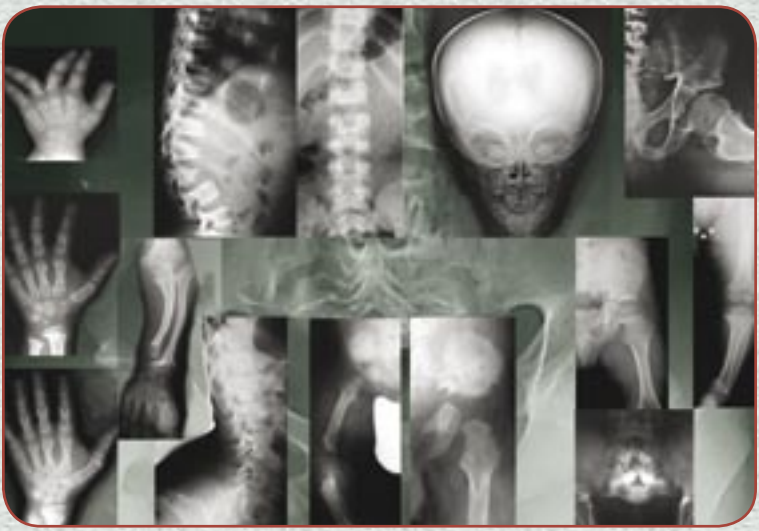
Pohybové ústrojí

Pokroky ve výzkumu, diagnostice a terapii



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Ambulantní centrum pro vady pohybového aparátu
Katedra antropologie a genetiky člověka PřF UK v Praze
Odborná společnost ortopedicko-protetická ČLS J. E. Purkyně

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LOCOMOTOR SYSTEM
Advances in Research, Diagnostics and Therapy

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Pokroky ve výzkumu, diagnostice a terapii

LOCOMOTOR SYSTEM 13, 2006, No. 3+4

Advances in Research, Diagnostics and Therapy

OBSAH

CONTENT

OBRÁZEK NA TITULNÍ STRANĚ ČASOPISU DEMONSTRUJE

Obrázek na titulní straně časopisu demonstruje charakteristické RTG příznaky **Achondroplazie (Achp)**: Lebka je velká s vypouklým čelem, baze lební krátká, foramen magnum zúžené. Lopaty kyčelních kostí jsou malé, zakulacené, někdy čtverhranné („uši slona"), acetabula jsou horizontální plochá, sakroischiadické zářezy jsou krátké a úzké. Dlouhé kosti jsou zkrácené, masivní, prominují svalové úpony. Epifyzární osifikace je opožděná, růstové epifýzy kolenních kloubů mají zářezy ve tvaru „V". Metafýzy jsou rozšířené nepravidelně ohraničené, krčky femurů jsou krátké. U kojenců se prokazuje oválné projasnění v proximálních metafýzách femurů a humerů. Obratlová těla jsou krátká a plochá, na bederní páteři se kaudálním směrem zmenšuje (zužuje) interpedikulární vzdálenost, pedikly jsou krátké, kanál páteřní úzký. Žebra jsou krátká s konkávními ventrálními konci.

Na obrázku jsou vyobrazeny **typické radiografické dysplastické změny** pozorované **na lebce, ruce, páteři, bérci, pánvi a kyčlích** u pacientů s Achp v různém věku, kteří jsou sledováni a léčeni v Ambulantním centru pro vady pohybového aparátu v Praze.

Lebka

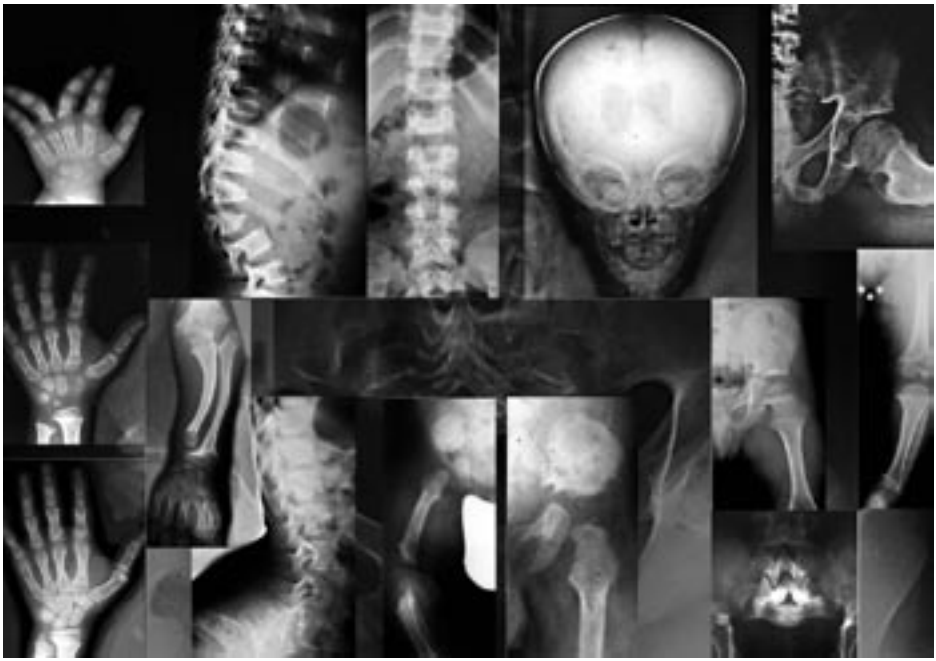
Lebka v AP projekci u 18 měsíčního batolete ukazuje rozšíření postranních komor, makrocefalii, způsobenou komunikujícím hydrocefalem, jež je následkem zvýšeného intrakraniálního venosního tlaku. Nekomunikující hydrocefalus vzniká při stenóze aquaeductus mesencephali. (V těchto případech je nutné včasné *neurochirurgické léčení* – ventrikuloperitoneální drenáž, i když logičtější je chirurgický výkon uvolňující venózní tlak).

Ruka

Krátké široké a konické články prstů zvláště proximální a střední falangy. Nalevo obrázku jsou pod sebou RTG levé ruky ve věku 4 roky – ruka ve tvaru vidličky či trojzubce (3. a 4. prst nelze ani pasivně zcela přiblížit), 12 a 15 let (tubulární kosti ruky jsou krátké a široké). Na RTG snímku předloktí ve věku 12 let je subluxace hlavičky radia, což omezuje extenzi v loketním kloubu (flekční kontraktura 45°), diafýzy obou kostí předloktí jsou prohnuty radiálně, krátký distální konec ulny je příčinou Madelungovy deformity ruky a instability zápěstí. Distální konce radia a ulny jsou nálevkovitě rozšířeny.

Páteř

V bočné projekci na snímku nahoře (4 roky) zobrazuje výraznou dorsolumbální kyfózu způsobenou klínovitým tvarem obratlových těl L1 a Th12. Na snímku dole (5 let) je abnormální hyperlordóza LS krajiny, sakrum je zakřiveno dorsoproximálně. Na obou snímcích se prokazuje předozadní zkrácení pediklů. V AP projekci LS páteře není sacrum zobrazeno (RTG snímek na obrázku vpravo dole). Na snímku Th-L a L páteře v AP projekci (6 let) je nápadné zužování interpedikulární vzdálenosti kaudálním směrem.



Kyčle a pánev

U kojenců a batolat je pánev nízká a široká, kyčelní kosti mírně hranaté (kvadratické), křížové zářezy jsou úzké.Uprostřed dole na obrázku vlevo je RTG pravé dolní končetiny ve věku 3 měsíce, vpravo L polovina pánve a proximální femur v 1 roce. Vpravo obrázku je zobrazena levá polovina pánve a proximální femur ve věku 2 roky, vpravo nahoře levá kyčel v axiální projekci ve věku 14 let – krátký široký krček je valgosní a v anteversi.

Vpravo obrázku uprostřed je levá dolní končetina v AP projekci (7 let), varosní zakřivení kolena, bérce a hlezenního kloubu je projevem rychleji rostoucího distálního konce fibuly.

Achp je nejčastěji se vyskytující kostní dysplazií, vyznačující se krátkou disproporcionální postavou, relativně dlouhým trupem a krátkými končetinami. Současné epidemiologické studie uvádějí incidenci achondroplazie 3 : 100 000 živě narozených dětí (1 : 26 000–1 : 15 000). Odhaduje se, že achondroplazie tvoří asi 80 % z celkového počtu velmi vzácně se vyskytujících kostních dysplazií.

Dědičnost

Dědičnost je autosomálně dominantní (AD), v 80–90 % vzniká jako spontánní nová mutace (vyšší věk otců – nad 37 let) na krátkém raménku 4. chromozómu (v oblasti 4p16.3).

Etiopatogeneze: Více než 99 % případů vzniká bodovými mutacemi (G–A nebo G–C) v nukleotidu 1138 v transmembránové doméně genu pro receptor 3 fibroblastů, vážící růstový faktor (FGFR-3 – fibroblast growth factor receptor 3). Výsledkem obou těchto mutací je substituce glycinu argininem v codonu 380. FGFR-3 se uplatňuje při vývoji chrupavky a v CNS. Detekce běžných mutací 1138G-A nebo 1138G-C jsou přímé a snadno proveditelné. Detekce mutací FGFR-3 byla v ČR zavedena v *prenatální diagnostice* již před více než 10 lety.

Klinická symptomatologie

Typická facies s vpáčeným kořenem nosu, makrocefalie s vypouklým čelem, porodní délka kolem 47 cm, porodní hmotnost se neliší od průměru. Kojenci jsou hypotoničtí a opožďují se v motorickém vývoji, chodit začínají až mezi 24. a 36. měsícem. Následkem hypotonie a kloubní hypermobility vzniká torakolumbální kyfóza, pánev je dopředu skloněná, prominují hýždě a břicho. Hrudník je plochý s malým objemem. Typické je disproporcionální rizomelické zkrácení horních a dolních končetin. Horní končetiny u novorozenců dosahují k pupku, u dospělých k tříslům.Výška dospělých je v rozmezí 106–142 cm (muži dosahují průměrné výšky 130 cm, ženy 123 cm). S růstem často progreduje varozita bérců. Trup roste na dolní hranici normy, zkrat dolních končetin bývá v dospělosti v rozmezí 25–40 cm. Průměrná hmotnost dospělých mužů je 55 kg, dospělých žen 46 kg, většina má sklon k obezitě. Inteligence bývá normální.

Pro kostní dysplazie obecně platí, že pro určení diagnózy je diagnosticky cenné hodnocení dysplastických změn epifýz, metafýz a obratlů na RTG snímcích zhotovených v období růstu. Dysplastické změny skeletu u pacientů s Achp jsou pro potvrzení diagnózy typické od narození do dospělosti (existují paleopatologické nálezy částí koster achondroplazie staré více než 5 000 let). U kojenců a batolat je RTG nález metafyzárních dysplastických změn podobný Hypochondroplazii, pro rozlišení je významný snímek kyčlí a pánve a bederní páteře v předozadní projekci.

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SROVNÁNÍ DIACHRONNÍHO NÁRŮSTU NÁLEZŮ ZHOUBNÝCH NÁDORŮ V EVROPĚ A STARÉM EGYPTĚ

COMPARISON OF DIACHRONIC INCREASE OF FINDS OF MALIGNANT TUMOURS IN EUROPE AND ANCIENT EGYPT

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ABSTRAKT

Poprvé v paleopatologii se pokoušíme o diachronní zpracování nálezů zhoubných nádorů v minulosti. Vycházíme přitom z naší dosud nejrozsáhlejší databáze 188 dostatečně dokumentovaných nálezů zhoubných nádorů Starého světa. Obsahuje případy nádorů 12 diagnóz, sdružených do 5 diagnostických skupin, které jsou analyzovány. Nálezy pocházejí z archeologických nalezišť v 26 zemích nebo oblastech, v nichž jsou zastoupeny značně nerovnoměrně. Diachronní růst počtu nálezů nádorů bylo možno zachytit u 113 spolehlivě datovaných případů z Evropy a 52 případů ze Starého Egypta a Núbie. Srovnání odhalilo mezi oběma oblastmi výrazné rozdíly. V Evropě se nálezy zhoubných nádorů vyskytovaly v pravěku vzácně, od počátku neolitu, a jejich počet stagnoval, zatímco po změně letopočtu začal prudce narůstat s kulminací ve vrcholném středověku. Naproti tomu v Egyptě je doložen výskyt nálezů nádorů na počátku tamní civilizace (kolem roku 3000 př.n.l.) s trendem mírného růstu s kulminací v Pozdní až Ptolemaiovské době. Po roce 1500 n.l. v Evropě a od změny letopočtu v Egyptě nastal pokles výskytu nalézaných nádorů v důsledku nedostatečného počtu zkoumaných pohřebišť.

Klíčová slova: paleopatologie, nálezy zhoubných nádorů, geografická distribuce, diachronní růst.

ABSTRACT

First time in palaeopathology, we attempt a diachronic elaboration of occurrence of malignant tumours in the past. We use our up till now largest database of 188 sufficiently documentated finds of malignant tumours from the Old World. It contains cases of tumours with 12 diagnoses joint into five diagnostic groups to be delt with in the analysis. The finds originate in archaeological sites of 26 countries or regions, in which they are represented unevenly. Diachronic growth of number of finds could be recorded in 113 well dated cases from Europe and 52 cases from Ancient Egypt and Nubia. The comparison revealed outstanding differences between these regions. In Europe finds of malignant tumours were rare in prehistoric times since Neolithic Period and their number stagnated. After beginning of our era it started to grow fast with a culmination in high Middle Ages. On the other hand, first finds of tumours occurred in Egypt at the beginnings of civilization (around 3000 years BC) with a trend of mild increase up to the peak in Late to Ptolemaic Periods. After 1500 AD in Europe, and with the beginning of our era in Egypt, a decrease of finds of tumours set in, caused by an insufficient number of investigated cemeteries.

Key words: palaeopathology, finds of malignant tumours, geographical distribution, diachronic growth.

ÚVOD

Během posledních 15 let jsme vytvořili databázi 188 dostatečně dokumentovaných případů zhoubných nádorů z 26 zemí Starého světa, z nichž pochází 116 z nalezišť v Evropě, 56 v Egyptě a 16 v Asii. Jde jednak o naše vlastní nálezy v archeologicky vykopaných antropologických sériích, jednak o výsledek screeningu nám dostupné literatury.[1] Poprvé v paleopatologii se v tomto sdělení pokoušíme o diachronní zpracování archeologických nálezů zhoubných nádorů, které v dalším označujeme stručně jako „nádory".

Jsme si vědomi, že náš pokus je obrazem současného stavu a dostupnosti materiálu, a že s dalšími výzkumy nálezů nádorů neustále přibývá, takže po uplynutí určité doby bude nutno analýzu opakovat s použitím většího počtu nálezů. Naši analýzu je třeba považovat za *první skicu*, jejíž kontury bude třeba opakovaně zpřesňovat.

MATERIÁL

Ze 188 nádorů jich 183 vzniklo jednak *z kosti či z její krvetvorné dřeně*, jednak z měkkých tkání, přičemž svým *invazivním růstem kost charakteristicky rozrušily.* Zbývajích pět nádorů (2 z Evropy a 3 z Egypta) bylo odhaleno v *měkkých tkáních mumií* a pro jejich odlišný charakter nebyly do této analýzy zařazeny. V literatuře jsme zachytili kolem 60 dalších nálezů, které jsou nedostatečně dokumentovány nebo mají spornou diagnózu. Nelze je dohledat a revidovat, takže museli být zatím ze zpracování vyloučeny spolu se stovkou námi zachycených nálezů benigních nádorů (bez osteomů).

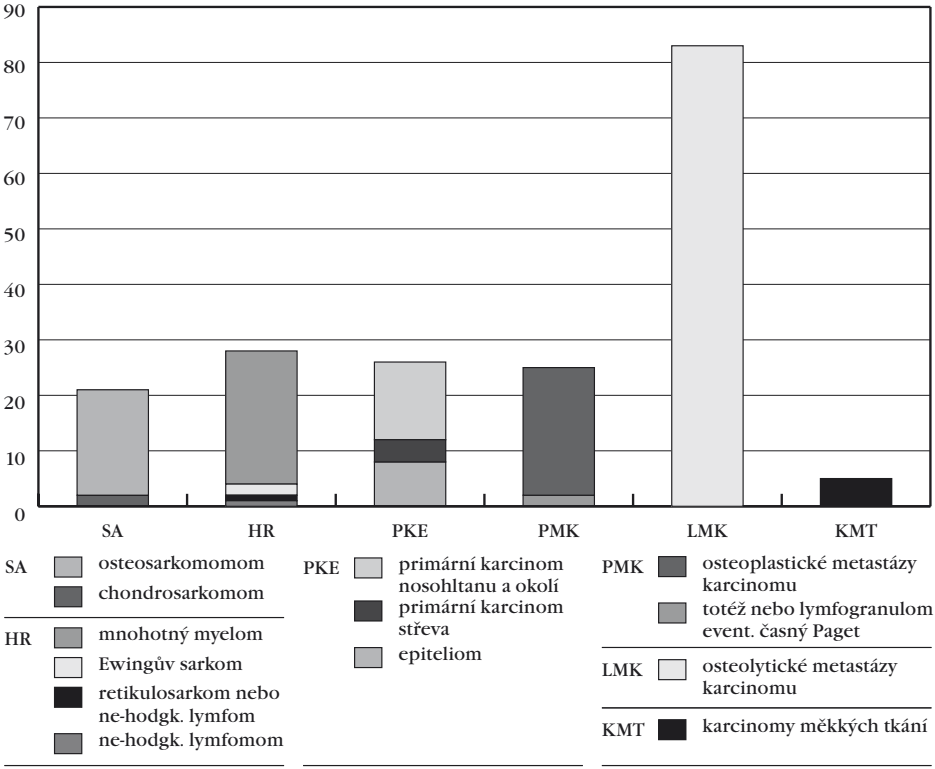
METODIKA

Vzhledem k odlišným fyzicko-geografickým a klimatickým podmínkám a zásadním rozdílům historického vývoje jsme sestavili sloupcové diagramy sledující *diachronní* (čili chronologický) *nárůst počtu nálezů nádorů* zvlášť pro Evropu (n = 113) a zvlášť pro starý Egypt a Núbii (n = 52). Po jednom nálezu z obou oblastí postrádá datování. Sloupcové diagramy konfrontujeme vzájemně jako celek i pokud jde o jejich jednotlivé diagnostické skupiny.

