Kandzierski Grzegorz (Lublin, Poland)

Pediatric Orthopaedic and Rehabilitation Department, Medical University of Lublin, Poland

E-mail: jkarski@vp.pl

Introduction

Incidence of excessive valgosity and varosity of axis of lower extremities in children is constantly becoming higher. Radical increase of obesity in children and their less active, more sitting way of life could be among reasons. Long bone osteotomies performed in children to correct disturbances of axis of extremities require prolonged cast immobilisation and absence from school activities. Temporary asymmetric blocking of growth plates on the other hand,

allows controlled monitoring of axis correction without necessity to change child's normal daily habits.

Aim

The aim of the paper is to present outcomes of temporary asymmetric blocking of growth plates in treatment of children with excessive valgosity, varosity or leg length discrepancy.

Methods and material

Metaizeau method in children above 12 year of life, and „8-plate“ method in younger children are minimal invasive procedures on growth plates, protecting from increase of deformity, and still leaving place for bone osteotomies in future.

For the last 5 years we have introduced procedures of temporary asymmetric blocking of growth plates in treatment of long bone axis and length disturbances in children. In the period 2010-03.2014 96 patients, aged from 8 to 15 years, underwent such treatment. 155 lower extremities have been treated: 116 with excessive valgosity and 13 with excessive varosity and 26 lower extremities with length discrepancy.

The group of children with axis disturbances comprised of: bilateral valgosity in 53 patients, one-sided valgosity in 10 patients, bilateral varosity in 6 patients and 1 patient with varosity of one lower extremity. Average value of valgosity before treatment was 14° (10° – 25°) in girls and 13° (8° – 20°) in boys.

The group of children with length discrepancy comprised of: idiopathic discrepancy in 16 patients; post inflammatory or congenital shortening in 5 patients; post traumatic lengthening in 4 patients; lengthening in the syndrome of one-sided overgrowth (Russell-Silver syndrome) in one patient. Average value of discrepancy before treatment was 2,3 cm (1.5 cm – 2.9 cm).

The last group where blocking of growth plates was performed were children with axis disturbances due to multiple exostoses (3 patients) and one patient with Blount diseases.

Problems and complications:

In 2 cases hypercorrection from valgosity into varosity was noted. One patient required second procedure to correct misplaced cannulated screw and one with misplaced „8-plate“. In one case the treatment had to be stopped and „8-plate“ was removed due to allergic reaction and knee flexion contracture of 25°.

Results

The treatment in 68% of patients was finished with axis of lower extremities back to physiological values. In girl the remaining valgosity was of 3,5° in boys 0°±. We noted 90% of good and excellent results no matter which method of epiphysiodes was used.

After the treatment was finished in the group of children with leg length discrepancy the final values were below 0,5 cm, giving 85% excellent results.

In children with axis deformity due to multiple exostoses temporary asymmetric blocking of growth plates seems a simpler and more effective method than osteotomies. Also in cases of Blount disease the method can support axial correction after osteotomies.

Conclusions

The work presents our experience in temporary asymmetric blocking of growth plates in treatment of long bone axis and length disturbances in children. We find these procedures highly effective and safe. Guided growth procedures in children may diminish incidence of severe deformities at adult age.

ABSTRACT

HEMI-EPIPHYSIODESIS AT THE KNEE REGION: LONG – TERM RESULTS OF AMBULANT CENTRE FOR DEFECTS OF LOCOMOTOR APPARATUS, PRAGUE, CZ

Petrasova Sarka¹⁾, Myslivec Radek^{1), 3)}, Zemkova Daniela^{1), 2)}, Marik Ivo^{1), 4)} (Prague, Czech Republic)

¹⁾ Ambulant Centre for Defects of Locomotor Apparatus; Prague; Czech Republic

²⁾ Dept. of Paediatrics; University Hospital Motol; Prague; Czech Republic

³⁾ Orthopaedic and Traumatology Department, Hospital Pribram, Czech Republic

⁴⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

E-mail: dezem@email.cz

The Ambulant Centre for Defects of Locomotor Apparatus in Prague has achieved very good results with permanent epiphysiodesis that was carried out both in cases of unequal leg length and at deformities around the knee joint. The goal of the communication is to present our last ten years experience with anthropometric measurement of tibio-femoral angle, indication and timing of the surgery and long-term results of permanent hemi-epiphysiodesis (carried out by modified Macnicol's method using drilling of growth physis) that was indicated to children with deformities around the knee joint region.

Hemi-epiphysiodesis (HE) was indicated to growing children suffering from the knee joint deformities caused by idiopathic, metabolic, neuromuscular, genetic skeletal disorders. Partial permanent medial or lateral HE of distal femoral physis and/or proximal tibia one was done in a cohort of 28 patients aged 10.4 – 15.95 years. Totally

were made 47 medial and 10 lateral hemi-epiphysiodesis. Average age of surgery was 13.27 ± 1.31 years. Valgosity was indicated to HE in children with both the idiopathic cases (obesity, hypermobility) and in multiple exostoses, bone dysplasias (BD), etc. In patients with valgosity the average T-F angle was $13.62^\circ \pm 4.08^\circ$ measured before surgery, the angle was normalized to $4.4^\circ \pm 1.39^\circ$. The evaluation showed that intermalleolar distance was decreased from $8.1 \text{ cm} \pm 2.63 \text{ cm}$ to $0.91 \text{ cm} \pm 1.29 \text{ cm}$. Varosity was indicated to HE in children with bone dysplasias (achondroplasia, pseudoachondroplasia, hypophosphatemic rickets etc.). Average T-F angle in

these cases was $-13.63^{\circ} \pm 2.29^{\circ}$ measured before surgery, the angle was changed to $-9.75^{\circ} \pm 2.36^{\circ}$. Intercondylar distance was decreased from $3.38 \text{ cm} \pm 1.25 \text{ cm}$ to $2.2 \text{ cm} \pm 1.68 \text{ cm}$.

In the right time indicated HE results to excellent correction of tibio-femoral angle. Worse results were gained in patients with bone dysplasias and varosity of the knee joints due to late carrying out HE. In BD cases we begin to use so-called „guided growth method” which uses the special 8-plates in last two years.

The correction of the biomechanical axis of legs by HE is a mini-invasive surgical procedure that is indicated with the aim not only to prevent premature osteoarthritis of the knee joints but it improves the posture, walking stereotype and visual aspect, too.

Key words: Hemi-epiphysiodesis, tibio-femoral angle measurement, timing of surgery, knee valgus/varus deformity correction

ABSTRACT

“SYNDROME OF CONTRACTURES AND DEFORMITIES” AND ITS CAUSAL INFLUENCE IN DYSPLASIA OF HIPS, WRY NECK, BLOUNT DISEASE AND SO-CALLED IDIOPATHIC SCOLIOSIS

Karski Jacek¹⁾, Karski Tomasz²⁾, Kałakucki Jarosław¹⁾, Okoński Marek¹⁾ (Lublin, Poland)

¹⁾ Medical University of Lublin

²⁾ Vincent Pol University in Lublin, Poland

E-mail: jkarski@vp.pl, tmkarski@gmail.com

Introduction

In orthopaedic literature most authors speak about deformity in children and problem of pain in adults in context of “weakness of muscles, which mean – “the muscles are not enough strong”. In our observations, the problem of deformity in children and pain in adult patients is connected with asymmetric or symmetric shortening of soft tissues even causing contractures of joints.

Causes of „syndrome of contractures” (SofC). The „syndrome of contractures” has been described primarily by Professor Hans Mau as “Siebener [Kontrakturen] Syndrom” (syndrome of seven contractures). This syndrome has been also described by: Hensinger, Howorth, Green & Griffin, Dega, Vizkelety, Komprda, J. Karski, Tarczyńska & T. Karski & M. Karska. The causes of the „SofC” are related to foetus: big weight, long body or with maternal conditions like: small belly during pregnancy, lack of amniotic fluids (oligohydramion), “androidal” or “platypeloidal” pelvic bone. In the asymmetric contractures of joints also CNS has influence as additional cause. The “left sided syndrome of contractures” is more common, as a result of first position (left sided) of foetus during pregnancy, which occurs in 85% – 95% of cephalic presentations pregnancy (Oleszczuk).

Clinical symptoms in the “syndrome of contractures” according to Mau are:

1. scull deformity (plagiocephaly),
2. torticollis muscularis (wry neck),
3. scoliosis infantilis (infantile scoliosis) – other than idiopathic scoliosis,
4. contracture (shortening) of adductor muscles of the left hip. Untreated contracture can lead to development of developmental hip dysplasia (DDH acc to Klisič),
5. contracture (shortening) of abductor muscles and soft tissues of the right hip (acc to T. Karski), described as Haltungsschwäche (“weak posture”) by Mau. With time, asymmetry in movement causes asymmetry during gait and loading; causing so called idiopathic scoliosis (Karski 1995-2006);
6. pelvic bone asymmetry – the oblique pelvis positioning visible during X-ray examination for hip joint screening – [see above points 4 & 5];
7. Foot deformities – such as: pes equino-varus, pes equino-valgus, pes calcaneo-valgus.

In Lublin we also include in the “syndrome of contractures and deformities” in newborn and babies excessive shank deformity (crura vara) which later can lead to Blount disease [T. Karski, J. Karski and others 2006].