FREKVENCE DIAGNOSTICKÝCH SKUPIN

Do současné doby bylo ve shromážděném materiálu rozlišeno 12 *diagnóz zhoubných nádorů*, jejichž seznam uvádíme na **obr. 1.** K provedení analýzy jsme je spojili do 5 *diagnostických skupin* nádorů vznikajících z kosti či její dřeně nebo kost rozrušujících (**obr. 1**).

Pokud jde o jejich *frekvenci,* jsou v našem souboru Starého světa zastoupeny nej-



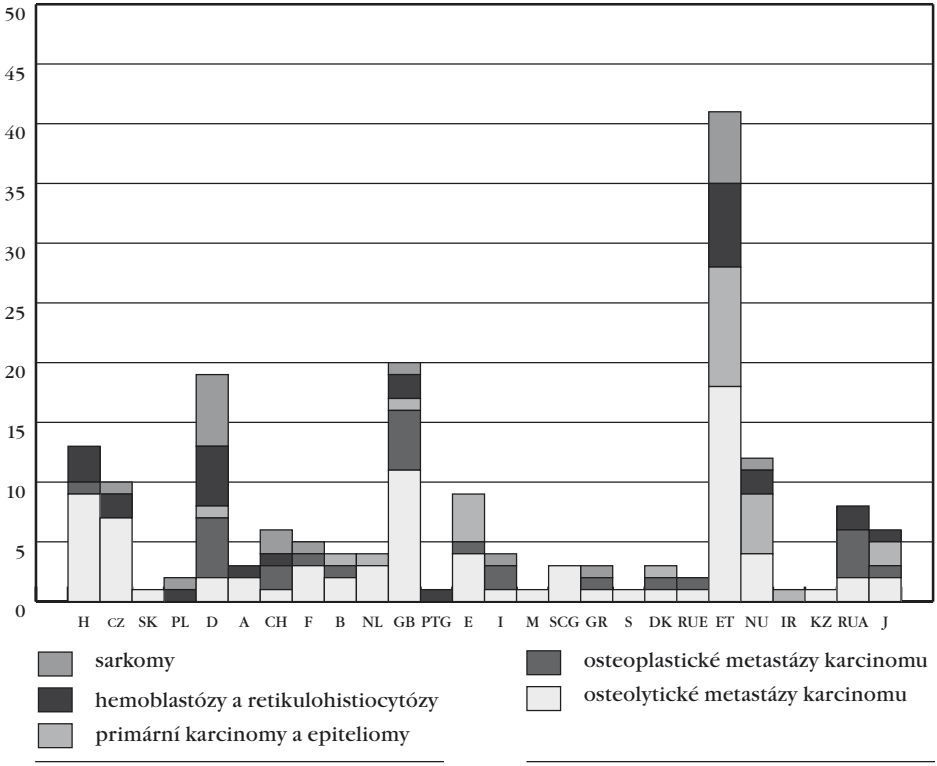
Obr. 1. Diagnostické skupiny a detailní diagnózy paleopatologických nálezů zhoubných nádorů Starého světa (n = 188). SA = sarkomy, HR = hemoblastózy a retikulohistiocytózy, PKE = primární karcinomy a maligní epiteliomy, PMK = osteoplastické metastázy karcinomu, LMK = osteolytické metastázy karcinomu, KMT = karcinomy měkkých tkání.

častěji lytické metastázy karcinomu (LMK, 83 případy; 45,4 %). Více než trojnásobně překračují relativně vyrovnanou frekvenci nálezů ostatních diagnostických skupin.

Z nich jsou nepatrně častější nádory myelogenního původu čili hemoblastózy (HR, 28 případů; 15,3 %). Skládají se z 24 mnohotných myelomů, dvou Ewingových sarkomů, jednoho retikulobuněčného sarkomu *nebo* ne-hodgkinského lymfomu a jednoho ne-hodgkinského lymfomu.

Podobné zastoupení mají dvě další skupiny. První je složená z 14 případů primárního karcinomu nosohltanu a okolí, 4 případů primárního karcinomu střeva a 8 případů maligního epiteliomu (PKE, 26 případů; 14,2 %).

Následují osteoplastické metastázy karcinomu (PMK, 25 případů; 13,7 %). U dvou z nich byla vyslovena alternativní diagnóza – jednak kostních změn u maligního



Obr. 2. Geografická distribuce nálezů kostních zhoubných nádorů ve Starém světě (n = 183).
H = Maďarsko, CZ = Česko, SK = Slovensko, PL = Polsko, D = Německo, A = Rakousko, CH = Švýcarsko, F = Francie, B = Belgie, NL = Nizozemí, GB = Velká Británie, PTG = Portugalsko, E = Španělsko, I = Itálie, M = Malta, SCG = Srbsko a Černá Hora, GR = Řecko, S = Švédsko, DK = Dánsko, RUE = evropská část Ruska, ET = Egypt, NU = egyptská a súdánská Núbie, IR = Irán, KZ = Kazachstán, RUA = asijská část Ruska, J = Japonsko.

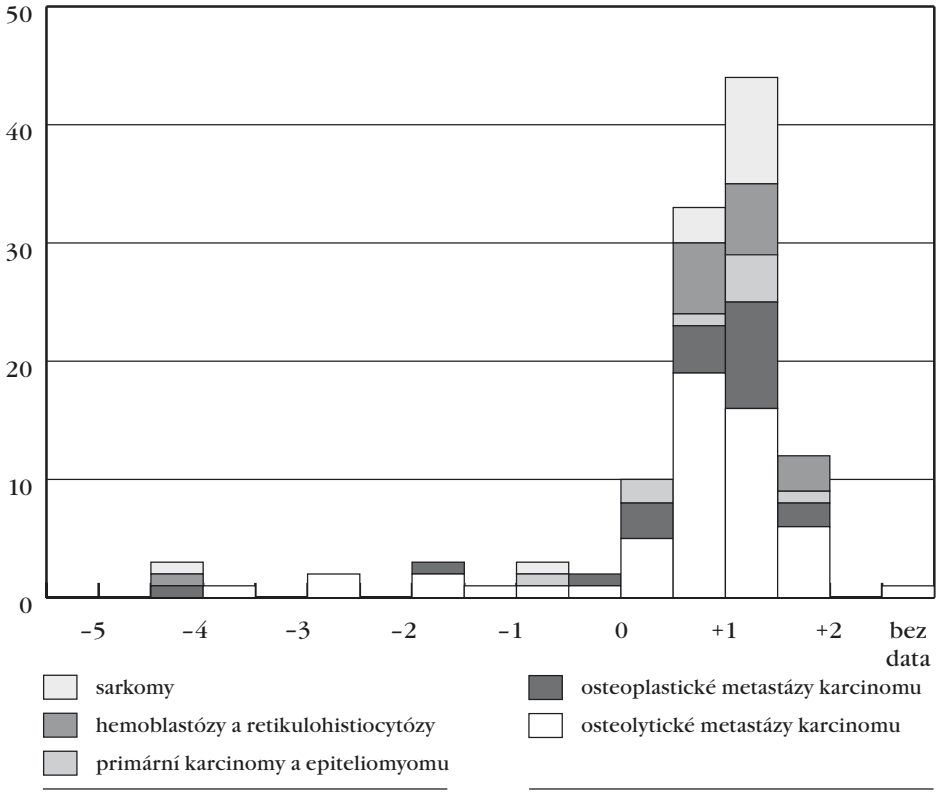
(Hodgkinova) lymfogranulomu, jednak časné Pagetovy choroby.

Poněkud méně bylo zjištěno nádorů pojivové tkáně (SA, 21; 11,5 %), z toho 19 osteosarkomů a 2 chondrosarkomy.

Nízký sloupec nálezů karcinomů měkkých tkání (5 případů; 2,7 % z celkového počtu 188 nálezů) obsahuje čtyři adenokarcinomy a jeden maligní epitheliom. Připočteme-li je k primárním karcinomům a epiteliomům rozrušujících kost, stane se tato skupina druhou nejčastější (31 případů; 16,5 % ze 188).

GEOGRAFICKÉ ROZLOŽENÍ NÁLEZŮ

Geografické rozložení nálezů maligních tumorů je zachyceno v 26 zemích či oblastech – 20 evropských, 2 afrických a 4 asijských (**obr. 2**).



Obr. 3. Diachronní růst počtu nálezů zhoubných nádorů v Evropě (n = 114). Časové úseky po 500 letech. Čísla označují tisíciletí, minusová před n.l., plusová n.l.

Největší podíl nálezů zhoubných nádorů připadá na starý Egypt (41), k němuž lze připočíst i dávnou Núbii, která přesahuje i do dnešního Súdánu (12), což společně zahrnuje 53 nálezy (29,0 %). Za nimi následují s velkým odstupem Velká Británie s 20 případy (10,9 %),[2] Německo s 19 případy (10,4 %), Maďarsko s 13 případy (7,1 %) a další země s menšími podíly, mezi nimi Česko s 10 případy (5,5 %) a Slovensko s jedním (0,5 %).[3] Stejné zastoupení jako Česko má obrovské Rusko, na diagramu rozdělené na evropskou (2) a asijskou část (8).

Geografické rozložení nálezů zhoubných nádorů nelze ovšem považovat za obraz frekvence skutečného výskytu nádorů v různých zemích Starého světa. Zjištěné podíly nálezů neodpovídají velikosti jednotlivých zemí, ani počtu jejich obyvatelstva. Odrážejí spíše intenzitu archeologických výzkumů pohřebišť v daných zemích, množství zpracovaného antropologického materiálu, který byl k dispozici pro vyhledávání případů nádorů, a aktivitu badatelů vybavených znalostmi morfologie kostních nádorů a zájmem o jejich studium v příslušných zemích.

DIACHRONNÍ NÁRŮST POČTU NÁLEZŮ NÁDORŮ V EVROPĚ

Na vodorovné ose použitých sloupkových diagramů je vyznačena časová stupnice s intervaly po 500 letech, na svislé ose počet zjištěných nálezů nádorů. Čísla označují zkratkou tisíciletí, minusová před n.l., plusová n.l.

Na *evropském diagramu* je patrný počátek výskytu nádorů v neolitu (od intervalu 4500–4000 př.n.l.). Současně pozorujeme nápadný nepoměr mezi nepatrným počtem nálezů nádorů v době před naším letopočtem, v období evropského pravěku (14; 12,4 %) ve srovnání s dobou po změně letopočtu (99; 87,6 % – **obr. 3**).

V jednotlivých pětisetletích pravěku se vyskytují jeden až tři nálezy, dvakrát žádný. Průměr činí pouhých 1,5 nálezu na pět set let. V této době není dosud patrný ani náznak diachronního nárůstu nálezů nádorů, což by mohlo být výrazem stálé a dosud velmi nízké hladiny kancerogenních vlivů. Všech pět diagnostických skupin je v této době již zastoupeno.

Změna je patrna v intervalu 0–500 let n.l., tj. v době císařského Říma a počátku byzantského období, kdy se počet nálezů nádorů statisticky významně zvedá na 10 případů (8,8 %). V dalším pětisetletí raného středověku pozorujeme ještě markantnější, vysoce významný vzestup na 33 případů (29,2 %). Nárůst vrcholí v intervalu 1000–1500 let, době vrcholného a pozdního středověku, 44 případy (38,9 %).

Místo logicky očekávaného pokračování vzestupného trendu pozorujeme v intervalu 1500–2000 let, období novověku, paradoxní pokles na pouhých 12 případů (10,6 %). Jde nepochybně o artefakt, vzniklý tím, že pohřebiště z této doby jsou archeologicky zkoumána vzácně, teprve odnedávna.

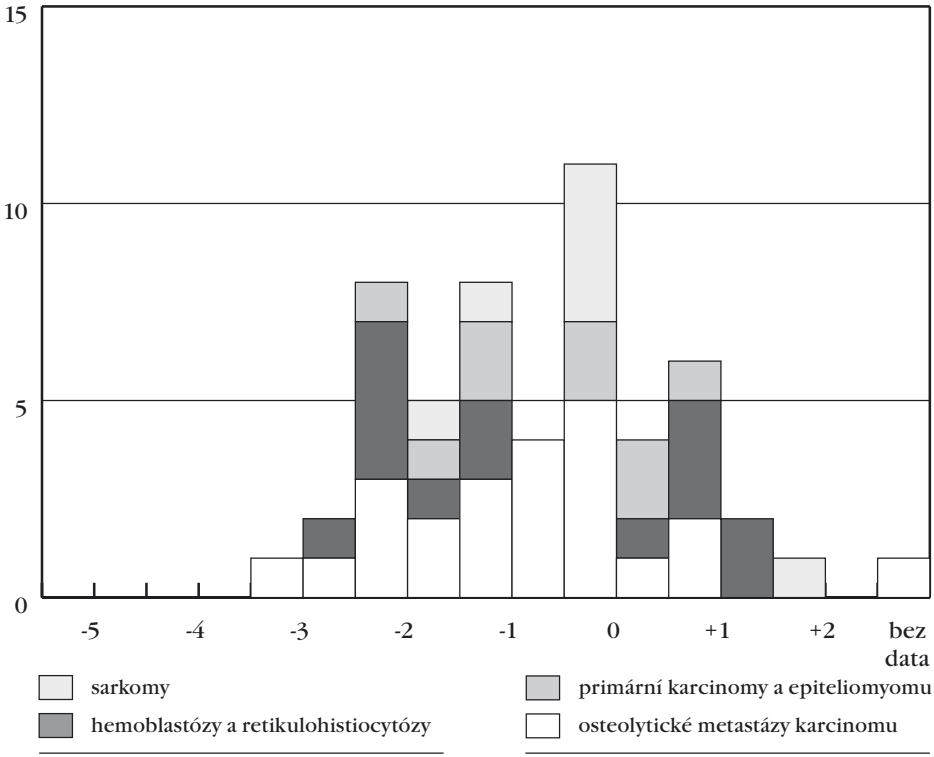
Z jednotlivých diagnostických skupin jsou v Evropě zastoupeny nejčastější osteolytické metastázy karcinomu (53; 46,9 %), které sledují celkový trend s výjimkou paradoxního poklesu za vrcholného středověku ve srovnání s raným. Následují osteoplastické metastázy karcinomu (21; 18,5 %), hemoblastózy a retikulohistiocytózy (16; 14,2 %), sarkomy (14; 12,4 %) a nejméně zastoupené primární karcinomy a maligní epiteliomy (9; 8,0 %).

Srovnáme-li uvedené frekvence diagnostických skupin s hodnotami celého souboru Starého světa (**obr. 1**), jeho evropská část se odlišuje větším zastoupením osteoplastických metastáz a menším podílem primárních karcinomů a epiteliomů. Frekvence ostatních tří skupin jsou podobné.

DIACHRONNÍ NÁRŮST POČTU NÁLEZŮ NÁDORŮ V EGYPTĚ A NÚBII

Diagram starého Egypta a Núbie má ve srovnání s evropským naprosto odlišný tvar (**obr. 4**). Od prvního ojedinělého výskytu v předdynastické době vzrůstá počet nálezů zhoubných nádorů zprvu prudce do intervalu 2500–2000 let př.n.l., kdy kulminoval civilizační rozvoj Staré říše, následovaný úpadkem 1. přechodného období (8; 15,4 %). Po poklesu v intervalu 2000–1500 let př.n.l., odpovídajícím Střední říši a 2 přechodnému období (5; 9.6 %), pozorujeme během Nové říše, mezi 1500–1000 lety př.n.l., opětný vzrůst počtu nálezů nádorů na úroveň Staré říše.

Následuje další pokles v rozmezí 1000–500 let př.n.l., tj. v 3. přechodném období a Sajské době (4; 7,7 %). Po nich počet nále-



Obr. 4. Diachronní růst počtu nálezů zhoubných nádorů ve starém Egyptě a Núbii (n = 53)
Časové úseky po 500 letech. Čísla označují tisíciletí, minusová před n.l., plusová n.l.

zů nádorů vrcholí mezi 500–0 lety př.n.l., tj. v Pozdním až Ptolemaiovském období (11; 21,2 %).

Po změně letopočtu, v římské a byzantské době, pozorujeme místo očekávanému nárůstu nálezů nádorů směrem k současnosti protichůdný trend jejich postupného ubývání. Je přerušen pouze mírným nárůstem v intervalu 500–1000 let n.l., v době křesťanské Núbie (6; 11,5 %). Diagram pak během 2. tisíciletí n.l. směřuje k minimu. Souvisí to s klesajícím počtem archeologických výzkumů křesťanských pohřebišť a striktním zákazem výkopů islámských hřbitovů.

Ve starém Egyptě a Núbii jsou zastoupeny nejčastěji osteolytické metastázy karcinomu (23, 43,4 %), následované primárními karcinomy a epiteliomy (14, 26,4 %), hemoblastózami a retikulohistiocytózami (9; 17,0 %) a sarkomy (7; 13,2 %).