Material

In the years 2005 – 2013 authors examined 818 newborns and babies with signs of “syndrome of contractures”. The control group count 212 children presented by parents for examination, but they were without sign of “SofC”.

Syndrome of contractures and its influence on locomotors system by youth and adults. In the lecture are presented cases of SofC with problems of (1) hip dysplasia, (2) Blount disease, (3) wry neck (torticollis), and there are given new observations connected with (4) biomechanical aetiology of so-called idiopathic scoliosis.

Conclusions

- 1) Every paediatric orthopaedic surgeon and paediatric doctor should be familiarized with knowledge about “Syndrome of Contractures” according Prof. Hans Mau,
- 2) Every newborn and baby with SofC should be treated very early by proper nursing, proper orthopaedic devices, older children by stretching exercises to reach symmetry of joints movements, sometimes by surgery,
- 3) Effective early therapy of “residual changes” in hips, in spine, in knees can look at an effective prophylaxis of movement insufficiency of knees, hips and spine in adult age of many people.

Key words: syndrome of contractures, dysplasia of hips, wry neck, Blount disease, idiopathic scoliosis

Literature

By authors and www.ortopedia.karski.lublin.pl

ABSTRACT

SPASTIC HIP – CLINICAL AND RADIOLOGICAL DEVELOPMENT

Okoński Marek, Karski Jacek (Lublin, Poland)

Medical University of Lublin, Poland

E-mail: jkarski@vp.pl

Abstract was not sent.

Session V. Orthopaedic anthropology. Biomechanics

Chairmen: Dmitri Tesakov, Pyrc Jarosław

ABSTRACT

RADIOLOGICAL FEATURES OF BONE GROWTH OF THE PELVIS AND SPINE IN PATIENTS WITH IDIOPATHIC SCOLIOSIS

Tesakov Dmitry K., Tesakova D.D., Beletsky A.V., Gigko-Mikhasevitch N.O. (Belarus, Minsk)

Republic Scientific-Research Center of traumatology and orthopedic surgery Belarus, Minsk

E-mail: dk-tesakov@yandex.ru

Introduction

Development of spinal deformity in patients with idiopathic scoliosis (IS) depends on the process of bone growth.

The aim of research is to study of the activity of the bone of the pelvis and the sprout of the spine to determine its age dynamics in patients with IS.

Materials and methods

We investigated the age dynamics of bone growth of the pelvis and spine in 2006 of the patients who were at the age of 4-20 years and had spinal deformation in the main arc in the frontal plane from 5 up to 168 degrees. Applied x-ray research method. The activity of the pelvic

bone growth was evaluated by Risser-tests. The activity of bone growth of the spine was assessed by Sadofeva-tests. All tests were divided into three groups. The first group included tests 0-III, which characterized the active bone growth. The second group consisted of test IV that pointed to a stabilization of bone growth. The third group consisted of test V, which demonstrate the completeness of the bone growth.

Results and discussion

The data obtained showed that when IS the pelvis and spine maturation in the bone behind the 1-5 years in relation to the physiological norm. Also found that when IS the spine begins and ends his physiological growth with a certain lag compared to the bones of the pelvis for the term from 1 year to 3 years. The results indicate immaturity of bone growth of the pelvis and spine as a syndrome characteristic to IS. That is possible to regard as certain osteal growth infantilism, caused probably by general osteopeny or any other disease pathogenic specify which is not found out yet. Determined that Risser-test should be regarded as an objective, but indirect information which characterizes the activity of spinal growth plate in patients with IS. For direct evaluation of activity growth in the spine with scoliosis to use this Sadofeva test. This test allows you to objectively predict development of Pathology, as well as to determine the proper corrective treatment and optimal terms.

Key words: Idiopathic scoliosis, spine, bone growth

ABSTRACT

THE RADIOGRAPHIC METHOD FOR EVALUATION OF AXIAL VERTEBRAL ROTATION – PRESENTATION OF THE NEW METHOD

Cerny Pavel^{1), 3)}, Marik Ivo^{2), 3)}, Pallova Iveta¹⁾ (Prague, Czech Republic)

¹⁾ ORTOTIKA I.I.c., Prague, Czech Republic

²⁾ Ambulant Centre for Defects of Locomotor Apparatus I.I.c., Prague, Czech Republic

³⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

E-mail: pavel@ortotika.cz

Assessing the extent of a rotation of a spinal segment on a transversal plane is difficult. Many methods have been proposed and employed to measure vertebral rotation such as radiography, CT, MRI methods and ultrasound. However these methods do not display a close correlation nor do they reproduce the actual and known values of the thoracic or lumbar vertebral rotation.

The objective of this study is to present a new radiographic method for the assessment of vertebral rotation from an antero-posterior (AP) view of conventional X-rays which is sufficiently precise in comparison with radiographic methods presently used in clinical practice (methods of Nash-Moe and Perdriolle).

This method is based on the properties of the geometric shape of vertebrae and their shared dimensional proportions. It means that the relation between vertebral body width and height doesn't change significantly within the entire thoracic and lumbar sections of the spine. The absolute size of the angle of vertebral rotation is measured on X-ray film.

In order to verify the method, we have constructed a special device for vertebral fixation (in vitro) with the possibility to obtain X-ray films with a predefined rotation.

Results

Subsequently, the X-ray pictures of individual human vertebrae with predefined rotation values (ranging from 0° to 45° by steps of 3°) were radio-graphically measured and then compared with their actual axial rotation on the vertebral rotation device. All arithmetic averages correlate very closely with the actual values. A published X-ray picture with defined rotational values was read utilizing both our new method and a Perdriolle torsion-meter and the acceptable accuracy of our method was verified.

The verification of axial vertebral rotation with the assistance of CT and MRI pictures of six scoliotic patients (in supine position) and the evaluation of axial vertebral rotation by both the new radiographic method and with the Perdriolle method proved the satisfactory accuracy of our method.

Conclusion

The main advantage of the newly presented radiographic method is the uncomplicated measurement of vertebral rotation from AP projection of conventional X-ray pictures or from its printed copies. The absolute size of an X-ray picture or its copy is unimportant. The gold standard of the new radiographic method is the evaluation of axial rotation of vertebrae to 30° approximately and the shape of vertebral bodies without severe structural deformities. The new radiographic method seems to be suitable for use in clinical practice.

Key words: axial vertebral rotation, radiographic method, X-ray of spine, vertebral rotation device

Notes: Publication in Scoliosis Journal, 1. 8. 2014

Free software AngleSpine to download as ZIP file: <http://www.anglespine.com>

ABSTRACT

EFFECT OF BRACING ON THE QUALITY OF LIFE OF ADOLESCENTS WITH IDIOPATHIC SCOLIOSIS

Domański Krzysztof, Kwiatkowski Michał, Popko Janusz (Białystok, Poland)

Department of Pediatric Orthopaedics and Traumatology, Medical University of Białystok, Poland

Introduction

So-called Adolescent Idiopathic Scoliosis (AIS) is known to be associated with biomechanical-etiology concerning asymmetry of hip movement in gait and habitual standing "at ease" mostly on the right leg (T. Karski, first publication in 1996). Bracing is so far the most effective non-operative treatment of AIS with spine curvature range between 25°-45° of Cobb angle. This method is widely accepted and its primary goal is to prevent skeletally immature patients from further progression of the spinal curve. In this study we aimed to investigate how bracing treatment impacts patients mental health and what is the compliance of very demanding treatment recommendations.

Aim

The aim of this study was the verification of, patients compliance with prescribed brace wearing schedules, patients self-perception and physical functional health status, outcomes and problems associated with AIS during brace treatment therapy

Material and Methods

We've researched our departments patient database records from 2006 to 2013. 51 patients aged 9 to 18 (84% girls) with AIS treated with Brace (18 months mean duration of brace treatment), were asked to complete translated and modified by the authors survey (Quality of Life Profile for Spine Deformities Instrument). Patients Cobb angle values were compared before and after brace treatment. Statistical data analysis was performed

Results

The mean compliance with a prescribed 23h/d regiment was 70%, 14 patients achieved over 90%, 22 patients reached 50-90%, for 11 people rate was below 50%. The vast majority of patients – 48 (94%) were satisfied with the method and final result of treatment. 6 patients (12%) reported difficulties in activities of daily living and movement limitation during brace wearing. 4 patients (8%) reported sleeping disorders while 10 (20%) were unsatisfied with the shape of their posture. Pain complaints with mean 4 pkt score (0-10 scale) were observed in 18 patients, up to 34 (70%) declared suffering from minor abrasions and scratches of the skin. There was no significant deterioration of spinal curvature measured with Cobb angle when compared before and after brace treatment.

Conclusions

1. Sleeping disorders and the social relationship in the study group deteriorated minimally in relation to the quality of life before brace treatment.
2. High score in faulty posture awareness in the research group is an important measure because it potentially affects the good compliance results.
3. Pain did not significantly affect the comfort of brace wearing moreover minor abrasions and scratches are quite common outcomes of brace treatment thus it is important to properly fit the brace before treatment
4. In most cases bracing did prevent patient posture from further deterioration what confirms it's value in treatment of mild and moderate adolescent idiopathic scoliosis

Key-words: idiopathic scoliosis, bracing, quality of life

ABSTRACT

BIOMECHANICS OF PROXIMAL FEMUR DUE TO PERTROCHANTERIC FRACTURE. HOW IMPORTANT ARE ACCURATE REDUCTION AND IMPLANT PLACING BY TREATMENT OF PROXIMAL FEMUR FRACTURES

Pyrć Jarosław (Dresden, Germany)

Centre of orthopaedic and trauma surgery, University Carl Gustav Carus, Dresden, Germany

E-mail: jaroslaw.pyrc@uniklinikum-dresden.de

The femur is the largest and strongest bone in the body and it is capable to absorbing a huge amount of energy and resisting all but the greatest amount of trauma without damage.