Ve srovnání s diagnózami celého našeho souboru se v Egyptě a Núbii výrazně liší nápadně větší zastoupení nálezů primárních karcinomů a epiteliomů, které je téměř dvojnásobné než v celém souboru Starého světa (**obr. 1**) a současně více než trojnásobné ve srovnání s evropskou frekvencí (**obr. 3**). Souvisí to nejspíše s intenzivnějším vdechováním kouřových zplodin z otevřených ohnišť v této části světa.

Současně je signifikantní absolutní nepřítomnost nálezů osteoplastických metastáz karcinomu, která – navzdory egyptskému a zvláště núbijskému horkému klimatu – prozrazuje vzácnost karcinomu prostaty, pravděpodobně v důsledku krátké průměrné délky života (18–30 let).[4, 5]

ZÁVĚR

Závěrem lze konstatovat, že paleopatologické nálezy nezvratně dokazují existenci zhoubných nádorů, v Evropě od neolitu (4500–4000 let př.n.l.), v Egyptě od předdynastické doby.

(3500–3000 let př.n.l.). Jediný paleolitický nález z afrického Kanamu je diagnosticky nevyřešený a převažuje mínění, že spíše než o nádor jde o mohutný svalek po zhojené zlomenině.[6]

Ve faraonském Egyptě a Núbii se jeví diachronní růst počtu nálezů tumorů pomalý, vlnitý, s vrcholy v době největší prosperity (Stará Říše, Nová Říše, Pozdní a Ptolemaiovská doba). To lze pravděpodobně spojovat s růstem populace doprovázeném zvýšenými karcinogenními vlivy, zvláště ve městech. Naopak v Evropě během prehistorických kultur trvala nízká incidence nálezů nádorů bez jejich diachronického nárůstu.

Kontrast 75 % nálezů nádorů z jejich úhrnu v Egyptě a Núbii ve srovnání s pouhými 12,4 % z v Evropě v době před změnou letopočtu je přesvědčující. Zrcadlí zřejmě rozdíl mezi pomalým nárůstem karcinogenní zátěže v civilizaci starého Egypta ve srovnání s jejím nepatrným dopadem na život v pravěkých kulturách Evropy. Náhlý strmý nárůst počtu nálezů nádorů od změny letopočtu v Evropě jakoby chtěl dohnat pravěké zaostávání. Jeho přerušení poklesem v novověku by mohl vyplnit jedině rozvoj výzkumu tehdejších pohřebišť. Nebýt toho, nepochybně by vyústil v obecném trendu přibývání zhoubných nádorů, zrychlujícímu se v naší době.

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WEDGED VERTEBRAE EXPANDED TOWARDS SYMMETRY BY BRACE. TWO CLINICAL CASES

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SUMMARY

It is well documented that congenital scoliosis of patients suffering from defects of segmentation, like unilateral unsegmented bars, need early surgical treatment, as the deformity will malignantly progress. Other similar cases having defects of formation the same as hemivertebrae (nonincarcerated, semiincarcerated, or incarcerated) are receiving a variety of treatments shifting from observation to brace treatment or surgical intervention.

Aim of this report is to point out the fact that, in selected congenital scoliosis patients, there is beneficial effect of brace treatment in a way that the smaller side of blocks and wedged vertebrae can be expanded due to brace treatment. We have only seen a few similar cases published in the literature, signed by a former pupil of one of us.

Two patients with blocks and hemivertebrae are presented. The first case is a Greek boy 11 years of age when he initially attended the scoliosis clinic (born on 30 October 1985) with a L3 incarcerated hemivertebra, with Cobb angle L2–L4 of 10 °. Due to surface deformity and due to the anticipation of a possible progression of the scoliotic curve the boy was commenced conservative treatment with a modified Boston brace and he was followed up regularly clinically and radiographically. The long-term follow up revealed that the incarcerated hemivertebra was so normalized, that no further treatment is needed.

The second patient is a German girl, six years of age when initially presented, had an abnormal block, a congenital wedge vertebra Th5–6 and 23 ° of Cobb angle. She received a nearly typical Chêneau brace: After two, then four years, symmetry of the congenital wedge vertebra was almost attained.

We extend the discussion to a more general theme. Other kinds of vertebral deformations, idiopathic scoliosis and Scheuermann's disease often show wedge deformed vertebrae and can also be straightened by brace, although this fact seems to be generally not known.

Key words: congenital scoliosis, congenital wedge vertebra, incarcerated hemivertebra, bracing, modelling of vertebral bodies

INTRODUCTION

It is well documented that congenital scoliosis patients suffering defects of segmentation, like unilateral unsegmented bars, need early surgical treatment, as the deformity will malignantly progress. Other similar cases having defects of formation the same as hemivertebrae (nonincarcerated, semiincarcerated, or incarcerated) are receiving a variety of treatments shifting from observation to brace treatment or surgical intervention.

General principles of bracing

On every curve, brace should press on three points: The first pressure point, on apex, covers one third of the hump surface. The peripheral two thirds of the convex side have to be maintained far from the brace parts. That reduces the hump (**Figure 1,** dodging 1), and allows some movements around the apex (dodging 2 and 3). All dodges have an active correcting action. Two other pressure parts of the brace act on both extremities of the concave side, on apexes of neighbouring curves. Their pressed surface is tiny, some one fifth of the whole concave surface for each pressure part. No brace part should hinder dodging 1, 2 or 3. Their body areas have to remain free or far from the brace walls. Actually, nearly no one respects those rules, for several reasons, and we see all over the world nearly all braces embedded in concave pressures, in pressures on dodging areas. Here follow examples of rules and of good and bad pressure parts.

The normalization of the shape of bones is a goal of orthotic effect. The orthesis (brace) increases pressure on the convex side and releases the load on the concave one. That causes a quicker growth on the concave side and a growth slackening on the convex one. There are Delpech laws, well known for more than two centuries (the beginning of 19th). Later this law was described as Hütter-Volkmann law. It is valid for clubfoot, genu valgum/varum (6), for some hip diseases and for many other bony deformations in growth period. Why should the Delpech laws not be true for vertebral apophyses? But there are good braces necessary without iatrogenic action and without pressures on concave parts of the deformed body (concave pressures). Only with braces without concave pressures, as we show in this paper, the congenital deformations can be changed.

In discussion we consider a more general theme, not only congenital, but also idiopathic scolioses and Scheuermann's

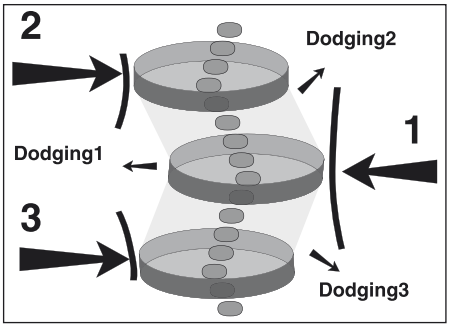


Figure 1. Hump should be pressed on $^1/_3$ of the surface of apex. The corresponding dodging 1 involves $^4/_5$ of the surface of the concave side of curve. The others pressure parts, 2 and 3, of the three points system, press each one on $^1/_5$ of the surface of the concave side. They are the apexes of the neighbouring curves. Dodging 2 and 3 allow movements straightening the curve an active way. Never hinder any of the three dodging areas, $^4/_5$ of concave side and $^1/_3$ over and under convex side.

disease kyphoscoliosis. In those cases, wedging is a main symptom.

Concerning congenital scoliosis

We only saw a single publication of two cases of congenital wedged vertebrae which had been made more symmetric by bracing (http://rahmouni.fehlbildungsskoliose). The brace maker had been an attendant at the lectures of one of us. Recently, the writer has heard in the Poznan congress of the SOSORT Society that braces should be contra-indicated in congenital scoliosis! This paper proves that this assertion is false, like many others.

CASE REPORTS

Case 1

A Greek boy was born on 30 October 1985. The mother is a physiotherapist and was concerned that her son boy had a mild scoliosis. They attended the scoliosis clinic for the first time when the boy was 11 years of age (winter of 1995) and the boy was commenced conservative treatment with a modified Boston Brace (**Fig. 4**) and he was followed up regularly clinically and radiographically. The radiography (**Fig. 2**) showed a congenital scoliosis with an incarcerated L3 hemivertebra (failure of formation and segmentation) with Cobb angle L3–L4 of 21 degrees. The vertebral index according to Cheneau (**1, 2**) was 36, which means very great wedging. Index is calculated: higher vertical side of vertebral body minus shorter side divided by breadth of vertebral body multiplied by 100. This index is quite independent on the size of the picture. Weaning of bracing was started on April 2000 when the boy was 178 cm tall and the body weight was 50 Kg and finished at the end of the next year when the boy was almost 17 years of age. It means that the boy was treated 6 years by Boston brace (**3, Fig. 4**). The radiograph showing definitive result (**Fig. 3**) was made in 2003, when Cobb's angle was 9° and vertebral index 23. The last

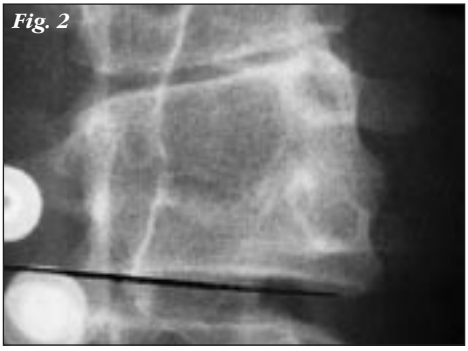


Fig. 2. Boy, 11 years old, 1995. The third lumbar vertebra has two pedicles at its right side.We call this vertebra 3_3'.

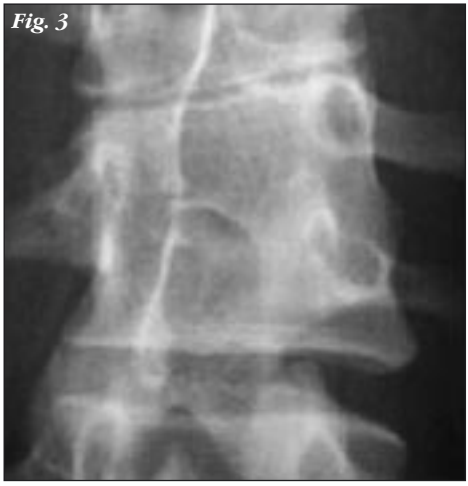


Fig. 3. 2003. The smaller side of 3_3' has grown relatively more than the larger one.

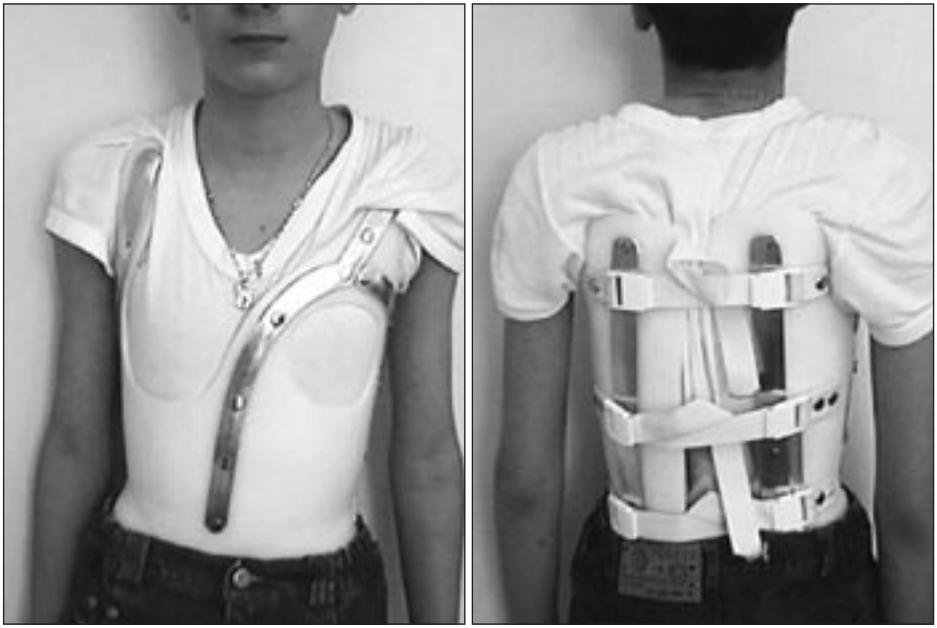


Fig. 4. Modified boston brace

radiographic follow up was on 26 April 2006 when the patient was 20 years of age, showing no change since 2003. The compliance to the brace treatment was good according to the mother's report. Status of patient in 2003 is shown in **figure 5.**

Case 2

Six years old German girl was examined for the 1st time in 2001. Family anamnesis and proband´s personal anamnesis did not prove any abnormalities and malformations of locomotor apparatus. Her mother has noticed a scoliosis of her daughter at the age of six. The spine deformations are clearly visible although the girl stands without any overhang (scoliosis is not decompensated). Radiographs (**Fig. 7 and 8**) show a tiny wedge consisting in a right pedicle of Th6 surrounded by a thin layer of bone. The non homogenous block Th5–6 is wedged with angle 26°. The vertebral index was 38.8 showing a very important wedging.

The lower part of the upper vertebra on its right side was strongly notched, the upper part of the lower vertebra was less notched. NMR views showed a kind of horizontal bi-lobulation of this atypical block Th5-6 (**Fig. 7 and 8**).

On another level of the spine, the fifth lumbar vertebra was asymmetric, its left side being higher, causing a scoliotic curve of 24° L1–L5.

Two, then two more years later, in region Th5-6, the smaller side has grown much more than the right one. The wedge

is less individualized. The angle Th5-6 has now only 10°. The vertebral index is now 10.4–8.4: 10.8 x 100 = 10 (index of a relatively minor wedging) (**Fig. 6**).

In the lumbar region, symmetry is nearly complete, and can hardly be calculated. We are now waiting for the end of adolescence before we can judge if corrective remodelling is achieved.

DISCUSSION

The brace has acted according to the laws of Delpech: Charging one side of a growing joint and discharging the other one brings on a greater growth on the discharged and a slower growth, even a growth stop, on the overcharged side. What seemed to be unknown up to our times is that the laws of Delpech concern wedged vertebrae, too, and that an abnormal bone piece reacts according to

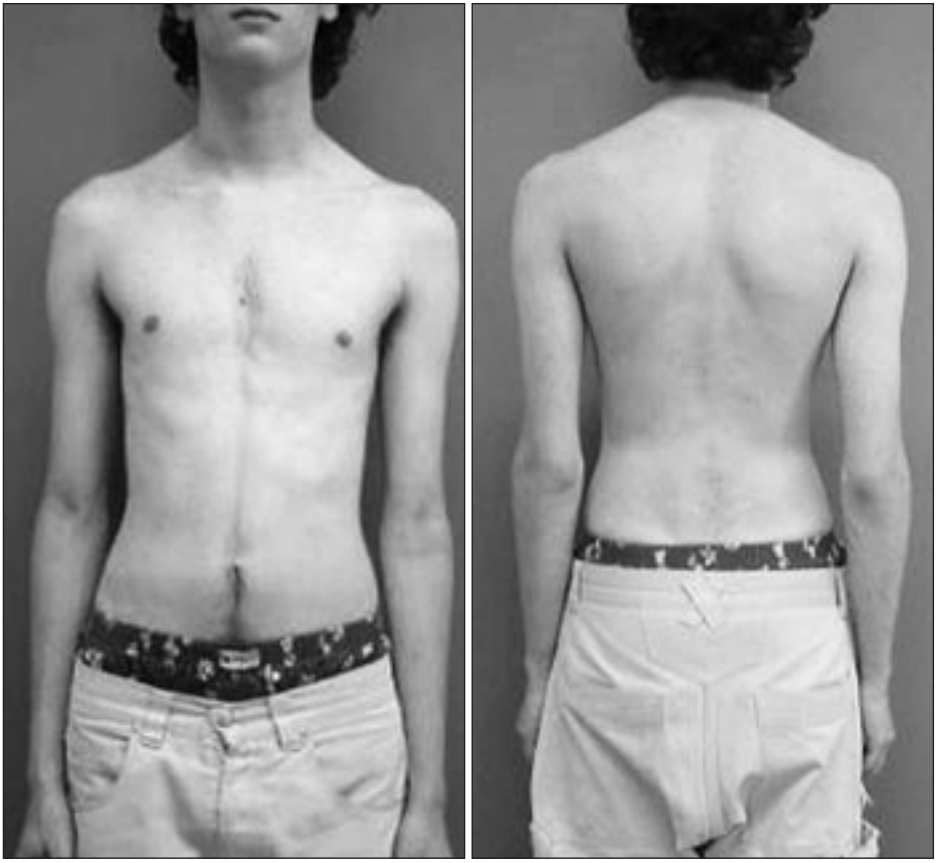


Fig. 5. Clinical appearance at 2/7/2003

Delpech's laws much more electively than a neighbouring normal bone. As a result, the congenital wedged vertebrae became nearly symmetric. Other cases are being treated by brace at present time and we expect a longer delay before publishing them. This strategy therefore can reduce the rate of surgical cases. We think that a brace should be given in selected congenital scoliosis patients, too.