But only in Germany, more than 100,000 elderly suffer a hip fracture especially pertrochanteric femur fractures every year. In this study we explain the differences between the stable and instable pertrochanteric femur fractures due to biomechanics. It is extremely important to understand biomechanics of the pertrochanteric region for the trauma surgeon. The aim of operation is to achieve the exactly reduction and optimal placement of implant, to mobilise the patient as soon as possible. The current common treatment of pertrochanteric fractures is intramedullary nail osteosynthesis. We reported about our experiences in the treatment of so called instable pertrochanteric femur fractures in comparison to international results.

Key words: proximal femur fracture, pertrochanteric femur fracture, instable proximal femur fracture,

ABSTRACT

SINUS TARSII – KEY IN THE TREATMENT OF FLAT FEET

Karski Jacek, Okoński Marek (Lublin, Poland)

Pediatric Orthopaedic and Rehabilitation Department Medical University of Lublin / Poland

Head: Prof. Grzegorz Kandzierski MD, PhD

E-mail: jkarski@vp.pl

Introduction

Flatfoot with valgosity of ankle is the often cause of pain in children, limits their sport activity and adversely affect the motility of the lower limbs and spine. It can lead to sinus tarsi syndrome. This syndrome is described in dancers, volleyball and basketball players associated with flatfoot and hyperpronation deformities as well. Since two years we are performing minimally invasive operating procedures, using implants. There are two methods: the first method is using the Nicky implant, placed in the sinus tarsi and the second, Lima implant - implant screwed in the calcaneus, when head of the screw stays in ST.

Aim of the study

The aim of the study was to evaluate the effectiveness of treatment with implants placed in sinus tarsi (ST). The second aim was to compare both methods of treatment.

Material and method

We used implants located in ST in 100 feet in 58 children: Nicky method in 60 feet and Lima method in 40 feet. Surgeries carried out in children aged 4 to 16 years (average 12.8 years old). Nicky method consists in place metal screw with plastic cover into the ST, screws with dowel an expansion when tightening the screws - plastic umbrella. The method of Lima special titanium or biodegradable screw placed it to calcaneus from the ST, so that the screw head will extinguish the ST. In both methods, the skin incision is about 1 cm. Patients begin normal loading of operated leg from 2 to 5 days after surgery.

Analysis of the material and discussion

Children were evaluated after a period of 5 months to 2 years. Nicky and Lime increased longitudinal arch of the foot, the heel shape has improved. In one child implant Nicky stepped partly, however, the effect of the operation was maintained. In two children operated using Nicky implant there was pain observed - up to 2 months. In the case of Lime implant in one case we observed prolonged pain - up to 2 months. Other patients were satisfied, can practice sports normally. These data are consistent with the literature (the first are the observations of the Italian dates back 30 years) use of such therapies in flat-valgus feet.

Conclusions

Introduction of the implant into the ST seems to be a good alternative for the treatment of Grice-Green method. Children do not require long immobilization cast, start loading in the first week after surgery.

ABSTRACT

ACCELERATION OF NEW BONE FORMATION IN CALLUS

Petryl Miroslav¹⁾, Denk Frantisek¹⁾, Marik Ivo^{2), 3)} (Prague, Czech Republic)

¹⁾ Laboratory of Biomechanics and Biomaterial Engineering, Faculty of Civ. Engineering, Czech Technical University in Prague, Czech Republic

²⁾ Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic

³⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

Biomechanical loading affects bone structures. The anabolic effects of cyclic biomechanical loading on bone tissue are influenced by the frequency of loading. Mechanotransduction appears to involve a complex interaction between extracellular fluid shear forces and cellular mechanics. Bone cells are activated by both the cyclic fluid shear stresses and transported ions/molecules in fluid flow. The cyclic loading stimulates new bone formation through (for example) integrin linkages and ion channels. Cyclic stress/strain changes in bone and the cyclic fluid flow in intercellular networks can be induced by the dynamic electronic fixative (EDF). The dynamic effects of EDF stimulate the distraction osteogenesis (desmogenesis). Increasing the rate or frequency by which dynamic loading is applied greatly improves bone tissue mechanosensitivity, possibly due to loading-induced extracellular fluid forces around bone cells, that serve as mechanosensors. The elongation of long bones by EDF is accompanied by the gradual stretching and/or oscillations of the callus between bone fragments. Defined microoscillations of callus between bone fragments initiated by predetermined external force effects very efficiently regulate the healing velocity, the corticalisation – the rise of load bearing tissue structures and the development of elastic and viscoelastic properties of new bone tissue. The active load cycles can be interrupted by the defined tranquillity also. The EDF regulates both strain frequencies and amplitude modulations also. EDF presents the effective clinical tool for software regulated osteogenic stimulations within the callus.

The presented distraction fixator was originally the first electronically controlled distraction fixation apparatus in the world. Its advantage is the ability to stimulate and regulate the corticalisation of the callus during distraction, to asymmetrically or symmetrically elongate shortened long bones of children/adults and to contribute to the elimination of some deformities of long bones in children or in adults.

Key words: bone, distraction of diaphyses, distraction apparatus, electronic regulation of oscillations, callus

ABSTRACT

RADIOGRAPHIC ASSESSMENT OF LENGTHENING CALLUS STRENGTH: COMPARISON OF ACHONDROPLASIA AND UNILATERAL HYPOPLASIA

Myslivec Radek^{1), 3)}, Marik Ivo^{1), 4)}, Petrasova Sarka¹⁾, Zemkova Daniela^{1), 2)}, Marikova Alena¹⁾ (Prague, Czech Republic)

¹⁾ Ambulant Centre for Defects of Locomotor Apparatus, Prague, Czech Republic

²⁾ Paediatric Department, University Hospital Motol, Prague, Czech Republic

³⁾ Orthopaedic-Traumatologic Department, Regional Hospital Pribram, Czech Republic

⁴⁾ Faculty of Medical Studies, West Bohemia University, Pilsner, Czech Republic

E-mail: ambul_centrum@volny.cz

Aim of the paper is to present an experience with two radiographic methods for prediction of possible collapse of lengthening callus after external device removal in children with achondroplasia and unilateral shortening.

Introduction

For the study we used clinical, anthropological and radiological evaluation of the depositary cases with achondroplasia and unilateral hypoplasia that were surgically treated and monitored in the Ambulant Centre for Defects of Locomotor Apparatus (ACDLA) from 1994. ACDLA is familiar with Ilizarov's method and external fixation device using it more than 30 years. Ilizarov introduced the concept of local bone regeneration using minimally invasive surgery in 50th years of 20th century (Ilizarov 1989). Lengthening of long bones by a method of distraction osteogenesis (desmogenesis) is reached by step by step callus stretching of healing bone tissue i.e. controlled gradual distraction of bone fragments. Complete healing is a long process, which would involve remodeling of the regenerate, and its completion is difficult to define. There are obstacles and complications during and after lengthening and still the most important decision in distraction osteogenesis is the timing of device removal.

Objectives

The paper is continuation of previous studies carried out in years 2008 – 2011. These studies were focused on assessment of the callus diameter ratio (CDR, %) measured retrospectively (Myslivec et al. 2008, 2011) at X-rays of achondroplasia and unilateral hypoplasia cases (during and after leg lengthening). We used radiographic examination of CDR according to Mamada, Nakamura et al. (1998) for evaluation and prediction of biomechanical properties of tibial and femoral distraction osteogenesis.

When the CDR was 85% or more in both planes, there were no angular deformities (bending) and fractures. But when the CDR was 80% or less, the complications called collapse of callus were observed and should be expected (Mamada, Nakamura et al. 1998, Myslivec et al. 2008, 2011).

Main objective of this paper is to compare the assessment of distraction osteogenesis in patients with achondroplasia and unilateral leg shortening according to so-called callus diame-

ter ratio – CDR (Mamada, Nakamura et al. 1988, Myslivec et al. 2011) and by classification system based on callus shapes and types of radiographic features (Li et al. 2006).

Patients and Methods

Firstly, the authors retrospectively reviewed radiographs of 26 tibia and 11 femoral lengthening in 14 achondroplasia patients (age-range 6 – 16 years, 10 males, 4 females) and 14 tibia and 3 femoral lengthening in 12 patients with unilateral hypoplasia or hypotrophy (age-range 2 – 23 years, 4 males, 8 females). Lengthening procedures (osteotomy, rate distraction 1 mm per day after latency 7-10 days) were made using monolateral external fixation (femur) or original Ilizarov's rings (tibia) during 1994 to 2008. The CDR (%) was calculated as the minimum callus diameter (the callus width) divided by original diaphysis diameter of the tibia/femur at the level of proximal osteotomy bone site. The minimum diameter of the callus was measured using a ruler on anteroposterior and lateral radiographs taken in the time when the lengthening was finished and/or in the time of fixator removal and 6 and 12 months after device removal.