Both presented cases are congenital, with incarcerated wedges. In the 2nd case

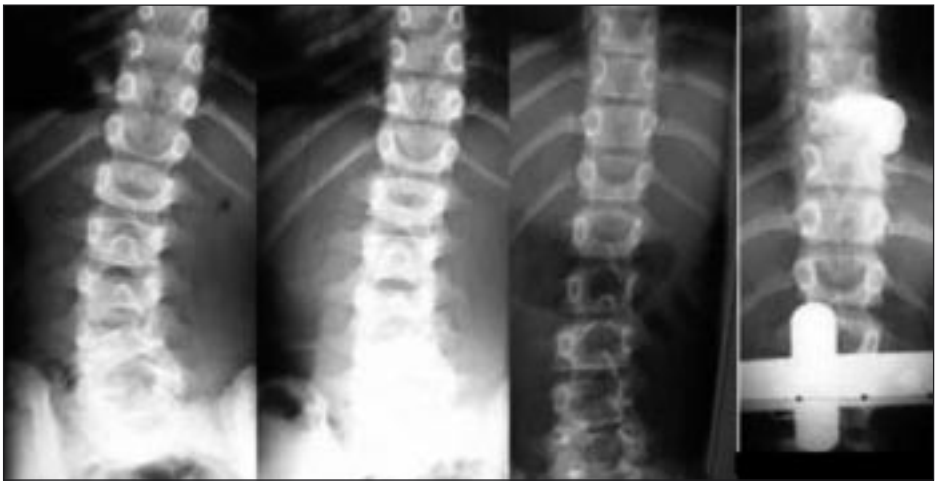
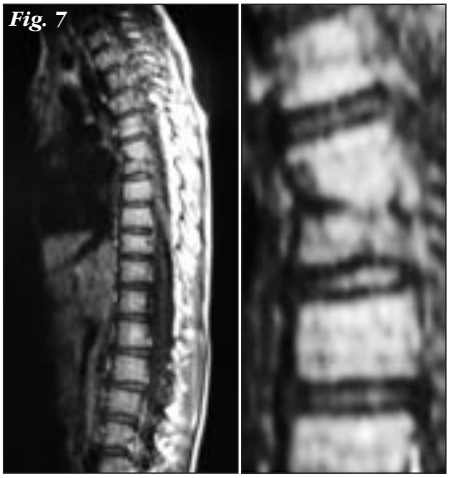


Fig. 6. Left, 6 years old girl, block Th5–6 Cobb 24 °. L5 is wedged a reverse side, greater side left. Right, 2005, Cobb 10 °. At level of L5, it is not possible to measure an angle, near 0.



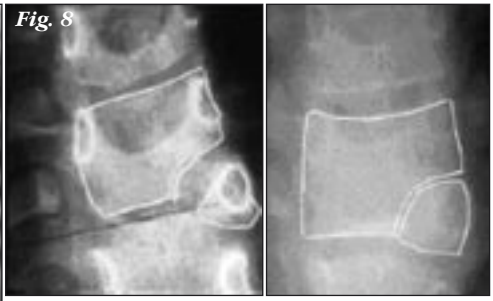


Fig. 7. NMR profile. Block Th5–6 atypical and bi-lobulated.

Fig. 8. Details of the block T5–6, the smaller side of which having grown almost to symmetry. Left, 2001, Wedge coefficient 38.9. Right: 2005, coefficient 10.

of the girl, a surgical excision of the wedge was planned before beginning of bracing.

One team (Cheneau, Engels and Bennani) is now treating similar 2 cases. There is necessary to wait a certain time before these cases will be possible to publish. The team intends to publish these cases without respect whatever the result can be, good or bad. We think that a brace should be given in selected congenital scoliosis patients. This strategy therefore can reduce the rate of surgical cases.

Concerning idiopathic scoliosis

In idiopathic scoliosis (**1, 2**), we have studied and measured the wedging of short time results in a small series. The comparison of indexes of the series shows a normalization of more than 60 % after one or two years of bracing. No case of this series had carried braces with concave pressures. Measuring a wedge before and after treatment is a little untrue because wedging is often accompanied with rotation, and un-wedging with derotation. A true measurement should compare apexes with the same views, independent of the rotation. We did not make such an essay in order not to submit the patients to X-ray irradiation. But Kotwicki (**4, Fig. 9**) has derotated by hand a scoliotic curve, and measured the wedge index of the apex of a scoliotic patient, once with apex rotated and a second time with apex derotated. They are a little different, but wedging can be seen even in

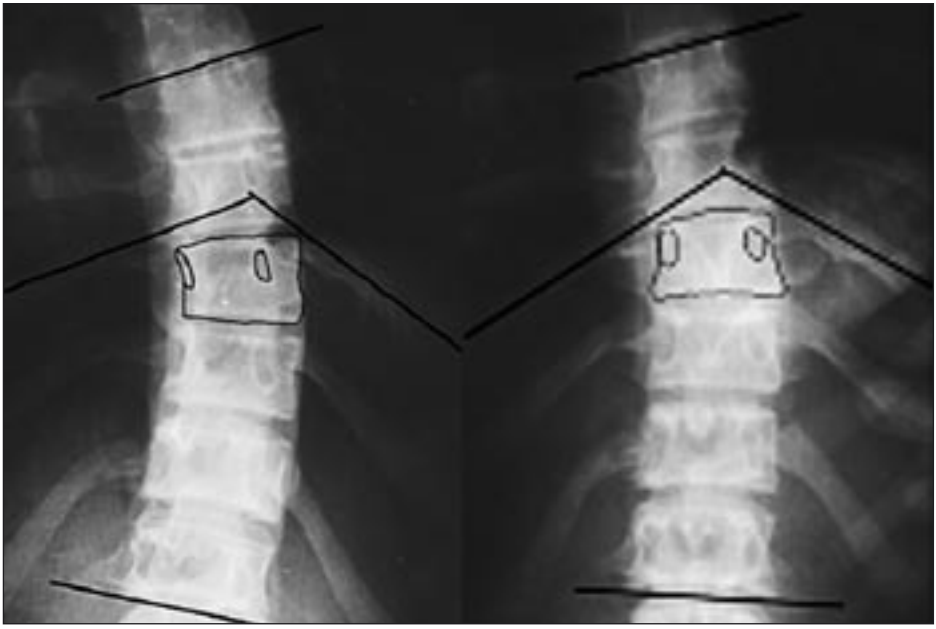


Fig. 9. Wedged vertebra, derotated with hand - manually (Dr. Kotwicki). Wedging can be seen also in the derotated spine, and its size is just a little different from the previous view. Both radiographs have been made a couple of seconds from one to another.

Fig. 5. Clinical appearance at 2/7/2003

the derotated view. We never have found a single publication which took wedging in account.

The problem of rotation is not present in one of two cases we showed here (the girl) because the apex of vertebrae was not rotated, as it generally is in congenital scoliosis

Concerning Scheuermann's disease

1. How to brace a Scheuermann patient

Figure 10 shows a Rumanian patient with Scheuermann's disease. Her thoracic kyphosis will be worsened if the pressure part has the shape shown left. The place of the pressure part, on the thoracic apex of convex side, is right. But her pressure part presses also over and under this apex. Correction, active correcting movements and growth are hindered. The upper part of the pressure forms a "reverse moulding". The patient should suffer a discomfort, and her trunk should be crushed. **Figure 10,** right, there are correction and growth not hindered, and there is comfort. So has the patient been braced by us.

Figure 11 is a diagram drawn around a lumbar scanner. The team aims at correcting a lumbar hyperlordosis. A and B show an "enveloping brace part". Correction can be relatively good, but belly is crushed and the patient suffers discomfort. C and D show that strong lines of brace run

Fig. 10. Left, thoracic pressure as we see it all over the world. Its highest and lowest parts are a "reverse moulding". Upper and lower part of pressure press on concave zones. That hinders altogether correction, corrective movements and growth. It crushes, but just maintains the rounded shape of the thoracic spine. Right, so must be the pressure. The upper and lower parts of the pressure are diverging away from the skin. So are managed expansion possibilities for growth and correction. Unfortunately, all teaching pictures we see are as shown left.

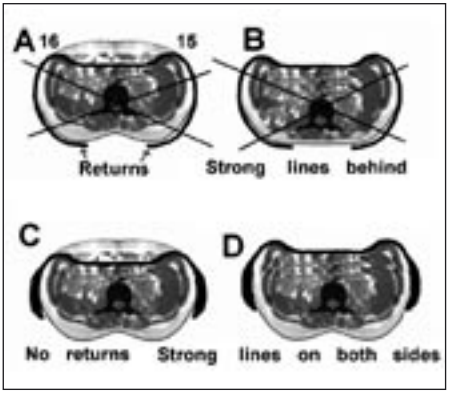


Fig. 11. Way of bracing a Scheuermann's patient in his lumbar region. Diagram made from a Scanner at the level of L3. A. B. There are, behind, two parts of the brace which press on concave region of the body. Strong lines of brace are around the body, and also behind. B. There is a certain wished correction of hyperlordosis, but also a crush of the abdominal tissues. C. No brace parts presses on concave part of body. The strong lines of the brace are on both sides. D. There is a good correction without crush.

vertically on both sides of the trunk. There is a good correction, no crush and a good comfort.

2. An example of failures when treat Scheuermann's patients

Figure 12. There was a brace which could be relatively effective, but it crushed the trunk. We have marked the concave pressures that hinder growth, correction and give discomfort. The brace maker has been informed of those failures. A couple of years later, I saw the physician of this team and he has reminded me of the failures I had pointed out. That proves that the team has understood and does not go on making such failures.

3. What generally is taught concerning brace for Scheuermann

The most unforgivable failures are made by authors who teach how to make braces with huge failures. The famous author of the drawing of **figure 13** is responsible of several hundred or several thousands bad and iatrogenic effects by patients treated according to those models. He could not even avoid to show how much the patients are crushed by so bad brace parts.

Figure 14. We have copied a picture of an internet site which aims at teaching how to brace a Scheuermann's disease. The author shows a so-called "Spitzy brace" – a very old system. I hoped for 35 years that I saw it for the last time. It can achieve a small result, but, besides the strangulation

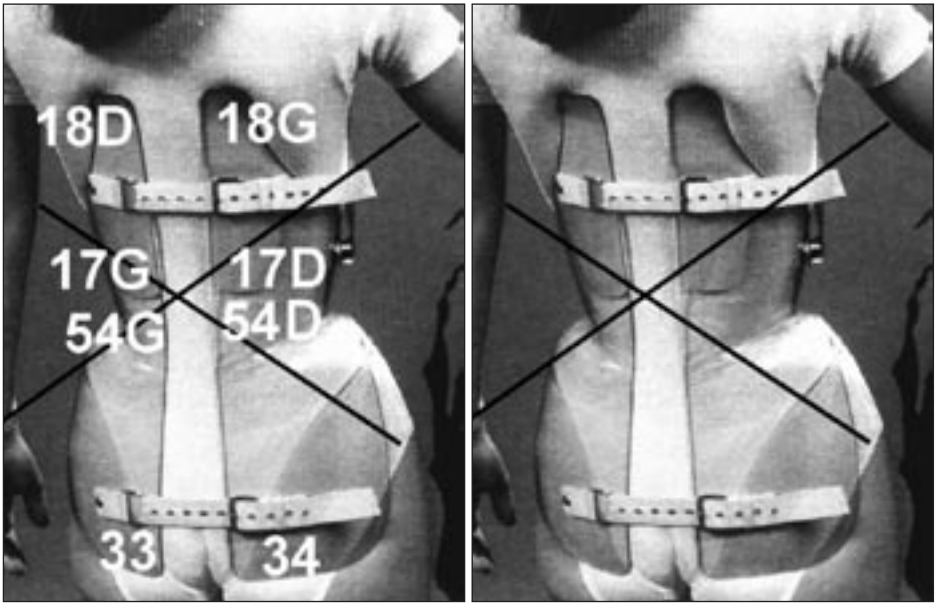


Fig. 12. Typical example of a brace relatively efficient, but which crushes. In the areas 17, 18 and 54 D and G, the brace part should be away from the skin, to allow together correction and concave expansion. Parts 33 and 34 hinder growth.

lace, there are many concave pressures. I have drawn black spots besides three of them.

4. How we brace our Scheuermann's patients

In Scheuermann, my experience is relatively small, and I can show very few pictures, for a simple reason. I am visiting numerous workshops where I help to build braces for scoliosis and sometimes for Scheuermann. But it happens relatively rarely that I see the result when, some months later, I return to the same workshop. When I see a result, I often have no possibility to take photos. But in a few cases where I could see the patients after two years of bracing, the braces having been controlled by me, i.e. without any concave pressure, all wedging had decreased or disappeared.

Figure 15 shows 18 years old girl, relative of mine. Indexes of wedges were Th11 = 18, T12 = 12, L1 = 12,5. She had thoracic-lumbar angular kyphosis with a brown blot at apex. She suffered from pains. At this time, she could not get a convenient brace, owing to the incompetence of the regional brace makers. When she was 32 years old, I could build for her in Barcelona a brace which soothed pains. Some ten years later, the vertebrae are almost completely normalized, with vertebral indexes Th11 = 0, Th12 = 8.1 and L1 = 0. Can such minute wedging be considered as Scheuermann's disease? It matters

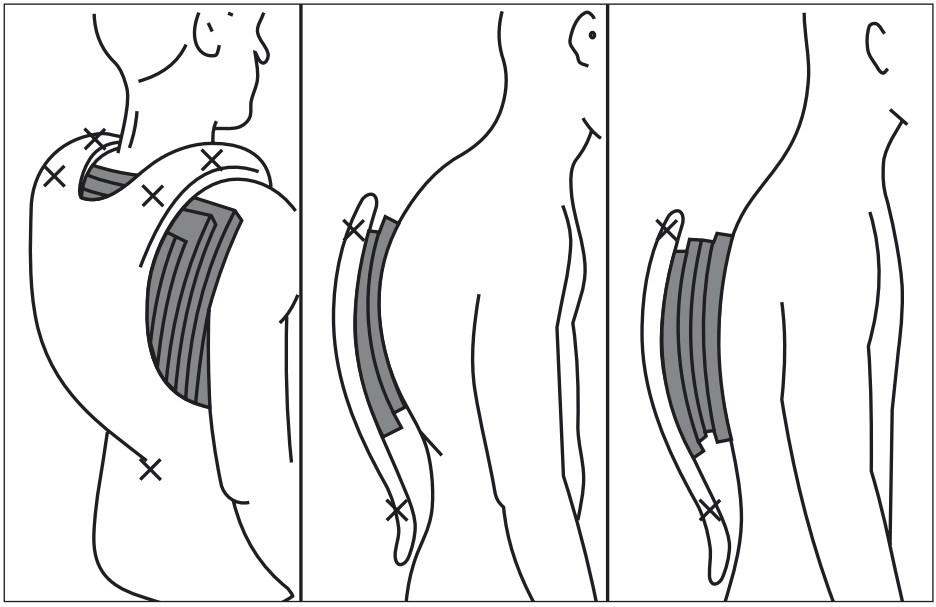


Fig. 13. This picture, published some thirty years ago in a handbill, is signed by one of the greatest names of Orthopaedics. The author could not even avoid to show in his drawing how much such an orthesis crushes the body, and how badly it corrects it. We have marked the main concave pressure parts with crosses.

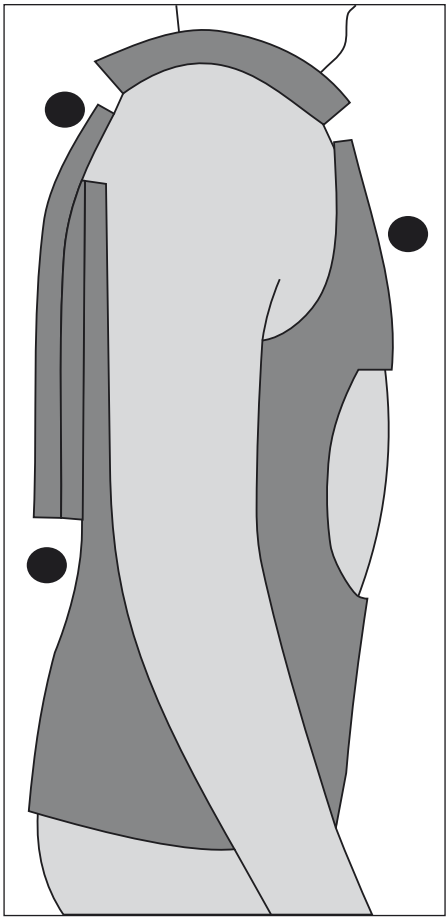


Fig. 14. A website with international conceit shows "Scheuermann's braces" according to Spitzy (a very old system). This name is not even mentioned in the site. Thirty years ago, I hoped I saw this kind of torture toy for the last time. But here, in addition to the strangulation lace, the rest of the brace is not elective, and presses on all parts of the body, either convex or concave. We have put dark spots besides the most important concave pressure parts of this "brace". That is a drawing of a picture which is in the site then we have no right to reprint the original photo without an authorization.

little: the important fact is that they cause pains and are soothed and straightened by brace. We emphasize, that diagnosis of such minute vertebral deformations is nearly never made, because this region is hardly visible on X-rays. The last thoracic vertebrae are in the dark region of lungs; the first lumbar ones in a very clear region, the abdomen. I saw once a consulting physician in a specialized part of one hospital of Paris, who had recommended the patient to a psychiatrist. Another time, a radiologist had made a detailed description of several alleged anomalies of the lumbar-sacral hinge. But he had not quoted the wedging of L1, which was the only cause of the pains. Once, on a postgraduate teaching session, a highly specialized physician showed a patient who presented an obvious kyphosis of Th12 and L1, visible with naked eyes. On radiographs were severe deteriorations of bones and discs. But the specialist noticed and described only the compensating hyperlordosis under the involved vertebrae! All over my active live, I saw such cases, all of them having badly been diagnosed before. All of them felt their pains soothed by brace.