Secondly, in years 2009 – 2013 next 8 elongated patients with achondroplasia (**2**), fibular hemimelia (**2**), femur hypoplasia (**1**), enchondromatosis Ollier (**1**) and shortening due to osteoarthritis (**2**) were reviewed from the point of clinical, anthropological and radiological evaluation – **table 1**. Radiographic assessment was carried out as by CDR method (Mamada et al. 2008) as by classification system based on 5 callus shapes and 10 types of radiographic features that occurred at different stages during limb lengthening from osteotomy through distraction and consolidation to the removal of the fixator. (Li et al. 2006).

Results

In patients with achondroplasia the average distracted length of tibia was 72.8, femur 78.7 mm. In patients with unilateral hypoplasia, the mean lengthening of tibia was 62.5 mm, femur 68 mm. In the achondroplasia group we proved CDR lesser than 85 % in 5 tibias and 2 femurs. In these cases we observed at X-rays after device removal 4 fractures and 1 bending of tibia and 1 fracture and 1 bending of femur. In the unilateral hypoplasia group we proved CDR lesser than 85 % in 6 tibias and 2 femurs. In these cases we observed at X-rays soon after device removal 4 bending of tibia and 1 fracture and 1 bending of femur. The collapse of callus was in 18.9 % in the achondroplasia group and in 35.2 % in the unilateral hypoplasia group. In both groups the diameter change rates after fixation removal were significantly positive at X-rays 6 months or more both at the tibia and the femur (Myslivec et al. 2009). Results of 8 patients group are presented in tables.

Conclusions

The CDR (< 85%) is a simple and good alarming index for preventing the complications called collapse of callus occurring in tibial and femoral lengthening after external fixation removal. The collapse of callus was more frequent in the unilateral hypoplasia group than in the achondroplasia group probably because of prolonged remodelling of callus and bone density

from hypo-activity (patients predominantly loaded unaffected leg). The CDR criterion was the same for both groups. In both groups the diameter change rates after fixation removal were significantly positive at films 6 months or more both at the tibia and the femur. We described this phenomenon as peripheral lateral drift of corticalis (Myslivec et al. 2009) and we concluded that simple axial loading is not a sufficient mechanical impulse for restoration of the physiological geometry of diaphysis and biomechanical properties. The negative influence on the distraction osteogenesis results mainly from high rigidity of the external fixation (undesirable shield effect). Bending, torsion and shear micromotions are necessary for increase of the diaphysis diameter (in the place of original callus) and full remodelling of long bones diaphysis after device removal.

On a small group of 8 patients, we verified that feature type based on four patterns and three levels of regenerate bone density can be used to predict the possible problems of healing in children and adults and it allows corrections to be made at the appropriate time to improve outcome of leg lengthening.

Combination of radiographic methods both callus diameter ratio – CDR (Mamada et al. 2008) and classification system based on callus shapes and types of radiographic features of distraction osteogenesis (Li et al. 2006) escalates reliability of the assessment of the regenerate healing and monitoring its biomechanical properties.

In the next study we plan to classify retrospectively by this classification system the whole ACDLA group of achondroplasia and unilateral hypoplasia patients. The classification will be simplified to make it more appropriate for clinical use.

Key words: lengthening, external fixation, achondroplasia, leg hypoplasia, callus diameter ratio – CDR, callus shape and feature

References:

1. ILIZAROV GA. The tension-stress effect on the genesis and growth of tissues, Part II. The influence of the rate and frequency of distraction. *Clin. Orthop*, 239, 1989, p. 263-85.
2. LEE DY, CHUNG CY, AND CHOI IH. Longitudinal growth of the rabbit tibia after callotasis. *J. Bone Joint Surg.* 75B, 1993, p. 898-903.
3. LI R, SALEH M, YANG L, COULTON L. Radiographic classification of osteogenesis during bone distraction. *J Orthop Res.*, 24, 2006, p. 339–347.
4. LIEBERMAN J.R., FRIEDLAENDER. *Bone Regeneration and Repair: Biology nad Clinical Applications*, Humana Press Inc., Totowa, New Jersey, 2005, 398 p.
5. MAMADA K, NAKAMURA K, MATSUSHITA T, OKAZAKI H, SHIRO R, OU W, TANAKA K, KUROKAWA T. (1998). The diameter of callus in leg lengthening: 28 tibial lengthenings in 14 patients with achondroplasia. *Acta Orthop Scand*, 69, Jun 3: p. 306-310.
6. MAŘÍK F, MAŘÍK I, KLIKA V. (2005). Chemické procesy kostní remodelace (in Czech). *Locomotor System*, 12, No. 1+2, p. 51-61. ISSN 1212-4575.
7. MAŘÍK I, SOBOTKA Z. Biomechanické spolupůsobení zevních fixátorů při komplikacích během prodlužování dolních končetin. In: *Biomechanika člověka '98*, Ed. Jelen K, Pejšová J., Praha, 1998, p. 58 – 60. ISBN 80-902147-6-2

-
8. MYSLIVEC R., MAŘÍK I., ZEMKOVÁ D., MAŘÍKOVÁ A., PETRTÝL M. Prediction of the callus strength according to its X-ray geometry. *Locomotor System* 15, 2008, Suppl., 3-4: p. 342 – 346. ISSN 1212-4575
 9. MYSLIVEC R., MAŘÍK I., ZEMKOVÁ D., MAŘÍKOVÁ A., PETRTÝL M. Modelace kostního svalku po sejmутí zevního fixátoru u prolougovaných pacientů s achondroplazií (in Czech). *Pohybové ústrojí* 16, 2009 Suppl, 1-2, p134-137. ISSN 1212-4575
 10. MYSLIVEC R., PETRASOVA S., ZEMKOVA D., MARIKOVA A., MARIK I. Lengthening callus strength: comparison of achondroplasia and unilateral hypoplasia. *Locomotor System*, 18, 2011, No. 3+4, p. 325-327. ISSN 1212-4575
 11. MYSLIVEC R., PETRÁŠOVÁ Š., MAŘÍK A., ZEMKOVÁ D., MAŘÍK I. Anthropological and biomechanical assessment of the leg lengthening in achondroplasia: case report (in Czech). *Pohybové ústrojí* 18, 2011, 1-2: p. 69-84. ISSN 1212-4575
 12. NAKAMURA K., MATSUSHITA T., MAMADA K., OKAZAKI H., OU W., OKUMA Y., KUROKAWA T. Changes of callus diameter during axial loading and after fixator removal in leg lengthening. *Arch Orthop Trauma Surg*, 117, 1998, 464-467.

ABSTRACT

CHANGES OF BODY COMPOSITION AND MOTOR ABILITIES OF PRESCHOOL CHILDREN DURING LAST FIVE DECADES

Sedlak Petr¹⁾, Pařízková Jana²⁾, Vignerová Jana³⁾, Daniš Robert¹⁾, Dvořáková Hana⁴⁾ (Prague, Czech Republic)

¹⁾ Department. of Anthropology and Human Genetics, Faculty of Science, Charles University in Prague, Prague, Czech Republic

²⁾ Obesity Management Centre, Institute of Endocrinology, Prague, Czech Republic

³⁾ The National Institute of Public Health, Prague, Czech Republic

⁴⁾ Faculty of Education, Charles University in Prague, Prague, Czech Republic

E-mail: petr.sedlak-uk-prf@seznam.cz

Due to significant changes of lifestyle (inadequate nutrition, sedentarism) secular changes of adiposity appeared in all age categories, including early age. In preschool children (n= 2578) height, weight, body mass index (BMI), skinfold thickness (Harpenden caliper) over triceps, subscapular and suprailiac were measured along with testing motor performance (broad jump and throw a ball). repeatedly since the fifties of the last century until this millennium. During last five decades the values of skinfold thickness increased significantly until 2011, mainly on the trunk. Simultaneously, the level of motor performance significantly decreased. BMI did not change significantly and did not reflected especially body composition changes. As follows, modifications of the way of life during mentioned five decades characterized by sedentarism and inadequate food intake as related to energy output influenced negatively both adiposity and motor performance already in preschool children. Between the years 1990 and 2011, when significant social, economic, cultural etc. changes especially occurred, most marked changes were revealed. Mostly increased deposition of fat on the trunk which is considered as a marker of possible development of metabolic syndrom was apparent already in preschool age, indica-

ting the importance of early intervention concerning also physical activity and availability for exercise since early life.

Key words: secular trend, adiposity, motoric development, preschool children

ABSTRACT

RISK FACTORS OF LOW-ENERGY FRACTURES IN CHILDREN FROM MIXED RURAL AND URBAN PODLASIE REGION

Michał Karpiński¹⁾, Galicka A.²⁾, Milewski R.³⁾, Popko Janusz¹⁾ (Białystok, Poland)

¹⁾ Department of Pediatric Orthopedics and Traumatology,

²⁾ Department of Medical Chemistry,

³⁾ Department of Statistics and Medical Informatics, Medical University of Białystok, Poland

E-mail: jpopko@umwb.edu.pl

Background

In recent years the growing number of fractures, of forearm particularly, in children is observed. Different risk factors of low-energy fracture occurrence are postulated. Those are low physical activity, obesity, lowered bone mineral density, lowered level of vitamin D concentration, consumption of carbonated drinks like coke. It is known that vitamin D deficiency is associated with increased risk of osteoporotic fractures in adults. However, unequivocal evidence for the connection between lowered concentration of vitamin D and either low- or high-energy fractures in children is still to be found. It was decided to estimate the group of children with low-energy fractures in a prospective way.