5. Lack of world publications concerning un-wedging of Scheuermann's vertebrae

Concerning Scheuermann's disease, we never saw any publication mentioning normalization, even partly, by brace. Seeking in Internet, we have found several thousands of sites concerning Scheuermann, and have read some hundred fifty. We were surprised that bracing was very rarely quoted. When brace was mentioned, no site mentioned the slightest normalization of the vertebral shape. In one site, we could read "brace makes situation a little

better, but avoids a worsening". Métaireau (**5**) writes that pains are soothed by brace. But he does not quote any un-wedging of vertebrae. On pictures showing the patient of Métaireau in his brace, the writer saw concave pressures.

CONCLUSION

Two patients have blocks with incarcerated wedged vertebrae. After a couple of years of bracing, the abnormal smaller side has grown much more than the larger

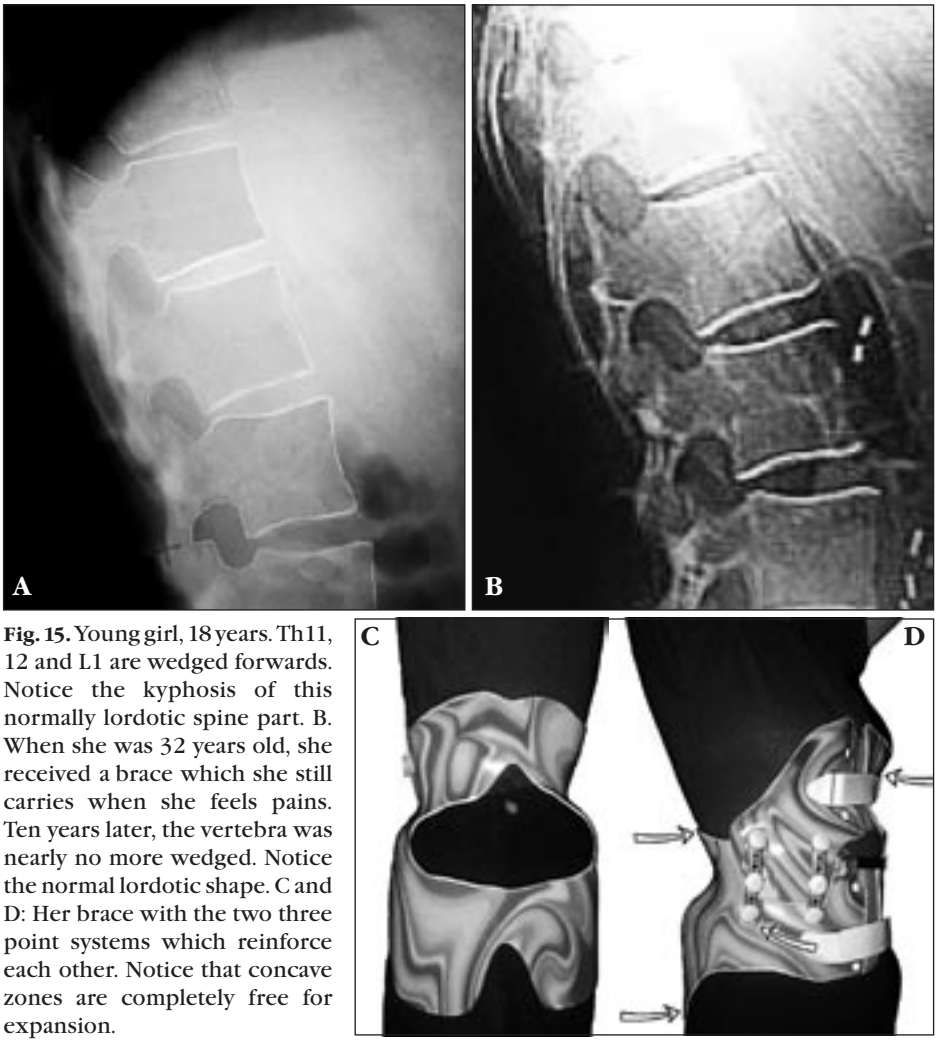


Fig. 15. Young girl, 18 years. Th11, 12 and L1 are wedged forwards. Notice the kyphosis of this normally lordotic spine part. B. When she was 32 years old, she received a brace which she still carries when she feels pains. Ten years later, the vertebra was nearly no more wedged. Notice the normal lordotic shape. C and D: Her brace with the two three point systems which reinforce each other. Notice that concave zones are completely free for expansion.

side, according to the laws of Delpech. The long-term follow up revealed that wedged vertebrae were so normalized, that no further treatment is needed in both patients. In the world literature, we could find only one author, a former attendant at our lectures, who has reached similar results. More generally we have studied in literature wedged vertebrae in idiopathic scoliosis and in Scheuermann's diseases. Almost all authors show braces in which many parts press on concave areas, and do not present any result on the abnormal shape of bones. We conclude, that bracing is indicated in selected cases of scoliosis, both congenital and idiopathic, as well as in Scheuermann's disease. A major condition is that expansion possibilities are given on all hollow parts of the body.

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PLÁNOVANÉ ODBORNÉ AKCE SPOLEČNOSTI PRO POJIVOVÉ TKÁNĚ A ODBORNÉ POLEČNOSTI ORTOPEDICKO-PROTETICKÉ ČLS JEP NA ROK 2007

SCHEDULED ACTIONS OF THE SOCIETY FOR CONNECTIVE TISSUE AND SOCIETY FOR PROSTHETICS AND ORTHOTICS, CZECH MEDICAL ASSOCIATION OF J. E. PURKYNĚ FOR THE YEAR 2007

The 8th Prague-Sydney-Lublin Symposium, 20.–21. 4. 2007, Lublin.
Kontaktní osoba / contact person: **Prof. Tomasz Karski, MD, PhD**
Chair and Department of Pediatric Orthopedics and Rehabilitation,
Medical University of Lublin / Poland
20-093 Lublin, Chodźki 2 Street, Tel./fax: 0048 81 741 56 53, E-mail: tkarski@dsk.lublin.pl

Visit of Prof. Kazimierz Kozlovski, 14.–18. 5. 2007, Prague.
Plánována společná večeře / scheduled dinner (výbor SPT ČLS JEP a RR PÚ) 16. 5. 07
Case presentation conference 17. 5. 07 v Ambulantním centru, Olšanská 7, 130 00 Praha 3.
Kontaktní osoba / contact person: **Doc. MUDr. Ivo Mařík, CSc.**
Ambulantní centrum pro vady pohybového aparátu
Olšanská 7, 130 00 Praha 3, Česká republika,
Tel./fax: 222 582 214, E-mail: ambul_centrum@volny.cz

The 9th Prague-Sydney Symposium and Kubát´s Podiatric day, 19.–20. 10. 2007, Prague
Kontaktní osoba / contact person: **Doc. MUDr. Ivo Mařík, CSc.**
Ambulantní centrum pro vady pohybového aparátu
Olšanská 7, 130 00 Praha 3, Česká republika,
Tel./fax: 222 582 214, E-mail: ambul_centrum@volny.cz

PŘIHLÁŠKA

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Titul(y) .....

Datum narození ..... **Rodné číslo** .....

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Datum ..... **Podpis** .....

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Přijat dne ..... **Podpis** .....

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Společnost pro pojivové tkáně ČLS JEP, Olšanská 7,
130 00 Praha 3, ČR, tel./fax: 222 582 214, e-mail: ambul_centrum@volny.cz

Informace uvedené na tomto formuláři jsou přísně důvěrné a nebudou poskytnuty žádné další osobě ani organizaci.

INFORMACE O SPOLEČNOSTI PRO POJIVOVÉ TKÁNĚ ČLS J. E. PURKYNĚ (SPT)

Vážená paní kolegyně, vážený pane kolego,

dovolujeme si Vás informovat o možnosti stát se členem **Společnosti pro pojivové tkáně** *(SPT),* která v roce 2004 navázala na plodnou desetiletou činnost Společnosti pro výzkum a využití pojivových tkání vedenou panem prof. MUDr. M. Adamem, DrSc. Posláním *SPT* je podpora rozvoje výzkumu pojivových tkání, šíření nových poznatků týkajících se všestranných analýz tkání z obecného pohledu, moderních klinických přístupů k diagnostice a léčbě. Dalším posláním *SPT* je usnadnění styků mezi jednotlivými odborníky navázáním spolupráce s různými vědeckými, odbornými, výrobními a farmaceutickými společnostmi.
Vědecké poznání a aplikace nejnovějších poznatků v klinické praxi nabyly v posledních letech nebývalého zrychlení, a to nejenom v zahraničí, ale i u nás. Tato skutečnost bezprostředně souvisí s kvalitativním rozvojem poznání i v nebiologických vědách a v moderních inženýrských přístupech. Stále více se prokazuje, že vše se vším souvisí – není náhodou, že nové poznatky a objevy vznikají na rozhraní oborů a různých vědních disciplin. Lidská společnost v posledních desetiletích dosáhla nové civilizační kvality – ve vědě a v jejich aplikacích zcela jistě, avšak v morálce a etice ne tak příliš. Biomedicína je v současné době rozsáhlou interdisciplinární vědou, která bez kooperace s jinými vědními obory by byla odsouzena ke stagnaci. Proto cílem *SPT* je nejenom integrovat odborníky v biomedicíně, ale i v technických sférách.
Prioritní snahou *SPT* je presentovat odborné veřejnosti a specialistům v klinické praxi nejnovější poznatky v oblasti pojivových tkání. *SPT* je i společenskou organizací klinických pracovníků, vědců, pedagogů, která si klade za cíl společensky sblížit nejenom pracovníky v aktivní službě, ale i kolegyně a kolegy v důchodovém věku a v neposlední řadě i studenty a mladé doktorandy z vysokých škol, universit a akademických ústavů.
SPT bude organizovat během každého roku alespoň dvě odborná a společenská setkání, kde vedle odborných přínosů bude kladen důraz také na společenské – přátelské diskuse všech vás, kteří nechtějí stagnovat, a kteří nechtějí přemýšlet o nových poznatcích izolovaně a osamoceně.
Pro uhrazení nejzákladnějších nákladů na korespondenci se členy společnosti, jejich informovanost a pořádání odborných kolokvií, symposií a společenských odborných setkání byl stanoven **roční členský příspěvek pro aktivní kolegyně a kolegy 200 Kč** a **pro studenty a důchodce 100 Kč.**
SPT vydává časopis *Pohybové ústrojí – pokroky ve výzkumu, diagnostice a terapii,* do kterého se i vy můžete aktivně zapojit odbornými články, vašimi zkušenostmi a slunečnou pohodou. **Předplatné časopisu** zůstává **240 Kč ročně,** pro zahraniční odběratele **12 Euro.**
Milí kolegové, nestůjte (pro katastrofální nedostatek času) opodál a připojte se k české inteligenci – v oblasti pojivových tkání, ke které i Vy zcela jistě patříte. V naší krásné české zemi je třeba, aby prameny poznání byly stále živé a permanentně udržované. Poslání každého z nás není náhodné. Jsme velice zavázáni našim předkům, kteří rozvíjeli kvalitu odbornosti v naší zemi. Nepřipusťme útlum vědy u nás. Nenechme se zmanipulovat programovanou lhostejností, vyrůstající z neodbornosti, závisti a z patologického prosazování ekonomicko-mocenských zájmů.

Těšíme se na Vás a na Vaše zkušenosti – přijďte mezi nás!

Za výbor společnosti:
Doc. MUDr. Ivo Mařík, CSc. – předseda
Prof. Ing. Miroslav Petrtýl, DrSc. – místopředseda
Prof. MUDr. Josef Hyánek, DrSc. – místopředseda
Ing. Hana Hulejová – jednatel
As. MUDr. Miloslav Kuklík, CSc. – pokladník

ČESKÁ LÉKAŘSKÁ SPOLEČNOST J. E. PURKYNĚ

INFORMATION ABOUT SOCIETY FOR CONNECTIVE TISSUES CMA J. E. PURKYNĚ (SCT)

Dear Sir/Madam, dear Colleagues,

We have great pleasure to inform you about the possibility of joining the **Society for Connective Tissues** (SCT) that was established in 2004 in order to continue the ten-year fruitful activities of the Society for Research and Use of Connective Tissue headed by Professor M. Adam, MD, DSc. The activities of the SCT are aimed at supporting the research development in the field of connective tissues, the dissemination of knowledge related to the all-purpose analyses of the tissues in general, and the application of the up-to-date approaches to the diagnostics and clinical practice. Further, the SCT is determined to facilitate contacts between the respective specialists by means of collaboration with various research, professional, production and pharmaceutical companies.

In the last few years, the scientific knowledge and the application of the latest findings in the clinical practice have accelerated on an unprecedented scale, not only abroad, but also in this country. This fact is closely connected with the qualitative development of the knowledge in the non-biological sciences and in the up-to-date engineering approaches. The fact that all things are mutually connected is becoming more and more evident. It is fairly obvious that the new knowledge and discoveries arise on the dividing line between the different fields and disciplines of science. In the last few decades, the human society has reached the new qualities of civilization. This applies, in particular, for the disciplines of science and their applications; however, this statement can hardly be used with reference to the moral and ethical aspects of the human lives. At present, the biomedical science is a wide-ranging interdisciplinary science which, in case of lack of cooperation with other scientific disciplines, would be condemned to stagnation. That is the reason why the SCT is aimed at integrating the specialists both within the biomedical science and within the engineering fields.

The priority objective of the SCT is to present the professional public and specialists involved in the clinical practice with the latest knowledge in the field of connective tissues. The SCT is also a civic society whose aim is to bring people close together by joining members of the clinical staff, researchers and teachers including the retired ex-colleagues and, last but not least, the undergraduates and PhD students from universities and academic establishments.

The SCT is planning to organize at least two professional and social meetings each year. Beside the professional contribution of these meetings, emphasis will be laid on social activities – informal discussions of all those who do not want to stagnate and who do not want to acquire the new knowledge in solitary confinement.

The annual membership fee is 200 Czech crowns for full workers, and 100 Czech crowns for students and pensioners. This membership fee shall be used to cover the basic costs on correspondence with the members of the Society in order to inform them about organizing colloquiums, symposiums and social meetings.

The SCT is also engaged in publishing of the interdisciplinary journal entitled *Locomotor System – Advances in Research, Diagnostics and Therapy*. You are invited to contribute to the journal writing professional articles, exchanging experience or, simply sharing your opinions. **The annual subscription is 240 Czech crowns, for foreign subscribers 12 euros** (incl. shipping).

Dear Colleagues, do not stand aside (suffering from terrible lack of time) and join the professional people in the field of connective tissues to whom you undoubtedly belong. In this beautiful country, the sources of knowledge should be kept alive and maintained permanently. Our role in this process is not accidental. We are much

obliged to our ancestors who had developed the qualities of proficiency in this country. Do not allow the decline of science. Do not let the programmed indifference arising from lack of professionalism, enviousness, and pathological promotion of economic and power interests manipulate us.
We are looking forward to meeting you. We will be pleased if you join us and share your experience with us.

On behalf of the committee of the Society for connective tissues:

Associate Professor Ivo Mařík, MD, PhD – chairman
Professor Josef Hyánek, MD, DrSc – vice-chairman
Professor Miroslav Petrtýl, MSc, DrSc – research secretary
Hana Hulejová, MSc – secretary
Jana Zelenková, Eng. – treasurer

Society for Connective Tissue CMA J. E. Purkyně
&
Czech Society for Prosthetics and Orthotics CMA J. E. Purkyně
&
Ambulant Centre for Defects of Locomotor Apparatus

invite you for

THE 9TH PRAGUE-SYDNEY-LUBLIN SYMPOSIUM AND 12TH KUBÁT'S PODIATRIC DAY

"NEWS IN DIAGNOSTICS AND COMPREHENSIVE TREATMENT OF LOCOMOTOR DEFECTS"

The Symposium is launched within the framework Bone and Joint Decade 2000–2010 and belongs to education actions integrated into the life training system of physicians.

The Symposium will be held on 19th–20th October 2007 from 9 a.m. at The Medical House, Sokolská 31, 120 26 Prague 2, Czech Republic.

Registration Form should contain: Name, Address, Phone, Fax, E-mail.
Extended Abstract Form with key words (try to provide objectives, methods, results and discussion, English is preferred) – **submission deadline: July 31, 2007.**

Conference fee 200 Czech crowns (approx. 10 Euro) will be paid during registration. Participants will receive the journal "Locomotor System" with programme and extended abstracts of lectures.

Both Forms submit by e-mail: ambul_centrum@volny.cz
Assoc. Prof. Ivo Mařík, M.D., PhD., Ambulant Centre for Defects of Locomotor Apparatus, Olšanská 7, 130 00 Praha 3, Tel./fax: +420 222 582 214, Czech Republic

CZECH SOCIETY FOR PROSTHETICS AND ORTHOTICS J.E. PURKYNĚ

SOCIETY FOR CONNECTIVE TISSUES J.E.Purkyně

AMBULANT CENTRE FOR DEFECTS OF LOCOMOTOR APPARATUS

PLÁNOVANÉ AKCE OSTEOLOGICKÉ AKADEMIE ZLÍN NA ROK 2007

SCHEDULED ACTIONS OF THE OSTEOLOGIC ACADEMY OF ZLÍN FOR THE YEAR 2007

připravuje / prepares

PRACOVNÍ DEN 27. KVĚTNA VE ZLÍNĚ

WORKSHOP-SEMINAR ON MAY 27, 2007, IN ZLIN

Program:
Osteologická antropologie / Osteologic anthropology
Novinky v pediatrické denzitometrii / Advancements in pediatric densitometry

PRACOVNÍ DEN 24. LISTOPADU VE ZLÍNĚ

WORKSHOP-SEMINAR ON NOVEMBER 24, 2007, IN ZLIN

Program:
Laboratorní a klinická genetika v osteologické praxi / Laboratory and clinical genetics in osteologic practice
Základní otázky biomechaniky v osteologické praxi / Basics of biomechanics in osteologic practice

podílí se na organizaci a programu / co-organize

KONGRES SMOS A SOMOK

CONGRESS WITH SMOS AND SOMOK

ve dnech 28.-30. října 2007 v Luhačovicích
on October 28-30, 2007, in Luhacovice

ZPRÁVA O ČINNOSTI ČESKÉ SPOLEČNOSTI ANTROPOLOGICKÉ V ROCE 2006

Viničná 7, 128 44 Praha 2
www. anthropology.cz

Hlavní výbor ČSA se v roce 2006 sešel v únoru, červnu a listopadu na třech schůzích. Na únorové schůzi výbor rozhodl o zvýšení členských příspěvků ze stávajících 200 Kč/rok, na 300 Kč/rok, s platností od roku 2007. Schválení zvýšení příspěvků proběhlo formou hlasování na schůzích jednotlivých poboček ČSA (Brno – 28. 2., Olomouc – 6. 4., Praha – 7. 6. 2006). Členové Společnosti byli koncem června o této skutečnosti vyrozuměni osobním sdělením.

V březnu 2006 vyhlásil hlavní výbor ČSA, společně s Městským úřadem v Humpolci, další ročník **„Ceny dr. A. Hrdličky pro mladé antropology“,** v kategorii doktorských disertačních prací. Uzávěrka přihlášek byla stanovena na 31. října 2006. Práce, přihlášené do minulého ročníku, ve kterém nebyla pro malý počet přihlášek tato kategorie hodnocena, jsou automaticky přijaty do nového kola. Na listopadové schůzi hlavního výboru ČSA byli, pro posouzení jednotlivých disertací, stanoveni oponenti. Vyhlášení výsledků soutěže proběhne v průběhu roku 2007.

Za podpory grantové dotace RVS vyšlo počátkem roku další číslo **„České antropologie“** za rok 2005, v srpnu pak i **Supplementum** s abstrakty z **„13. antropologických dnů“** a 7. mezinárodní **konference „Diagnostika pohybového systému“,** které uspořádala olomoucká pobočka společně s Fakultou tělesné kultury UP v Olomouci. Hlavní výbor ocenil práci výkonné redaktorky časopisu Prof. RNDr. Jarmily Riegerové, CSc. **„Česká antropologie“** pod její edicí získala výrazně na prestiži. Časopis vychází ve velmi reprezentativním provedení a díky nově sestavené redakční radě jsou publikovány kvalitní příspěvky. Anglické abstrakty jednotlivých příspěvků budou, pro dostupnost širší veřejnosti, uveřejňovány i na webových stránkách ČSA. Plánováno je i vytvoření elektronické formy tohoto časopisu. K předepsanému říjnovému termínu podal hlavní výbor na Radu vědeckých společností žádost o dotaci na podporu vydání časopisu ČSA a provoz webových stránek pro rok 2007.

ČSA má opětovné zastoupení v koncilu Evropské antropologické asociace. Na 15. kongresu EAA v Budapešti, který se konal ve dnech 31. 8.–3. 9. 2006, byl znovu zvolen Doc. RNDr. Pavel Bláha, CSc. do funkce viceprezidenta.

Na listopadové schůzi schválil hlavní výbor návrhy pokladní ČSA na vyloučení některých členů, kteří dlouhodobě neplatí členské příspěvky a nereagují na opakované výzvy o doplacení dluhu.

V roce 2006 bylo přijato 10 nových členů – 5 olomoucká pobočka, 3 pražská pobočka, 2 brněnská pobočka.

Pražská pobočka České společnosti antropologické

V roce 2006 uskutečnila pražská pobočka ve spolupráci s Antropologickým oddělením Národního muzea, Antropologickým sborem Společnosti Národního muzea a Katedrou antropologie a genetiky člověka Přírodovědecké fakulty UK, přednáškový cyklus s názvem **„Ženy v antropologii“.** Tento cyklus představoval poděkování ženám, které přispěly k rozvoji české antropologie, a to nejen těm, které tento obor vystudovaly, ale i těm, které jako manželky antropologů jim vytvářely vhodné podmínky pro jejich práci a měly tak na rozvoji tohoto oboru u nás nemalý podíl. Příkladem byly manželky profesorů Matiegky, Malého, Fettera, Valšíka, Absolona nebo Jelínka.

Cyklus zahájil Doc. RNDr. Milan Stloukal, DrSc. a uzavřel vedoucí Katedry antropologie a genetiky člověka PřF UK Prof. RNDr. Zbyněk Šmahel, CSc. Byl rozdělen do 4 večerů v období od 11. 5. do 8. 6. 2006. Přednášeli a moderovali Doc.RNDr. Miroslav Prokopec, DrSc. a prof.h.c. RNDr. Josef Wolf, CSc.

První večer byl věnován vzpomínce na ženy, které již nežijí. Po uvedení jejich biografie a zásluh byla osobnost jednotlivých žen dokreslena doplňky a připomínkami z pléna. Druhý večer měl název „Poděkování zasloužilým“. Prezentovány byly ženy, které svou prací přispěly k povznesení oboru a v současné době jsou již většinou v důchodu. Třetí a čtvrtý večer byl oslavou a blahopřáním ženám v antropologii, které v současné době v oboru pracují, ať již na přírodovědeckých nebo lékařských fakultách, výzkumných pracovištích, muzeích, jakož i na pracovištích příbuzných oborů, jako je např. archeologie nebo hygiena. Byly zmíněny i čerstvé absolventky oboru, nebo ty, které dosud studují k získání vyšší kvalifikace. Některá jména, uvedená na programu, byla příliš čerstvá na to, aby byla ve všeobecném povědomí. Museli pomoci v publiku přítomní pedagogové a školitelé doktorandů, aby se o každé ženě, uvedené v seznamu, mohlo říci kde pracuje a jakou problematikou se zabývá.

Cyklus ukázal, jaké má česká antropologie bohatství v ženách, které se podílely nebo podílejí na jejím rozvoji. Některé absolventky však nacházejí uplatnění mimo obor, který vystudovaly.

Součástí činnosti pražské pobočky bylo uspořádání výstavy fotografií pod názvem **„Tváře Indie“,** kterou instalovala, na návrh ředitele Chodovské tvrze p. Ing. Vladimíra Levického, kulturní referentka Martina Horáková v budově radnice Úřadu městské části Praha 11 od 5. 6. do 22. 6. 2006. Autor vystavených snímků Doc. M. Prokopec byl dvakrát v Indii. V r. 1963–64 jako antropolog na pozvání Indického statistického ústavu a v r. 1978–79 jako účastník Mezinárodního kongresu antropologických a etnologických věd. Pestrost a různorodost obyvatelstva zachytil na snímcích z každodenního života z mnoha různých míst země – zeměpisně od Bombaje po Kalkatu a od podhůří Himálaje po Maysor, a společensky od audience u presidenta v jeho paláci v Dillí po chudinské čtvrtě Kalkaty a domorodé kmeny v horách v pořící řeky Krishna u Hyderabadu a v lesích Urisy. Nechybí ani záběry ze sídel maháradžů, ani typy lidí z pohraniční oblasti NEFA, z Manipuru, ze států Uttarpradéš, Maharástra, či z měst Poony, Barody, Puri, Bhubaneshwaru aj. ze současnosti, často na pozadí památek staleté kultury.

Výstavu zahájila starostka Prahy 11 pí. Marie Šorfová a Prof. PhDr. Rudolf Veselý, CSc. Pro časopis Photo Art ji komen-

toval Prof. PhDr. Ludvík Baran, CSc. Série snímků obyvatel Indie byla přenesena na CD a bude k disposici zájemcům na internetových stránkách České společnosti antropologické.

Brněnská pobočky České společnosti antropologické:

Na první členské schůzi brněnské pobočky, která se konala 28. února 2006, byl jednomyslně schválen návrh hlavního výboru o zvýšení členského poplatku. V hlavním programu setkání vystoupila RNDr. Pavla Šťastná, Ph.D. z Technologické fakulty Univerzity Tomáše Bati ve Zlíně s přednáškou na téma **„Zdravotní potíže nohou současné populace jako důsledek nošení nevhodné obuvi“,** která se setkala s velmi příznivým ohlasem.

V březnu se konala výstava fotografií RNDr. Ladislavy Horáčkové, Ph.D. **„Mezinárodní expedice v Sakkáře – Egypt“** v Moravském zemském muzeu v Brně, v dubnu se tatáž výstava uskutečnila v Moravské zemské knihovně v Brně. Výstava nabídla návštěvníkům pohled českého antropologa na výzkumnou činnost v jedné z nejstarších egyptských nekropolí.

24. října se konala další členská schůze, na níž členové pobočky informovali o účasti na antropologických konferencích v Olomouci, Budapešti a v Řecku. Své poznatky a postřehy doplnili zajímavou fotodokumentací. Hlavním bodem programu se stala přednáška docenta Petra Hlaváčka ze zlínské Technologické fakulty Univerzity Tomáše Bati o posledních výzkumech obuvi terakotové armády Prvního svrchovaného císaře Čchinů.

Možnost setkávání mají členové brněnské pobočky již tradičně i na seminářích, které pro své studenty a členy ČSA pořádá Katedra antropologie Přírodovědecké fakulty MU.

V roce 2006 tak měli například možnost vyslechnout přednášky:

- Prof. PhDr. Josef Unger, CSc.: **Pohřební ritus 1. až 20. století v Evropě z antropologicko-archeologické perspektivy.**
- Doc. PhDr. Luboš Bělka, CSc.: **Santalový Buddha.**
- Prof. MUDr. Pavel Bravený, CSc., Doc. MUDr. Marie Nováková, Ph.D.: **Fyziologie krevního oběhu.**
- Doc. PhDr. Břetislav Vachala, CSc.: **Abúsír: Staroegyptské královské pohřebiště.**
- Doc. PhDr. Luboš Bělka, CSc.: **Buddhistické pojetí pekel.**
- Prof. PhDr. MgA. Miloš Štědroň, CSc.: **Mozart: antropologický přístup.**
- Mgr. Richard Thér: **Keramická technologie jako socio-kulturní fenomén: komplexní přístup ke studiu keramiky z mladší doby bronzové.**
- Prof. PhDr. Josef Unger, CSc.: **Školní antropologicko-archeologický výzkum pravěkého a slovanského pohřebiště v Divákách (u Hustopečí) Ústavu antropologie Přírodovědecké fakulty Masarykovy univerzity: výsledky výzkumu 2000–2006.**
- Doc. PhDr. Luboš Bělka, CSc.: **Šambhalský mýtus.**
- Prof. RNDr. Ivo Budil, Ph.D., DSc.: **Vývoj etnických a rasových vztahů v Jižní Africe v devatenáctém století.**
- Ing. Marie Dohnalová, CSc.: **Czechkid: multikulturalita očima dětí.**

Olomoucká pobočka České společnosti antropologické

Olomoucká pobočka se sešla na čtyřech schůzích, na kterých její členové vzpomenuli náhlé úmrtí RNDr. Václava Hajna, CSc., dlouholetého člena olomoucké pobočky ČSA, oslavili životní jubileum Prof. RNDr. S. Komendy, DrSc. a vyslechli řadu odborných přednášek, např. **„Kulturní antropologie v Kazachstánu očima zdravotně-sociálního pracovníka“, „Symbolika sandálů na byzantských ikonách“** a další.

Členové olomoucké pobočky se podíleli na organizaci 13. antropologických dnů na téma **„Člověk – téma věčně živé“,** konané v Olomouci, odborně i organizačně zajišťovaných Katedrou funkční antropologie a fyziologie Fakulty tělesné kultury Univerzity Palackého. Anglická abstrakta příspěvků jsou publikována v Supplementu, Česká antropologie, 56, 2006.

Olomoucká pobočka dále spolupracovala na organizaci **„Festivalu zdraví a pohybu“,** který proběhl dne 3. 6. 2006 v Olomouci. Spolu s pracovníky Katedry antropologie a zdravovědy Pedagogické fakulty Univerzity Palackého zde bylo přítomným zájemcům prováděno antropometrické a fyziologické vyšetření, zaměřené na hodnocení výživového a zdravotního stavu (BMI, WHR, krevní tlak, množství tělesného tuku, orientační hodnocení zdatnosti oběhového systému).

RNDr. Petr Sedlak, Ph.D.
předseda ČSA

PEDAGOGICKÁ FAKULTA UNIVERZITY PALACKÉHO V OLOMOUCI

Katedra antropologie a zdravovědy a Katedra biologie

ve spolupráci

s Českou antropologickou společností
&
s Českou společností entomologickou,
&
Krajskou hygienickou stanicí v Olomouci
&
a Zdravotním ústavem se sídlem v Olomouci

pořádají ve dnech 5. – 6. září 2007 v Olomouci

mezinárodní vědeckou konferenci

I. OLOMOUCKÉ DNY ANTROPOLOGIE A BIOLOGIE

pod záštitou děkanky Pedagogické fakulty UP v Olomouci prof. PaedDr. Libuše Ludíkové, CSc.

VŠEOBECNÉ INFORMACE

Cíle konference

1. Prezentovat nové poznatky v oborech biologická antropologie, kulturní a sociální antropologie, zoologie a botanika.
2. Diskutovat působení environmentálních faktorů na vývoj a zdravotní stav obyvatelstva v Evropě.
3. Navzájem se informovat o interdisplinárních vztazích člověk – příroda – sociální prostředí.
4. Navrhnout využití přednesených teoretických a praktických poznatků do pedagogického procesu na základních, středních a vysokých školách.

Hlavní garant konference

Doc. PaedDr. Miroslav Kopecký, Ph.D.

Vědecký výbor

Prof. RNDr. J. Riegerová, CSc.,
vedoucí Katedry funkční antropologie a fyziologie FTK UP v Olomouci, ČR
Prof. RNDr. Z. Šmahel, CSc.
vedoucí Katedry antropologie a genetiky člověka, PřF UK v Praze, ČR
Prof. PaedDr. L. Jančoková, CSc.
Katedra telesnej výchovy a športu,
FHV Univerzity Mateja Bela v Banskej Bystrici, SR
Doc. RNDr. P. Bláha, CSc.
viceprezident koncilu Evropské
antropologické asociace, Katedra
antropologie a genetiky člověka,
PřF UK v Praze, ČR
RNDr. P. Sedlak, Ph.D.
předseda ČSA, Katedra antropologie
a genetiky člověka, PřF UK v Praze, ČR
Doc. Ing. M. Bocáková, Ph.D.
vedoucí Katedry biologie PdF UP
v Olomouci, ČR
Doc. RNDr. J. Šteigl, CSc.
vedoucí Katedry antropologie
a zdravovědy PdF UP v Olomouci, ČR
Doc. RNDr. A. Pouličková, CSc.
Katedra botaniky PřF UP v Olomouci, ČR

MUDr. Z. Nakládal
Krajská hygienická stanice Olomouckého kraje se sídlem v Olomouci, ČR
RNDr. D. Dvorská
ředitelka Zdravotního ústavu se sídlem v Olomouci, ČR

Organizační výbor

Předseda:
Doc. PaedDr. M. Kopecký, Ph.D.
Katedra antropologie a zdravovědy PdF UP
Tajemník:
PhDr. H. Skarupská, Ph.D.
Katedra antropologie a zdravovědy PdF UP
Členové:
Doc. Ing. M. Bocáková, Ph.D.
Katedra biologie PdF UP
Doc. RNDr. L. Hrabí, Ph.D.
Katedra biologie PdF UP
Doc. RNDr. L. Krejčovský, CSc.
Katedra antropologie a zdravovědy PdF UP
PhDr. I. Knausová, Ph.D.
Katedra antropologie a zdravovědy PdF UP
MUDr. H. Kabátová
Krajská hygienická stanice v Olomouci
MUDr. S. Jakubalová
Zdravotní ústav se sídlem v Olomouci
RNDr. V. Tlusták, CSc.
Katedra biologie PdF UP
Ing. I. Machar, Ph.D.
Katedra biologie PdF UP
Mgr. M. Müllerová
Katedra biologie PdF UP

Sekretariát konference

Mgr. Jitka Tomanová
Katedra antropologie a zdravovědy
Pedagogická fakulta UP v Olomouci
Žižkovo nám. 5, 771 40 Olomouc
tel.: 723 27 23 50
e-mail: Jitka.Tomanova@seznam.cz

Prezentace na konferenci

Výsledky práce účastníků konference budou prezentované formou:
- plenárních přednášek
- referáty v příslušných odborných sekcích
- posterů
- praktických ukázek výuky

Odborné sekce:
- Biologická antropologie (garant Doc. RNDr. L. Krejčovský, CSc.)
- Kulturní a sociální antropologie (garant PhDr. I. Knausová, Ph.D.)
- Výchova ke zdraví (garant MUDr. H. Kabátová)
- Botanika (garant RNDr. V. Tlusták, CSc.)
- Zoologie (garant Ing. I. Machar, Ph.D.)
- Ekologie a ekologická výchova (garant Mgr. M. Müllerová)
- Didaktika biologie (garant Doc. RNDr. L. Hrabí, Ph.D.)

Oficiálními jednacími jazyky konference jsou: čeština, slovenština, polština a angličtina.

Délka referátů

Hlavní přednášky 20 min., referáty v příslušných sekcích 10 min. a 5 min. na diskusi.