Aim

The present study seeks to provide correlation between risk factors of low-energy fractures (such as mentioned above) and occurrence of low energy fracture. Also the relation between development period, patient origin and relationship between development period and gender of the patients was analyzed.

Material and methods

280 children (74 % boys) who experienced low-energy fracture and were hospitalized in our Department between 2010 and 2013 were qualified to the study. The comparative group consisted of 124 patients (60 %boys), without fractures hospitalized in our Department. In the questionnaire distributed among parents and patients questions concerning weekly milk and carbonated drinks consumption, physical activity, drugs taken, and previous fractures were asked. Sexual maturation was determined on the basis of modified self-assessment questi-

onnaire. Cole's indicator served the purpose of proper weight estimation. Concentration of vitamin D were determined in every patient.

Results

In statistical analysis of collected data we found significant differences in vitamin D serum concentration levels between fracture and non-fracture group ($p < 0,000044$). Odds ratio for the occurrence of fracture was calculated for different risk factors both separately and together. Higher vitamin D serum concentration reduces the chance of fracture by almost 6 % per 1ng/ml ($p < 0.0001$). Drinking milk reduces the chances of fracture by 7 % per every glass taken per week ($p < 0.0001$). Male sex increases the risk of fracture almost twice (Odds ratio – 1.986, $p < 0.003$).

Conclusions

1. Children with fractures have significantly lower vitamin D serum concentrations
2. Male sex and vitamin D deficiency is one of the major fracture risk factors in children
3. Drinking milk is protective against fractures

Key words: low-energy fractures in children, risk factors, serum vitamin D

ABSTRACT

BONE FRACTURES IN OBESE CHILDREN AND ADOLESCENTS

Pařízková Jana (Prague, Czech Republic)

Obesity Management Centre, Institute of endocrinology, Prague, Czech Republic

E-mail: jparizkova@endo.cz

Key words: obesity – children – adolescents – bone fractures – physical fitness – motor abilities

Trauma databases indicate most often an increased rate of fractures, especially of the extremities in growing obese subjects compared with children and adolescents of normal body weight. In obese individuals, greater visceral fat is also associated with greater marrow fat, lower bone density and impaired bone structure. Another risk factor is reduced level of physical fitness and motor abilities, causing e.g. more falls and other accidents resulting in injuries, and including also bone fractures. Femur, tibia, ankle, knee, lateral and supracondylar fractures of humerus, and also wrist fractures were found to be associated with increasing BMI and obesity. Higher risk of the fractures of pelvic bone has been also considered due to excessive deposition of body fat. Body composition and hormones secreted and regulated by body fat are, inter alia, determinants of inadequate bone density, bone structure and bone strength; body composition

is also related to serum osteocalcin in overweight and obese children. Increased risk of Blount disease especially under conditions of vitamin D deficiency was revealed in obese children. Complex studies have analyzed this bone problem along with physical activity, fitness and motor abilities development related to adiposity, as the situation concerning these characteristics revealed during last decades a negative development. Higher level of physical fitness, skill and endurance could be an efficient factor of preventing also this significant health problem.

Key words: bone fractures, body composition, children obesity

ABSTRACT

HISTORICAL REVIEW OF CLUBFOOT TREATMENT

Csenge Szeverenyi (Debrecen Hungary)

Department of Orthopaedic Surgery, University of Debrecen, Clinical Center, Debrecen, Hungary

E-mail: szcsenge@med.unideb.hu

It is very likely that clubfoot is as old as mankind. The first depictions about clubfoot are already visible on the walls of ancient Egyptian tombs. The basic treatment principles were already described by Hippocrates around 400 B.C.: gentle serial manipulation is needed for the correction; the foot has to be held in the achieved position; the treatment has to be started as early as possible. Throughout centuries many manipulative and fixation instruments were developed by different doctors (Paré, Cheselden, Scarpa, Thomas, Lorenz, Phelps, Schultze) and most of them applied drastic force on the foot. The first description about the serial plaster casting is available from 1838 (Guerin). The results of the first percutaneous surgeries were also presented from the same period, but due to the high infection rate they did not spread worldwide. Denis Browne developed the abduction bar in 1934. From the 1930's Kite's casting method became popular, which in general gave good results after almost two years of serial casting. Due to the development of anaesthesia and the introduction of antiseptic principles the excessive soft tissue procedures of the foot started to prevail. With these types of surgeries also appropriate corrections could be achieved, but in many of the cases the range of motion of the foot significantly decreased and the foot became painful. Ignacio Ponseti, finding the Kite method too lengthy and the poor functioning feet after the surgeries, started to study the clubfoot more deeply and developed his own method, which provides a shorter casting period with good functioning feet and by which the excessive surgeries can also be avoided. His method and results were first published in 1963. Today Ponseti's method is the most effective method in the treatment of idiopathic clubfoot.

Key words: clubfoot treatment, historical review, Ponseti's method

ABSTRACT

SYMPTOMS OF DISEASE ON ANTIQUE FIGURES?

Wamser-Krasznai Waltrud, Krasznai Petúr (Frankfurt am Main, Germany)

DE- Butzbach/Frankfurt am Main

E-mail: waltrud.wamser-krasznoi@archaeologie.uni-giessen.de

1. Error in quantity

- Bild tiptoe
- Polydaktylie ? Incompetence of sculptor?
- Bild foot Praeneste
- The sixth (6.) toe is formed like little adnexa of the fifth (5.) We think the sculptor wanted to express pathological evidence in quantity.

2. But there are some pathological evidences in quality too.

- Bild Minoan statuette ca. 2000 B. C.
- This is very curious: a thickening of only one leg, the left.
- Lipoedem? Lymphoedem ? Elephantiasis? Papillomatosis cutis lymphostatica?

Curious seems to us:

3. A stylistic manner of representing parts of human body

- In early sixth century B. C. in Attica/Greece the little fingers of boys were represented with four (4) phalanges instead of three (3).
- At the same time they showed the ear very great and vertical, with parallels of Helix und Anthelix and with the Tragus like a button.
- Bild Ear

Now look at the manner they represented knees. Symmetrical swellings of Quadriceps above the Patella. Two buttons. One immediately below the Patella. This means the tuberositas tibiae, but dislocated. The other a little bit outside. This means the capitulum fibulae, wrong situated.

There is no reason to think of illness, nor of incompetence of the sculptors. It means a manner of style. The artist wanted only to show the important parts of knee from the front side.

Bild Kuros New York and the true Anatomie

In seventh century B.C. on Cyprus they produced Kentaur-Figures with male and female sex organs. This does not mean Hermaphrodit. The artist only try to express the demoniac creature.

Bild Cyprus Kentaur

At the end of archaic times it was a custom to represent the Musculus rectus abdominalis as six-pack instead of four-pack. It disappeared with the beginning of classical times.

Bild anatomic studies on abdomen

4. At least we are dealing with a kind of misinterpretation.

Bild Corinth, second half of the forth century B.C.

It's a votive statue from the Asklepieion of Corinth. The little boy is represented inclining the Head to his right side.

Connatal Torticollis with shortness and fibrous degeneration of Musculus sterno-cleido-mastoideus on one side only ?

Contraction of muscles as a symptom for instance of the „Siebener-Syndrom“?

Osseous defect? Klippel-Feil-Syndrom, rare congenital Synostosis, associated with other malformations?

Bild Villa Giulia

Associated with a short neck? There is an Italien archaeologist who commended to forget such a miscarried statuette at once and do not take any notice of him.

Bild Ayia Irini, Cyprus, early sixth century B. C.

In his thesis a young colleague described this statue of a Cypriote soldier with a blessed arm, put in a sling in flexion and middle position between pronation and supination.

Bild Marble. Sitting girl, Rome Capitolium, third century B. C.

He is topped from a medicine historian, who interpreted a charming young girl having blessed her arm and carrying it in a sling. But we look behind the surface and know, that this behaviour will only mean a fashionable and flirting pose.

Key words: symptoms of disease, antique figures

ABSTRACT

IDENTENCE BASED INTERMITTENT PNEUMATIC COMPRESSION (EBIPC) METHOD

Romanowski Richard (Malmoe, Sweden)

Rehabilitation Praxis. Malmoe, Sweden, Falsterbogatan 25, 21436 Malmoe, Sweden

mobile:+46 707 634013,

www.lifecomfortinteractive.com

Inroduction

The rehabilitation method using the EBIPC is a computer based massage, using pressure cuffs with the uniform compression of muscle tissue during massage therapy of the arms and the legs. Interactively informs on screen the massage effect in form of the muscles relaxation degree.

Purpose of the research

Purpose of the research using the EBIPC -method is to activate important signaling molecule nitric oxide (NO), which penetrates into and activates muscle causing relaxation of smooth muscle cells (Nobel Prize 1988, Ortop. Resarch Siciety, 1997, San Francisco). On this way NO induces synthesis of cyclic GMP, by activation of enzyme guanylyl cycles (GC) leading to relaxation of myosin (muscle protein) and relaxation of the muscle in physiological way.

The group of patients, treatment and research using EBIPC -method:

- a. The treatment of postoperative swelling of the hands and arms, during 3 days at the Department of Hand Surgery, reducing swelling in a physiological manner.
- b. The treatment of postoperative swelling legs after coronary bypass during 4 days at the Department of Heart Surgery, with good results.
- c. The treatment of S-scoliosis, after 2 month massage of legs and arms the pain has stopped.
- d. The treatment of postoperative paralyzed patient in both legs during 5 years, after 3 weeks of massage return sensibility I both big toes and after 2 month patient can get up and go.
- e. The treatment of Carpal Syndrome, after 7 days massage of arm syndrome has been finished.
- f. The treatment of 5 year old boy with Congenital Muscle Dystrophy, after 3 months massage of legs, the boy started crawling on the floor. The video available.

Applications

The EBIPC-method offers an important contribution to healthcare, giving new opportunities of healing to patients suffering from acute painful conditions where conventional treatment is unsuccessful.

Key words: Intermittent Pneumatic Compression method, Intermittent EBIPC method

ABSTRACT

CHALLENGES FOR TREATING AND MANAGING DISABILITIES IN UGANDA (20 MIN.)

Ochen Paul^{1), 2)} (Mukono, Uganda)

¹⁾ Afaayo Child Health education and Rehabilitation Unit (ACHERU), Mukono, Uganda

²⁾ Bachelor of Science Physiotherapy student, University of Vincent Pol, Lublin- Poland

E-mail: ochenanyoun2012@gmail.com

Uganda is a landlocked country situated in East Africa, member of the East African Community and neighboring Southern Sudan to the north, Kenya to the east, Democratic Republic of Congo to the west and Rwanda and Tanzania to the south.

Treating and managing disabilities is still a big task ahead where infrastructure, inadequate professionals, lack of equipment are part of the big social, cultural, environmental and avoidable hardships brought about by conflicts and disasters still affecting the progress that should reduce the burden of disability in Uganda.

Uganda has population of 34,758,809, almost half of citizens are below 14 years old (48,9%), other 21,2% below 24 years old. Birth rate is 44,5 births/1000 population. This number of childrens orthopedics problems is high. In the same time number of beds are 0,5/1000 population, and number of physicians are 0,117/1000 population. This lead to late time of initiation of treatment.

The majority of disabilities seen in Uganda are mainly congenital and from effects of infections which end up being complicated and complex due to neglect with time, inappropriate treatment and management and lack of follow-up impacting on compliance and adherence.

For many generations, the social and cultural influence has dominated and controlled the health seeking behaviors and this has held an impact in society till today. It will still remain a challenge for more decades until the state and opinion leaders become committed in fully addressing these issues which have resulted to social, economic, cultural, psychological, emotional, spiritual and physical tortures that many affected families and communities are facing today.

Treatment and management of disabilities heavily lies in the hands of Non-Governmental Organizations and which services can only be got in major cities or towns far from the reach of many poor rural families.

There are few specialized hospitals, doctors and surgeons to treat and manage orthopedic problems and there is a very big shortage of Physiotherapists, Orthopedic technicians/technologists in the country.

Most hospitals lack equipped operating theatres, diagnostic equipment like X-rays to perform confirmatory diagnosis and besides lack of regular electricity supply. Usually families have to meet all the costs for treatment, appliances and reviews and this has led to relapses and complications that need a concerted and team approach to reduce the burden imposed upon the families and communities affected.

Uganda has only 28 orthopedic surgeons serving the population of over 33 million people. "Health minister Dr. RukahanaRugunda says this has made many people with different fracture complication miss out on treatment and resort to traditional medicine."

There are currently two Physiotherapy schools in the country. Mulago School of Physiotherapy, state owned and Mbarara University of Technology and Sciences, private.

Admission to these schools is limited and for example, not more than 3 students graduate each year from Mulago School of Physiotherapy.

Current challenges

- Very few orthopedic surgeons in the country
- Very few Physiotherapists and Orthopedic Technologists
- Lack of equipment, electricity supply
- Services are concentrated within the capital city far from the reach of the most affected population
- No collaborative approaches to deal with issues and services for people who need orthopedic services

Remedies

- Need for more trainings and education for Orthopedic surgeons, Physiotherapists, orthopedic Technologists and other allied staff
- Develop team approach and collaboration with all the key Non-Governmental Organizations and hospitals treating patients with orthopedic and disability related conditions
- Build a team approach with international expatriates and hospitals who have extensive experience

Key words: disabilities in Uganda, treating and managing

ABSTRACT

ORTHOPAEDICS, PROSTHETICS AND ORTHOTICS IN THE THIRD WORLD COUNTRIES (45 MIN.)

Neff Georg (Berlin, Germany)
Berlin, Germany
E-mail: toc-neff@gmx.net

Despite a century long period of western influence – along with moderate medical care – sequels of poliomyelitis, trauma, scald, sickle cell anemia, tumors, limb deficiencies present at birth, punishment etc. are still common in Third World Countries or those under development.

Due to more than 40 years of cooperation mainly with gtz training centers for Orthopedic Technologists in Africa, Near and Far East and Asia, follow-up programs, evaluation of P&O projects, and local assistance – including diagnosis, conservative and surgical interventions – teaching and examining as a Visiting Professor and researcher is the background for an overview on

various deformities present at birth or acquired by disease or trauma and their treatment under nonstandard conditions including P&O solutions.

The shortcomings in infrastructure, equipment, materials and lack of qualified manpower are a challenge for improvisation and modified solutions to assist those in need.

Key words: orthopaedics, prosthetics, orthotics, 3rd world countries

Workshop Hand surgery

Lecturer: Smrcka Vaclav (Prague, Czech Republic)

ESME I.I.c. & Department of Plastic Surgery, 1st Medical Faculty of Charles University in Prague, Hospital Na Bulovce, Prague, Czech Republic

Titles of lectures

1. Flexor Tendon Repair
2. Extensor Tendon Repair (with Mallet Finger, Swan-neck Deformity and Boutonnière Deformity)
3. Skin Loss Defects and Replantation
4. Carpal Tunnel Syndrome/Release,
5. Tendinitis
6. Dupuytren's Disease.

ABSTRACT

REHABILITATION PROCEDURE AFTER INTERRUPTION OF TENDONS AND NERVE STRUCTURES IN THE WRIST OF AN ENTERTAINER – VIDEO FILM

Bejvlova Jarmila^{1), 2)}, Smrcka Vaclav^{1), 2)}, Molitor Martin²⁾

¹⁾ ESME I.I.c.

²⁾ Department of Plastic Surgery, 1st Medical Faculty of Charles University in Prague, Hospital Na Bulovce, Prague, Czech Republic

Description of a complete post-traumatic interruption of the n. medianus and nearly of all tendinous structures within the zone IV in the wrist of an entertainer, world master in jugglery, recorded in the Guinness Book of Records 2010 in Moulin Rouge, Paris for the speed and use of as much as seven clubs.

Rehabilitation was started 3 weeks after the operation done with a 4-strand suture acc. to Kessler. It was aimed to cure the oedema and maintain the joint range by means of passive mobilization. After 2 weeks of the beginning of the rehabilitation phase the oedema receded, after 2 months there is 60 -70 deg. range in the MP joints. After 4 months the fingers have the full range of the motion, nevertheless EMG shows no signs of regeneration.

Co-operation with the patient during the rehabilitation phase is excellent, he is even over-motivated, he himself completes the manual therapy by ergotherapeutic incorporation of the exercises with the clubs on the principle of limbering up.

Thus for one month he makes exercises with one club imitated by a plastic bottle and every other month he adds one more club.

So thanks to motivation, after 9 months he gets, as he says, up to the level of 98 percent of his performance he had before the injury.

After 13 months he normally does even his top performance with 7 clubs.

Key words: interruption n. medianus, inteerruption tendinous structures zone IV, rehabilitation after surgery

**PROFESSIONAL CURRICULUM
VITAE OF PROFESSOR
TOMASZ KARSKI, MD, PHD**



Professor Tomasz Karski, MD, PhD (left) and Associate Professor Ivo Marik, MD, PhD

Prague, 21st August 2014

Professor Tomasz Karski, MD, PhD

- **Professor Emeritus since 1st October 2009**
- **Former Head of Pediatric Orthopedic and Rehabilitation Department of Medical University in Lublin (1995–2009)**
- **53 years orthopedic activity to 2009**

Professor Tomasz Karski was born in January 2, 1939 in Rudka (Zwierzyniec) Zamość district (south – east part of Poland). Primary school in Zwierzyniec, secondary school in Zamość. In the years **1956–1963** he studied at Medical University in Lublin. In **1963** he received medical doctor degree. During the studies he worked 3 years in Students Scientific Orthopedic Association and later after graduation he began orthopedic career. In **1967** first grade of specialization), in **1971** second grade of specialization in orthopedics, orthopedic surgery and traumatology of movement apparatus. In **1972** and **1982** he passed degrees to receive **PhD** degree and **Associate Professor** title. In **1993** he was nominated for Professor and President of Poland confer him the scientific degree Professor ordinaries (full Professor). Since **1995 till 2009** he was a Head of Chair and Department of Pediatric Orthopedics and Rehabilitation of Medical University in Lublin/ Poland. It is the biggest University Pediatric Hospital in Eastern Poland (DSK in Lublin).