Rámcový program konference

Středa 5. 9. 2007

9,00 – 10,30 hod.	prezentace účastníků
10,30 – 12,30 hod.	zahájení konference a plenární přednášky
12,30 – 14,00 hod.	oběd
14,00 – 16,00 hod.	jednání v sekcích
16,00 – 16,30 hod.	přestávka
16,30 – 18,30 hod.	jednání v sekcích
18,45 – 19,45 hod.	prohlídka Arcidiecézního muzea v Olomouci* (pro zájemce)
20,00 hod.	večeře a společenský večer s hudbou

Čtvrtek 6. 9. 2007

8,30 – 10,00 hod.	jednání v sekcích
10,00 – 10,30 hod.	přestávka
10,30 – 12,00 hod.	jednání v sekcích
12,15 – 12,45 hod.	slavnostní zakončení
13,00 – 14,00 hod.	oběd
	Návštěva nízkoenergetické budovy ve Sluňákově** (pro zájemce)

*** Návštěva Arcidiecézního muzea v Olomouci**

1. června 2006 byl slavnostně zpřístupněn areál Arcidiecézního muzea, jediného tohoto typu v České republice, dokumentující stavební a umělecký vývoj Olomouckého hradu v průběhu celého tisíciletí, od pozůstatků paláců biskupského a knížecího přes románské, gotické a renesanční etapy až po pozdně barokní a rokokové interiéry. Vstup je pro účastníky konference zdarma.

**** Návštěva nízkoenergetické budovy ve Sluňákově**

Pro zájemce konference bude podle počtu přihlášených zorganizována ve čtvrtek 6. 9. 2007 exkurze do nově otevřeného střediska ekologické výchovy s oficiálním názvem „Centrum ekologických aktivit". Unikátní nízkoenergetická budova, postavená z podpory Státního fondu životního prostředí (SFŽP) a okolní přírodní areál nabízí především výukové programy (jednodenní i vícedenní – pobytové) pro základní i střední školy Olomouckého kraje, zaměřené na ekologii, environmentální výchovu a přírodopis. Sluňákov pořádá i výukové programy a semináře pro učitele a lektory ekologické výchovy. Protože Sluňákov leží u „vstupní brány" naučné cyklostezky do chráněné krajinné oblasti (CHKO) Litovelské Pomoraví, je zde v provozu návštěvnické informační centrum CHKO. Viz www.slunakov.cz

Doprava bude zajištěna autobusem. Čas exkurze bude upřesněn podle počtu přihlášených účastníků.

Publikace

Účastníci konference budou informováni o přednesených referátech formou anotací i plnými texty příspěvků, které budou zveřejněny v **recenzovaném sborníku v elektronické podobě (CD-R)**. Podmínkou zveřejnění příspěvku bude zaplacení konferenčního příspěvku.

Pro psaní anotací a příspěvků do sborníku se prosím řiďte podle následujících instrukcí:

Instrukce pro napsání anotace

1. Formát stránky: A 4, okraje 2,5 cm.
2. Písmo: Times Roman CE, 12 pt, bez dělení slov, hladký text.
3. Odstavec: řádkování jednoduché, zaro nání do bloku.
4. Anotace je v českém a anglickém jazyku.
5. Název anotace velkými písmeny, vycentrovat na střed.
6. Autoři: celé jméno, příjmení (bez titulů) a pracoviště (katedra, fakulta, škola, adresa, kontakt). Autoři z více pracovišť jsou rozlišeni horním indexem s odkazem na příslušné pracoviště.
   Příklad:
   Pavel Janák[1], Jiří Bezděk[2]
   [1] Katedra somatologie...
   [2] Státní zdravotní ústav....
7. Anotace v rozsahu maximálně 15 řádků a 5 klíčových slov.

Instrukce pro psaní příspěvku

Požadavky na digitální zpracování rukopisu do sborníku

1. Formát stránky: A 4, okraje 2,5 cm.
2. Písmo: Times Roman CE, 12 pt, bez dělení slov, hladký text.
3. Odstavec: řádkování jednoduché, zarovnání do bloku.
4. Název příspěvku česky a anglicky tučně velkými písmeny, vycentrovat na střed.
5. Autoři: celé jméno, příjmení (bez titulů) a pracoviště (katedra, fakulta, škola,adresa, kontakt). Autoři z více pracovišť jsou rozlišeni horním indexem s odkazem na příslušné pracoviště.
   Příklad: Pavel Janák[1], Jiří Bezděk[2]
   [1] Katedra somatologie...
   [2] Státní zdravotní ústav....
6. Text příspěvku členěte na následující oddíly: Úvod, Cíl práce, Metodika, Výsledky a diskuse, Závěr, Literatura. Nadpisy uvedených oddílů Times Roman CE, 12 pt, tučně.
7. Tabulky a grafy ve formátu MS WORD a EXCEL. Nadpis u tabulek, grafů a obrázků nezkráceně, není ukončen tečkou. (Příklad: Tabulka 1 Porovnání tělesné výšky 7 – 15letých chlapců a dívek (cm). Pokud bude v textu odkaz na tabulku, graf a obrázek, uvádějte odkaz následujícím způsobem: ... uvedené hodnoty převyšují doporučená kritéria (Tabulka 1, Graf 1) nebo ... tabulka 1 a graf 1 uvádějí hodnoty, které převyšují doporučená kritéria.
8. Tabulky, grafy a obrázky mohou být uvedeny v textu nebo i na závěr příspěvku za literaturou.
9. Tabulky: písmo Times Roman 12 pt, řádkování jednoduché. Grafy: písmo Times Roman 12 pt.
10. Rovnice, matematické vzorce a speciální znaky vkládejte do textu jako objekt Microsoft Equation 3.0 – editor rovnic.
11. Referenční seznam, uvedený pod nadpisem Literatura je seřazen podle abecedního pořádku. Citace literárních zdrojů je podle ČSN ISO 690 podle níže uvedených příkladů:

1. učebnice, monografie, studijní texty
HAAG, H., GRUPE, D., KIRSCH, A. *Sport Science in Germany*.
Berlin: Verlag Heidelberg, 1972. 575 p. ISBN 3-540-55657-5.

2. časopis
JANÁK, P., BEZDĚK, J. Hodnocení klenby nohy pomocí různých plantografických metod u dívek ve věku 7-19 let. *Česká antropologie.* Olomouc: Univerzita Palackého, 2003, roč. 53, s. 47-51. ISSN 0862-5085.

3. sborník
BEZDĚK, J., JANÁK, P. Výchova ke zdraví jako nový studijní obor na PdF UP v Olomouci. In A. Suchomel (ed.) *Sborník z mezinárodní vědecké konference „Tělesná výchova a sport 2004, Liberec – Euroregion Nisa“.* Liberec: Technická univerzita, 2004. s. 145–151. ISBN 80-7083-901-5.

Při prezentaci odevzdejte v tištěné podobě anotaci i plný text, do kterého jsou zařazeny tabulky, grafy a obrázky nebo zašlete na uvedenou adresu sekretariátu konference a to v jednom výtisku a na disketě nebo CD-R ve formátu MS WORD 97, 2000 a 2003 pro Windows.

Označení souborů

1. soubor – anotace: Jméno _anotace (např. Janák_anotace),
2. soubor – text příspěvku, který obsahuje plný text, tabulky, grafy popř. obrázky: Jméno_text (např. Janák_text).

Pro odevzdání příspěvku do sborníku je stanoven termín 6. 9. 2007. Příspěvky, které nebudou do tohoto termínu předány, nebudou publikovány.
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ORGANIZAČNÍ POKYNY

Datum konání

5. a 6. 9. 2007

Konferenční poplatek

500 Kč, studenti 250 Kč, učitelé ZŠ a SŠ neplatí konferenční poplatek.

Ubytování a stravování

ubytování bude zajištěno na VŠ kolejích v místě konání konference v ceně 105 Kč/osoba nebo 210 Kč osoba/samostatný pokoj. Snídaně zajištěna v místě ubytování v ceně 60 Kč. Oběd v ceně 130 Kč a společenský večer 250 Kč (jídlo a hudba).

Veškeré platby, konferenční poplatek a poplatky za ubytování, stravu a společenský večer bude hrazen hotově v den zahájení konference nebo platbou poukázat na účet (doporučujeme platbu mezinárodní poštovní složenkou).

Adresát: Univerzita Palackého v Olomouci
Pedagogická fakulta, Žižkovo nám. 5, 771 40 Olomouc
Číslo účtu: 19-1096330227/0100
IBAN: CZ0901000000191096330227
Variabilní symbol: 99410371
Konstantní symbol: 0308
Peněžní ústav: Komerční banka Olomouc
Tř. Svobody 14, 779 11 Olomouc
SWIFT (kód banky): KOMBCPPXXX

Místo konání

Pedagogická fakulta PdF UP v Olomouci, Žižkovo nám. 5, Olomouc 771 40
Z hlavního vlakového nádraží tramvají směr Centrum vystoupit na 2 zastávce na Žižkově náměstí.

Parkování účastníků konference bude zajištěno v prostorách Pedagogické fakulty UP v Olomouci v místě konání konference.

Přihlášku na mezinárodní vědeckou konferenci I. Olomoucké dny antropologie a zdravovědy konané ve dnech 5.–6. 9. 2007 zašlete nejpozději do 10. 5. 2007.

Objednávku na ubytování a stravování na I. Olomoucké dny antropologie a zdravovědy konané ve dnech 5.–6. 9. 2007 zašlete nejpozději do 10. 5. 2007.

PŘIHLÁŠKA NA MEZINÁRODNÍ VĚDECKOU KONFERENCI

Údaje o účastníku konference			
Příjmení, jméno, tituly:			
Pracoviště (název, adresa):			
Telefon, e-mail adresa:			
Příspěvek na konferenci			
Autor, autoři:			
Název příspěvku česky a anglicky:			
Forma prezentace (označte X)			
Plenární přenáška	☐	Přednáška v odborné sekci	☐
Poster	☐	Praktická prezentace (laboratoř)	☐
Odborná sekce (příslušnou sekci označte X)			
Biologická antropologie	☐	Zoologie	☐
Botanika	☐	Výchova ke zdraví	☐
Didaktika biologie	☐	Ekologická výchova	☐
Kulturní a sociální antropologie	☐		
Nároky na didaktickou techniku a pomůcky (označte X)			
Dataprojektor	☐	Diaprojektor	☐
Zpětný projektor	☐		
Laboratoř (specifikovat přístroje a pomůcky)			
Jiné (napsat)			
Mám zájem se účastnit návštěvy (označte X)			
Arcidiecézního muzea			☐
Nízkoenergetické budovy ve Sluňákově			☐

Přihlášku zasílejte v elektronické podobě na e-mailovou adresu:
Jitka.Tomanova@seznam.cz

nebo vytištěnou na adresu **Mgr. Jitka Tomanová, Katedra antropologie a zdravovědy, Pedagogická fakulta Univerzity Palackého, Žižkovo nám. 5, 771 40 Olomouc.**

OBJEDNÁVKA NA UBYTOVÁNÍ A STRAVOVÁNÍ

Údaje o účastníku konference		
Příjmení, jméno, tituly:		
Pracoviště (název, adresa):		
Telefon, e-mail adresa:		
Snídaně		
Středa 5. 9. 2007	60 Kč ☐	
Čtvrtek 6. 9. 2007	60 Kč ☐	
Pátek 7. 9. 2007	60 Kč ☐	
Oběd		
Středa 5. 9. 2007	130 Kč ☐	
Čtvrtek 6. 9. 2007	130 Kč ☐	
Ubytování		
Ze dne 4. 9. na 5. 9. 2007	1 lůžko 105 Kč ☐	samostatný pokoj 210 Kč ☐
Ze dne 5. 9. na 6. 9. 2007	1 lůžko 105 Kč ☐	samostatný pokoj 210 Kč ☐
Ze dne 6. 9. na 7. 9. 2007	1 lůžko 105 Kč ☐	samostatný pokoj 210 Kč ☐
Společenský večer		
Středa 5. 9. 2007	250 Kč ☐	
Celkem		

Objednávku na ubytování a stravování zasílejte v elektronické podobě na e-mailovou adresu: **Jitka.Tomanova@seznam.cz**
nebo vytištěnou na adresu **Mgr. Jitka Tomanová, Katedra antropologie a zdravovědy, Pedagogická fakulta Univerzity Palackého, Žižkovo nám. 5, 771 40 Olomouc.**

KONFERENCE: IOF WORLD CONGRESS ON OSTEOPOROSIS, TORONTO, KANADA, 2. 6.–6. 6. 2006

BRAUN M., HULEJOVÁ H.

Revmatologický ústav, Praha

Letošní červnový Světový kongres osteoporózy pořádaný pod záštitou Mezinárodní osteoporotické nadace (International Osteoporosis Foundation) tentokrát hostila, po zdařilém minulém ročníku v Rio de Janeiro, největší kanadská metropole – Toronto. Jako místo konání pro velkolepé odborné setkání na skutečně světové úrovni byl vhodně zvolen komplex Metro Toronto Convention Centre (MTCC), nacházející se přímo v srdci čtyřmilionového kosmopolitního velkoměsta. Kapacitou svých prostor dokázalo toto centrum vyhovět náročným požadavkům kladeným na akci natolik výjimečného rozsahu a uvítalo přibližně 5 000 kliniků a vědců ze všech koutů planety.

Již samo zahájení představovalo mimořádný zážitek – stylové akrobatické představení s hudebním doprovodem působivě demonstrující krásu, sílu, pružnost a harmonii pohybu

lidského těla předvedla formace Hang Time Circus. Dokonale zvládnuté číslo, nacvičené speciálně pro tuto příležitost, umělecky ztvárnilo myšlenku IOF „Move it or lose it". U diváků za to sklidilo zasloužený úspěch a následující „Wellcome reception" pak znamenala, díky pestré paletě vkusně upravených exotických pokrmů, požitek chuťový, a vhodně tak završila slavnostní ráz úvodního večera.

Organizátoři kongresu ve vlastním program pečlivě skloubili přednesení ústních sdělení, diskuzi i prezentaci posterů. V rámci pevně dané struktury zazněly vždy po ranním firemním „Special Breakfast Symposiu" v dopoledním bloku vyžádané plenární přednášky. V hlavním sále je předneslo celkem jedenáct renomovaných světových expertů. Po krátké přestávce na občerstvení na ně krátce před polednem navázaly v menších přidružených sálech MTCC specializované, mezi sebou „soupeřící", výběrové workshopy. Vzhledem k jejich značnému počtu (celkem 74 „Meet the Expert Sessions") a jejich tematické pestrosti bylo velmi těžké se mezi nimi rozhodnout. Výhodou však bylo, že organizátoři naplánovali po polední pauze opakování těchto dopoledních interaktivních workshopů, čímž umožnili účastníkům navštívit denně alespoň dvě ze zvolených témat. Nutno podotknout, že zájem o tato, téměř neformální, setkání a možnost diskuze s předními specialisty předčil očekávání a navzdory značné kapacitě přednáškových prostor neváhala řada zvídavých návštěvníků vyslechnout si hodinové projevy vestoje – po obvodu přeplněných sálů. Tradiční klinická témata věnovaná prevenci, diagnostice a léčbě osteoporózy a přidružených metabolických onemocnění skeletu byla doplněna řadou aktuálních otázek základního a klinického výzkumu, včetně nových možností moderních zobrazovacích metod, efektivnějších antiporotických léčiv nové generace a hodnocení rizika fraktur u postmenopauzálních žen. S hojnou účastí se setkaly např. sekce věnované úloze vitaminu D při léčbě osteoporózy, zaujala též problematika věnovaná praktickému využití biochemickým markerů kostního obratu.

Součástí programu byla i prezentace posterových sdělení, jichž bylo přihlášeno více než 800 a byla zájemcům k dispozici po celou dobu kongresu. V řadě případů zůstala však místa připravená pro vystavení přihlášených příspěvků bohužel neobsazena. V poledních hodinách byla k jednotlivým tématům umožněna diskuze s autory posterů. Odpoledne pokračovala částí s krátkými ústními sděleními (celkem předneseno 35 příspěvků) a nabitý den byl kolem šesté hodiny večerní uzavřen satelitními symposii.

Rozsáhlá výstavní plocha v 1. patře komplexu dovolila po téměř celou dobu konference nejen umístění posterů, ale též prezentaci předních farmaceutických firem a sponzorů. Mezi více než dvaceti světovými výrobci nabízejícími své produkty z oblasti terapie osteoporózy a příbuzných onemocnění skeletu nechyběly ani natolik renomované firmy jako např. Roche/GSK, Eli Lilli, Novartis, MSD, Pfeizer či Schering.

Kromě odborné části byli v rámci programu oceněni za svoji vynikající dlouholetou profesionální činnost a zásluhy významní vědci a lékaři, kteří svými objevy a zkušenostmi zásadním způsobem přispěli k zájmu o problematiku osteoporózy a získali tak podporu pro výzkum v této oblasti. Mezi oceněnými jmenujme alespoň prezidenta IOF, Prof. Pierra D. Delmase z Francie.

Pro návštěvníky kongresu byl nepochybně vítaným zpestřením i nabízený doprovodný program. Například návštěva CN Tower, nejvyšší samostatně stojící věže na světě (553 m),

a výhled na Toronto z výšky 447 metrů nad zemí nebo výlet k proslulým (150 km vzdáleným) Niagarským vodopádům byl pro mnohé jistě nezapomenutelným zážitkem.

Mezi účastníky kongresu bylo i několik českých a slovenských odborníků, kteří přiletěli do Toronta, aby své zahraniční kolegy seznámili s vlastními výsledky, konfrontovali je se současnými trendy výzkumu ve světě a získali zde nové poznatky a inspiraci pro svoji další práci. Nechyběl zde například ani předseda České lékařské společnosti JEP a současně čestný člen Společnosti pro pojivové tkáně, Prof. MUDr. Jaroslav Blahoš, DrSc., který je i v mezinárodním měřítku považován za velmi uznávaného experta v oblasti léčby osteoporózy.