He is a member of Polish Orthopedic and Traumatology Association (PTOiTr) since 1963. For 12 consecutive years he was elected as Secretary of Lublin Branch (Section) of Polish Orthopedic and Traumatology Association, for 4 years he was Vice-President of the Section and for next 4 years he was President of the Lublin Section. He works in Editorial Board of Polish Hand Surgery, of the Journal of Paediatric Orthopaedics part-B (till 2004), of *Biblioteka Ortopedii Dziecięcej* (Pediatric Orthopedics' Library) and of the journal Locomotor System – „Pohybové ústrojí” (Czech Republic). He is a member of EPOS since 1985 and a member of *Société Internationale de Chirurgie Orthopédique et de Traumatologie* (SICOT) since 2002.

Scholarships abroad

Orthopedic Departments: Neuruppin (German Democratic Republic – one month every year in years 1963–1972), Heidelberg (1972) – together 10 months & Essen (1973) – as DAAD scholarship holder, Budapest (one weeks – many times), Hajduszoboszlo (Congress), Szekesfehervar (Congress), Brno (one month), Neubrandenburg (German Democratic Republic Congress), Chemnitz (Congress), London (one month and Congress), Amsterdam (two weeks and Congress), Montpellier (Congress), Leipzig (one week and Congress), Erfurt (German Democratic Republic) one week and Congress, Paris (one week and Congress), Bratislava (many times), Szeged (many times), Debrecen (many times), Vienna (many times and EPOS Congress), Stolzalpe (three times, in period of one – two weeks), Berlin (many times), Hubertusburg (Wernsdorf – many times), Siebenlehn (as lecturer – many times), Rummelsberg (one month), Copenhagen (two weeks), Björred (Sweden – some days), Heinola / Finland (many times – every time – one month), Oulu (Congress), Milano (Italy – Congress), Lubjana (short stay), Hong Kong (2004 – one week stay and Symposium), Beijing (2005 – one week stay and Congress), Helsinki (2005 – lecturer at Orthopedic Summer School / Place: Invalid Foundation Hospital / Helsinki / Teholantie 10).

Awards

He was awarded by the Rector (main Director of University) of Medical University of Lublin 39 times for scientific and educational work. He received three times award from the Ministry of Health of Poland (1975, 1986, 1993). He was also awarded with medals: *„Przyjacieli Dziecka”* (1978r.), *„Medal Pamiątkowy Sześćdziesięciolecia TPD”* and *„Międzynarodowego Roku Dziecka”*

(1979r.), *Złotą Odznakę TWK* (1984r.), *Złoty Krzyż Zasługi* (1987r.), Medal *im. dr Henryka Jordana* (2000r.) and *Krzyż Kawalerski Polonia Restituta* (2000r.) and Medal *Komisji Edukacji Narodowej* (2003r.), *medal Vincentego Pola* (2010). Since **1996** he is Honorary Member of Hungarian and since **2003** of Slovak Orthopedic and Traumatology Association and since **2005** of Czech Orthopedic and Traumatology Association. In 2006 he was awarded by Honorary Membership of The Society for Connective Tissues, Czech Medical Association, J.E. Purkyně, in 2008 by a Medal of honour of the Czech Medical Association J.E. Purkyně and in 2009 by a Medal for Clinical and Scientific Merits of The Society for Connective Tissues, Czech Medical Association, J.E. Purkyně.

In 2003 he was awarded by International Biographical Center Cambridge, England as Outstanding Intellectual of the 21st Century. Since 2005 his name is putting on list in The Contemporary Who's Who of Professionals ABI (USA).

He described the biomechanical etiopathogenesis of the so-called idiopathic scoliosis (1995–2007) and he is the author of a new rehabilitation treatment of this spine deformity. In the year 1997 he found that all children with scoliosis has the habit to stand 'at ease' only on the right leg and it was deciding for development of "C" II/A scoliosis and "S" II/B group of scoliosis and additional cause of development of "S" I group of scoliosis. In 2001 he described two etiopathological groups (I-st and II-nd) and in 2004 the III-rd group of the development of so-called idiopathic scoliosis which proved to be crucial for prophylactics and new conservative treatment. In 2006 he described the "model of hips movement" – deciding in "development of every types of scoliosis". In 2007 he found the answer – why the blind children do not have scoliosis and in this year he also described the "indirect influences coming from CNS in small children and their influence for development of scoliosis in future".

He published these clinical findings in numerous polish and foreign publications and also in four books on scoliosis (2000, 2002, 2003 and 2011). His articles have been published also by International Research Society or Spinal Deformities – IRSSD Meetings in Athens (2002), in Ghent (2006) and in Liverpool (2008) and in Poznań (2012) – together 5 articles. He presented his ideas about etiology of scoliosis during SICOT Congress in Egypt (2002), in Cuba (2004), in Turkey (2005), in Marrakech (2007) and in Prague (2011).

In years 2012–2014 he attended many Symposia and Congresses (IRSSD – Liverpool, SOSORT – Wiesbaden, in Hungary, in Czech Republic, in Germany, in Belgium, in England, in Greece, in Egypt). The recent information about so-called idiopathic scoliosis he published in three articles: in 2005, in 2007 and in 2010 in Pan Arab Journal of Orthopedics and Trauma and in 2011 in Spain and in US-China Orthopedic Journal (USA). In last 2 years (2013) he published two articles in Journal of Novel Physiotherapies in USA and in Surgical Science in USA (2014).

His scientific interest is first of all pediatric orthopedic surgery and specially:

1. DDH – etiopathogenesis, new functional treatment at newborn, babies and small children; new concept of femur osteotomy and innominate bone osteotomy of dysplasia hips – here many successes in treatment,
2. congenital feet deformities (club foot) – modification of skin incision,
3. *torticollis* – effective early new conservative treatment of new-born and small babies (described in Orthopädische Praxis in Germany),

-
4. *Morbus Blount* – explanation of etiology and operative procedures and since 33 years effective conservative treatment children in age of 1.5–3 years (described in Orthopädische Praxis in Germany),
 5. *genua valga* – new operative procedure – “lateral high realize” (fasciotomy of tractus ilio – tibialis – it was described in the journal of Locomotor Apparatus that is edited in Czech Republic),
 6. cerebral palsy (CP) – concept of new treatment through the RAO method [R – rehabilitation, A – apparatus, O – operation (if needed)]. It was described in the journal of Locomotor Apparatus that is edited in Czech Republic
 7. coxarthrosis (arthrosis in hips) – adults patients, new concept for rehabilitation, new prevention's methods. This preventive method was presented in many Meetings in many countries.
 8. gonarthrosis (arthrosis in knees) – adults patients, new rehabilitation, new prevention, preventive surgery (simple surgery) – fasciotomy of tracts ilio-tibialis
 9. hallux valgus and other foot insufficiency - adults patients, new rehabilitation, new prevention. Importance of “*toes flexion test*” (described in Beitrage zur Orthopädie / GDR).
 10. back pain – adults patients, new rehabilitation, new prevention = physiotherapy methods

He is author of 7 original orthopedic devices (apparatus).

Publications in medical literature

Author of 6 monographs, author or co-author of 453 papers + 11 manuscripts after 2009 (plenty in English and in German). In 2011 he published a monograph about aetiology of the so called idiopathic scoliosis and about new treatment and causal prophylaxis of this spine deformity (4th Edition).

Foreign languages

German (full active), English (full active), Italian (passive / active), French (passive / active), Russian (passive / active).

Last five years

In 2009 (30th September / 1st October 2009) he become the status Professor Emeritus in Medical University. In next years (till now) he is working as Professor Lecturer in Vincent Pol University / Lublin / Poland, on Faculty of Physiotherapy. All years he is active and took place in many Congresses and Symposia in Poland and aboard (Orthopaedic Congresses in Hungary, in Germany, in SOSORT, SICOT, Prague-Lublin-Sydney-St. Petersburg Symposia. Since 2009 till now he is Orthopaedic Surgeon Consultant in Military Hospital in Lublin.

In 2013 he had the series of lectures for German Students in April (one week) in University in Dresden and in December (one week) in University in Indstein /north of Frankfurt / Main (in program of ERASMUS).

Family of Professor Karski

Wife – Jolanta Wójcikowska-Karska MD – ophthalmologist.

Son – Jacek Karski MD PhD – orthopedic surgeon.

Daughter – Catherine Karska MA – English language lecturer.

Five grand – daughters and sons: one grand-daughter – Claudia Karska is since 2010 – doctor of medicine.

At the occasion of the 75th anniversary of Professor Tomasz Karski, MD, PhD I sincerely wish him by the name of the Society for Connective Tissues Czech Medical Association J.E.Purkynje good health, personal fulfilment in his large family and further success during education of next professional generation.

PROFESSIONAL CURRICULUM VITAE OF PROFESSOR MIKHAIL GEORGIYEVICH DUDIN, MD, PHD, DSc



Professor Mikhail Georgiyevich Dudin, MD, PhD, DSc (right) and Associate Professor Ivo Marik, MD, PhD

He was born on October 21, 1949.

- 1972 – graduated with honors from the Leningrad Pediatric Medical Institute (now – St.-Petersburg).
- 1972–1974 – specialization (residency) in pediatric orthopedics and traumatology in the Leningrad Research Institute of Children's health G.I.Turnera to obtain the status of a specialist orthopedic surgeon.
- 1974–1984 – the practical work in the clinic Leningrad Recovery Center of Pediatric Orthopedics and Traumatology „Spark“.

-
- In 1982 he defended his candidate (PhD) thesis on „idiopathic scoliosis with atypical pathological vertebral rotation: diagnosis, course, treatment policy,“ which describes a special type of scoliosis with a benign course.
 - 1984–1986 – consultant orthopedic surgeon specialist in child orthopedics and traumatology at the Lenin hospital in the city of Holguin, the Republic of Cuba.

After 16 years of working as an orthopedic surgeon, after gaining experience and reflection on the results of this activity, the most natural way formed a conclusion: in a long line of treated patients many patients could not be handle! But this was not enough for three conditions:

First – it is knowledge of the etiology and pathogenesis of diseases (pediatric orthopedics such information remains a big „white spot“!).

Second – it is reliable early diagnosis and prediction of the development of children's lesions of the musculoskeletal system is reliable (in most cases, the solution of this problem is determined by the subjective experience of the individual physician and rarely has an objective basis).

Third – there is the lack of available orthopedic doctors, medical management technologies, vital functions of all parts of the musculoskeletal system (bones and connective tissues, as well as neuro-muscular complex).

Absence of these condition solutions fully determines the actual position of children's orthopedist – wait until the indications for surgical intervention will develop. And during this waiting all activities are reduced to kinesotherapy, rehabilitation, massage, often combined the term „rehabilitation“.

Based on this idea a new concept of pediatric orthopedics was conceived – it has to be a conservative. It should be emphasized that we are talking about a conservative orthopedics, not about rehabilitation. By the way, rehabilitation (Fr. rehabilitation from Lat. Re re + habilis comfortable fit) is to restore the lost health and the term answers all medical specialties and areas, from classical therapy before requiring complicated equipment surgical transplantation.

To implement the same ideas of conservative orthopedics was necessary to address a number of challenges. That is why the transition was made to work in an institution where they could begin the development of a fundamentally new direction in the ideology of pediatric orthopedics.

- 1986–1996 – researcher at the Leningrad Research Institute of Children's health. G.I.Turnera.

Based on the analysis of world literature in the spotlight hit the control system of the body in the first place – the endocrine and nervous. Invaluable experience in the study of these systems in children in the population and in various lesions of the musculoskeletal system was obtained when operating in that region of Russia, which has suffered as a result of the accident at the Chernobyl nuclear power plant. „Happy“ was the appointment of an accident M.G.Dudina to head the „orthopedic fragment“ of the state program „Children of Chernobyl“ (1989–1996 years).

Prior research group posed the question: „How has reacted musculoskeletal system in the pediatric population of that region on the factors associated with the accident? With the general

expectation that the main damaging factor is ionizing radiation from radioactive contamination, the main conclusion was obtained – most influenced by interference with metabolic processes such as unstable isotopes of iodine (I129 – I131), and an excess of stable I127, is widely used as a protector of the thyroid cancer.

For complete information, you can see that fellow psychologists established a series of reactions in the central nervous system.

This new experience and focused study osteotropic hormonal (growth hormone, cortisol, calcitonin, parathyrin) in children with the most common and defeat the mysterious skeleton – idiopathic scoliosis – allowed to see the pathogenetic role of these hormones. In addition, the obtained data showed the material basis of the most indisputable fact in the theory and practice of scoliosis – a direct dependence of the development of pathological three-plane deformation of the spinal column to the process of growth of the child.

- In 1993 he defended his doctoral (SciD) thesis entitled „Features of the hormonal regulation of metabolism in bone tissue as ethiopathogenetic factor of idiopathic scoliosis.“ Its main provisions were presented at the World Congress SICOT / SIROT in Amsterdam in 1996, and in 1999, this work has received the first prize of the European GICD (Jean Dubouset) for new developments in the diagnosis and treatment of AIS in children and adolescents.
- For the practical implementation of the findings obtained in the thesis needed transition to a practitioner clinic.
- From 1996 to the present – Director of the St. Petersburg Recovery Center of Pediatric Orthopedics and Traumatology „Spark“.
- Since 1997 – Professor, Department of Pediatric Orthopedics and Traumatology of the St. Petersburg Medical University, graduate education, and since 2001 – the title Professor.

After moving to the Recovery Center M.G.Dudin began to form a diagnostic service and currently available medical clinic has all the necessary work required for instrumental park: X-ray, ultrasound, computed topography, and stabilometry / stabilography, EMG, EEG (including 3DLocEEG), ECG (including monitoring by NJHolter), spiro-analyser, immunoassay analyser, thermal complex.

As a result of the objective diagnostic data from the Centre specialists he has the opportunity to see the prognostic criteria and the „target“ for the impact factor (electric and magnetic fields with different characteristics, light and laser therapy, ultrasound, biologically active application, etc.) in the pathogenesis of a number of lesions of the musculoskeletal system. Using the experience of the world of pediatric orthopedics, the experience of other medical specialties, as well as fundamental research biophysicists, neurophysiologists, endocrinologists and other colleagues in the biological sciences, podiatrists have an arsenal of techniques to effectively influence the normal and pathological processes in the musculoskeletal system. Today, no one is surprised not only the „stop“ progressive scoliosis, but also a significant, sustained decrease in its clinical symptoms.

Today is no surprise correction of 1–2-centimeter-different-sized legs. Today, no one is surprised remission in the treatment of arthritis.

-
- In 2005 M. G. Dudin received the honorary title „Honored Doctor of Russia“, and in 2009 the team of the Centre was awarded A.N. Kosygin Prize (for new technology and innovation in pediatric orthopedics).

Today St. Petersburg Recovery Center pediatric orthopedics and traumatology is a leading institution in the country in which the main idea is already being implemented – pediatric orthopedics should be conservative and the guarantee of its success in practice proved timely diagnosis and early treatment.

Professor M. Dudin is author of over 200 papers in medical journals in Russia and abroad, wrote 3 monographs (in 2009, 2011 and 2013), which present the main results of his research activities.

He has supervised 15 master's and one doctoral thesis. With every reason to conclude that Russia has formed a whole new direction – children's conservative orthopedics.

Professor M. Dudin with the team of Children's Rehabilitation Centre of Orthopedics and Traumatology "Ogonyok" was the main organizer of THE 15th PRAGUE-LUBLIN-SYDNEY SYMPOSIUM that was held with success in St. Petersburg, Russia in September 15–22, 2013.

At this opportunity he was rewarded with the Honorary medal of the Czech Medical Association J.E. Purkyně and honorary membership of the Society for Connective Tissues CMA J.E. Purkyně.

At the occasion of the 65th anniversary of Professor Mikhail Georgiyevich Dudin, PhD, DScM I sincerely wish him by the name of the Society for Connective Tissues Czech Medical Association J.E.Purkyně good health, personal fulfilment and further scientific success as well as success during education of next professional generation.



Ortopedická protetika Praha s.r.o.

Výrobce individuálních ortopedicko-protetických pomůcek

zajišťuje:

- Lékařské vyšetření pacienta a předpis pomůcky
- Zhotovení všech individuálních ortopedických pomůcek (protézy HK a DK, končetinové a trupové ortézy, měkké bandáže, ortopedickou obuv, ortopedické vložky apod.

provozní doba:

po 7.30-17.00; út-čt 7.30-16.00; pá 7.30-15.00

Ortopedická Protetika Praha s.r.o., Kloknerova 1/1245, 148 00 Praha 4
tel.: 272 932 241-6, l. 131, tel./fax: 272 937 386

e-mail: ortopedickaprotetika.praha@seznam.cz, www.protetikapraha.cz

Metro C stanice Chodov, dále autobus č. 136 stanice Dědinova – budova MEDICENTRUM

Partner všech zdravotních pojišťoven v ČR



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

Originální český kolagenní doplněk stravy **GELADRINK®** byl vyvinut na základě výzkumu revmatologa a spoluzakladatele společnosti Orling s.r.o. prof. MUDr. Milana ADAMA, DrSc., člena Akademie věd v New Yorku, oceněného prestižní cenou UNESCO za celoživotní přínos lékařské vědě.

doplněk stravy



DOPORUČUJÍ
odborné společnosti



22 let existence na trhu!

GELADRINK® obsahuje:

- + kolagenní peptidy GELITA®**
kolagenní bílkovina přispívá k udržování normálních kostí
- + vitamín C**
přispívá k normální formaci kolagenu pro normální funkci kostí a chrupavek
- + glukosamin a chondroitin sulfáty**
jsou součástí kloubní chrupavky
- + antioxidanty, MSM a další látky**
s příznivými nutričními a fyziologickými účinky doplňujícími běžnou stravu a vyživující kosti, chrupavky, klouby a pojivové tkáně

BEZPLATNÁ LINKA - 800 108 999 - WWW.ORLING.CZ

Zdravá a vyvážená strava a zdravý životní styl jsou nezbytné. Doporučená denní dávka 12 kapslí nebo jedna odměrka. Užívejte 3 měsíce. Není určeno pro děti do 12 let, těhotné a kojící ženy. Doporučenou denní dávku nepřekračujte.