Všichni účastníci konference získali přehledný sborník abstrakt ve formě suplementa a na CD. Abychom mohli zprostředkovat nejnovější poznatky z tohoto oboru i těm, kteří se kongresu nemohli zúčastnit, snažili jsme se pro Vás vybrat několik zajímavých příspěvků, které následují za tímto úvodním textem a o nichž se domníváme, že by mohly zaujmout i českou odbornou veřejnost. Kompletní přehled abstrakt prezentovaných příspěvků lze pak nalézt v suplementu časopisu Osteoporosis International (Vol. 17, Supplement 2, 2006).

Závěrem lze konstatovat, že tato akce přinesla zúčastněným mnoho nových informací a možností, jak pomoci pacientům v boji s tímto zrádným a hojně rozšířeným onemocněním, a věříme, že stejně povedené jako bylo letošní setkání, nabídne i příští světový osteoporotický kongres, který proběhne ve dnech 3. 12.–7. 12. 2008 v thajském Bangkoku.

RISK FACTORS FOR FRAGILITY FRACTURES IN MIDDLE AGE: A PROSPECTIVE POPULATION-BASED STUDY OF 33 000 MEN AND WOMEN

Holmberg A. H.[1] , Åkesson K.[1] , Johnell O.[1],
Nilsson P. M.[2], Nilsson J.[1], Berglund G.[2]
[1] Dpt of Orthopaedics,
[2] Dpt of Internal Medicine, Malmö University Hospital, Malmö, Sweden

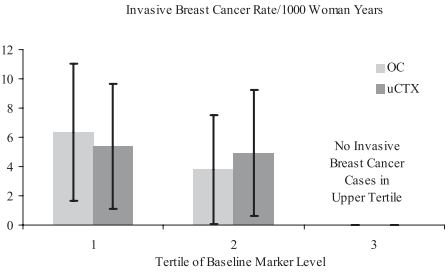
Aim: To prospectively investigate risk factors for low energy fractures in middle age in men and women and also specifically for forearm, vertebral, proximal humerus and ankle fractures as a mean to create a basis for risk assessment and risk factor modification.

Methods: The Malmö Preventive Project consists of 22 444 men and 10902 women witha mean age of 44 and 50 years at inclusion. Baseline assessment included multiple examinations and lifestyle information. Mean follow-up was 16 years for men and 11 years for women with regard to fracture. Clinically relevant data was analyzed in a Cox regression model.

Results: Fragility fractures occurred in 1262 men, 5.6% of the study population. The risk factor with the highest impact on fracture risk was diabetes (RR 2.38, CI 95% 1.65–3.42). Other strong risk factors for fracture in general and for specific fracture types were factors related to mental health problems; prior hospitalization for mental health problems (1.92, 1.47–2.51), poor appetite (1.72, 1.27–2.32), sleep disturbance (1.53, 1.31–1.80) and poor self-rated health (1.25, 1.11–1.41). An indirect measure of alcohol consumption, serum γ-glutamyl transferase, was associated with increased fracture risk in middle aged men for all fractures except forearm fractures. High BMI protected against fractures in general (0.88, 0.83–0.94) and also specifically for forearm, proximal humerus and hip fractures.

Fragility fractures occurred in 1257 women, 11.5% of the study population. The risk factor strongest associated with fracture was diabetes (1.87, 1.26–2.79), a significant risk factor also for vertebral, ankle and hip fractures. Previous fracture increased fracture risk in general (2.00, 1.56–2.58) and for all fracture types except proximal humerus fracture. Hormone replacement therapy decreased general fracture risk by 30% (0.68, 0.54–0.85).

Conclusions: Risk factor for fragility fractures can be identified already in middle age. Impaired health status including diabetes and in men also mental health problems, are major contributors to fracture risk in general and to increased risk of forearm, vertebral, proximal humerus and hip fracture. Risk factors associated with ankle fracture are more life style dependent, suggesting a different etiology compared to the other fracture types.



INFLUENCE OF CALCIUM INTAKE ON BONE RESORPTION DURING PREGNANCY

Avendaño-Badillo D.[1], Téllez-Rojo M. M.[2], Hernández-Cadena L.[2], Mercado-García A.[2], Solano-González M.[2], Koplan K.[2], Hu H.[3], Hernández-Ávila M.[2]

[1] Instituto Nacional de Rehabilitación, Mexico

[2] Instituto Nacional de Salud Pública, Mexico

[3] Harvard School of Public Health, USA

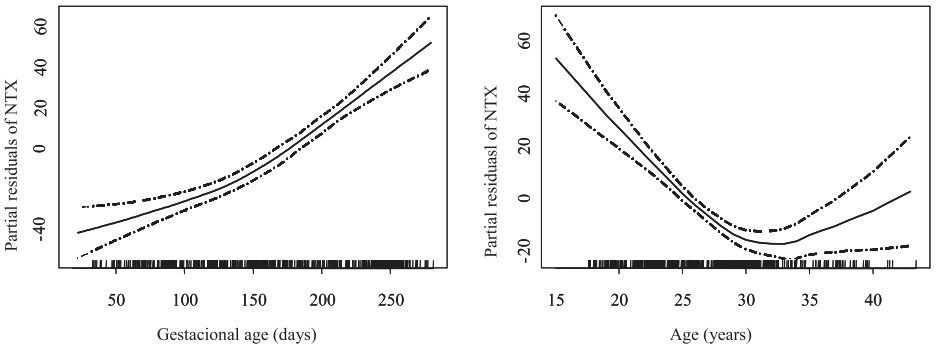
Aims: Calcium metabolism of the mother is modified during pregnancy because of the mineralization of the fetal skeleton. The objective of this study was to evaluate the association of calcium intake and bone demineralization process during pregnancy.

Methods: At each pregnancy trimester a food frequency intake questionnaire was applied in order to assess the daily calcium intake in a cohort of 206 pregnant women living in Mexico City. Samples of the second morning urine were recollected in order to analyze cross linked N-telopeptides (NTx) of type I collagen, which is a specific biomarker of bone resorption. The relationship between calcium ingestionand bone resorption was analyzed using aleatory effects models; nonlinear associations were explored using Generalized Additive Models.

Results: The mean ofage was 27 years in a range of 15–43 years, it was observed as a progressive increase of NTx during pregnancy with means and standard deviations (SD) of 76.50 (SD 38), 101.02 (SD 48.86) and 144.83 (SD 61.33) nmol BCE/mmol creatinine during the first, second and first trimester. After adjusting by maternal age, gestational age and height, the results suggest that calcium ingestion during this period is significantly associa-

Variables with lineal relation	Coefficient	*p* value
Dairy calcium (mg/day)	-0.016	<0.05
Others calcium (mg/day)	-0.006	0.73
Height (cm)	-1.57	<0.01

Variables with nolineal relation



*Adjusted for intake calories

Multivariate additive model of NTX among pregnant women (dairy calcium). Mexico City 1997–2000

ted with a lower bone resorption (β=-0.15; p<0.05). The relationship between age and NTx show a nonlinear behavior with an inflexion point around 33 years, the increase in the age in women under that inflexion point was associated with a decrease in bone resorption; while in older women, the increase was associated with an increased resorption.

Conclusions: The results of this study suggest that calcium ingestion, specifically of dairy products have significant influence on bone resorption during pregnancy: for each 300 mg (a glass of milk) of calcium there is a diminution of 4.8 nmol BCE/mmol of creatinin from NTx (p<0.05).

A SYSTEMATIC REVIEW OF CALCIUM SUPPLEMENTATION AND BONE MASS IN CHILDREN

Winzenberg T. M., Shaw K., Fryer J., Jones G.
Menzies Research Institute, Hobart, Australia

Trials of calcium supplementation in children have given inconsistent results particularly as to whether any benefit persists after supplementation is ceased. We performed a systematic review of randomised placebo-controlled trials of calcium supplementation in healthy children with measurement of bone mass at any site as an outcome. We searched multiple databases including Medline and Embase and used hand-searching to identify 233 potential studies. Assessment by 2 independent reviewers, yielded 35 references to 19studies. Of these, 18 provided data which could be used in meta-analysis. Results are given in the table below. There was no significant heterogeneity at any site. Inconclusion, calcium supplementation has little effect onBMD at the hip or lumbar spine. Total body bone mass increased during supplementation but this effect does not persist. Upper limb bone mass increases with supplementation and this effect persists after cessation but is likely to have little effect on fracture risk in children or later life. The differences between the sites are diffcult to explain biologically. Taken as a whole, this overview suggests calcium supplementation in childhood as a measure for improving long-term bone density is of marginal benefit at best.

Effect of calcium supplementation of bone mass

Site	No. studies	No. participants	Effect size[1] at end trial	No. studies	No. participants	Effect size after supplement ceased
Femoral neck BMD (g/cm^2)	10	1073	+0.07 (-0.05, +0.19)	5	617	+0.10 (-0.06, +0.26)
Lumbar spine BMD (g/cm^2)	11	1164	+0.08 (-0.04, +0.20)	5	617	-0.01 (-0.16, +0.17)
Total body BMC (g)	9	953	+0.14 (+0.01, +0.27)	1	96	0.00 (-0.40, +0.40)[2]
Upper limb BMD (g/cm^2)	12	1579	+0.14 (+0.04, +0.24)	6	840	+0.14 (+0.01, 0.28)

[1] standardised mean difference (SMD) (95% CI); an SMD of 0.3 is regarded as small.
[2] single study only

HIP PROTECTOR BIOMECHANICAL EFFECTIVENESS: THE INFLUENCE OF SOFT TISSUE STIFFNESS

Laing A. C., Gillan C. P., Robinovitch S. N.
Injury Prevention and Mobility Laboratory,
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Aims: Wearable hip protectors may reduce hip fracture risk in the event of a fall. However, there are no accepted standards for measuring the biomechanical effectiveness of these devices. One factor that should affect force attenuation (and therefore needs to be simulated accurately) is the spring stiffness of the skin, fat, and muscleoverlyingthe hipregion, whichacts in-serieswiththespring stiffness of the hip protector. Our aim was to determine how the stiffness of these tissues affects the force attenuation provided by hip protectors.

Methods: Our test system, which consists of an impact pendulum and surrogate pelvis, measures the peak force applied to the proximal femur (F_{max}) during a simulated sideways fall. The system matches the effective mass and pelvic stiffness of the body during impact to the hip, pelvis surface geometry, and the impact velocity of the body during a fall (2.6 m/s). We used this system to determine how soft tissue stiffness (simulated with closed-cell polyethelene foam) affects the attenuation in F max provided by rigidand softshell hipprotectors.We variedthe softtissuestiffness (measured by indentation testing) between "stiff" (183 kN/m), "physiologic" (23 kN/m, matching the average stiffness measured in 15 elderly women), and "compliant" (10 kN/m).

Results: The force attenuation provided by hip protectors increased with increasing soft tissue stiffness ($p<0.001$). In the physiologic condition, the rigid and soft protectors attenuated peak force by 19% and 22%, respectively. In the stiff condition, force attenuation increased to 32% and 47% for the rigid and soft protectors, respectively. In the compliant condition, force attenuation decreased to 2% and 14% for the rigid and soft protectors, respectively.

Conclusions: These results indicate the need for impact testing systems to accurately simulate soft tissue stiffness in order to provide valid estimates of the biomechanical effectiveness of hip protectors. For softprotectors, theeffect issimply ofsprings acting in series. For rigid hip protectors, tissue stiffness influences the amount the hip protector intrudes into the soft tissues, which affects its ability to form an energy-shunting bridge. Funded by grants from NSERC, CIHR, MSFHR, and Tytex, Inc.

VERTEBRAL FRACTURES AFFECT SPINE LOADS IN VIVO

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Aims: The aetiology of osteoporotic vertebral fractures is multifactorial and complex, and cannot be explained solely by low bone mineral density. Examination of physiologic loading of vertebral bodiesin vivo mayhelp to explain mechanisms underlying

fracture and recurrent fracture. The aim of this study was to model physiologic load parameters in individuals with and without osteoporotic vertebral fractures in upright stance, to determine if spinal loading profiles differ between these groups.

Methods: Gravitational flexion moments and compression and shear forces due to gravity and trunk muscle force were calculated from T2–L5 in 12 participants with fractures (66.4±6.4 yrs, 162.2 ±5.1 cm, 69.1±11.2 kg) and 32 without fractures (60.7±6.8 yrs, 160.2±5.4 cm, 63.3 ±10.3 kg). Gravitational loading estimates were solved using static analysis for each vertebral level, while muscle forces were calculated using a detailed trunk muscle model driven by mathematical optimisation, with a cost function minimising muscle fatigue. Least squares regression was used to derive polynomial functions to describe normalised load profiles over vertebral levels. Non-linear regression co-effcients were compared between the 2 groups using t-tests to examine differences in load profiles. Loads parameters were also compared between groups at the level of fracture and the vertebral level inferior.

Results: Results are presented as normalised data. Fractures were most common in the mid-thoracic spine at T6 and T8. The fracture group demonstrated signficantly greater flexion moments across vertebral levels (9–82 %, p=0.033). Significantly greater compression force (p<0.0001) and shear force (p=0.002) profiles (1–17 % and 13–162 %, respectively) were observed in the fracture group. The fracture group had significantly greater flexion moments (p<0.001) and shear forces (p<0.001) at the level of fracture and greater flexion moments (p=0.001) and compression force (p=0.004) at the level below the fracture, compared to the equivalent level in the non-fracture group.

Conclusion: The differences observed in multilevel spinal loading between the groups may partly explain the reasons for increased risk of subsequent vertebral fractures. Force profiles are likely to differ due to subtle changes in spinal curvature as a result of fracture. These results may provide valuable insight into interventions to improve posture and/or restore normal vertebral morphology in order to normalise spine force profiles.

ONCE-MONTHLY AND DAILY ORAL IBANDRONATE ARE SIMILARLY WELL TOLERATED IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS: 2-YEAR RESULTS FROM MOBILE

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Aims: In postmenopausal osteoporosis, premature withdrawal from oral bisphosphonate treatment can significantly compromise therapeutic outcomes. Adverse events (AEs) are a leading cause of treatment discontinuation. Extending the dosing interval may help to improve therapeutic adherence. Ibandronate (Bonviva) is a potent, nitrogen-containing

bisphosphonate that can be administered as a once-monthly oral regimen. 1 At 1 year, once-monthly ibandronate dosing was well tolerated in the MOBILE study. We present the 2-year safety and tolerability findings from this study.

Methods: In MOBILE, a randomized and double-blind study, women (aged 55–80 years and R5 years postmenopause) with osteoporosis (lumbar spine BMD T-score <-2.5, but R-5) received 2-years' treatment with either once-monthly (50+50 mg, 100 mg or 150 mg) or daily (2.5 mg) oral ibandronate. Vitamin D (400IU/day) and calcium (500 mg/day) were also provided. All recorded AEs, including symptomatic fractures, were included in the safety analysis. Results: Over the 2-year treatment period, once-monthly dosing was well tolerated, independent of the administered dose. Specifically, and asat1 year, noimbalanceinthe overallincidenceofAEs (76.5–80.3%), including drug--related AEs (30.1–36.9%) and drug-related AEs leading to withdrawal (5.1–7.6%), was reported across the treatment groups. In all analyses, no safety disadvantage was observed in the 150 mg arm. Drug-related serious AEs were reported with a low incidence (0.3–0.8%; n=8). At 2 years, the frequency of upper gastrointestinal AEs was well balanced across the treatment arms (monthly: 19.9–25.8%; daily: 22.8 %). A low and balanced rate of clinical fractures was also obtained (6.3–8.1%). No cases of osteonecrosis of the jaw were reported.

Conclusions: Once-monthly oral ibandronate administrations are as well tolerated as a daily schedule that has previously shown tolerability similar to placebo. With improved adherence to therapy, once-monthly dosing may further improve the overall therapeutic effectiveness of oral bisphosphonates.

1. Miller PD, et al. J Bone Miner Res 2005;20:1315–22.

PROPHYLACTICAUGMENTATION OF THECONTRALATERALFEMUR: A FINITE ELEMENT STUDY

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Purpose: Hipfracturepatients areassociated withanincreased risk of a future contralateral hip fractures. There is currently no procedure that instantly strengthens the contralateral femur in hip fracture patients. To address this need, three new surgical procedures were tested.

The goal of this study was to assess, using a finite element analysis, the ability of three new surgical reinforcements to strengthen the proximal femur.

Methods: A finite element model of the proximal femur was developed using a QCT scan of a femur from a 73-year-old female donor with a BMD of -2.2. The model was made in ANSYS 8.1 and was validated through mechanical testing with strain gauges. The model was modified to include three different implants (**Figure 1**): a Gamma Nail (Howmedica/Osteonics, Mahwah, NJ), a carbon sleeve set in bone cement that

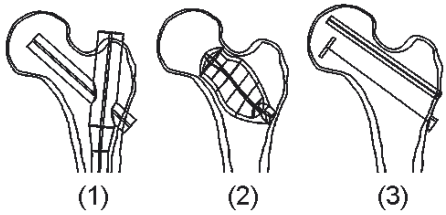

Figure 1 – Implant models

contours the cortex in the femoral neck and extends into the trochanteric region, and a two-part construct consisting of a carbon sleeve set inbone cement placed in the superior neck and a wire which is anchored in the femoral head and runs through the inferior neck. Strength testing was performed by loading the models in a simulated fall.

Results: The model predicted that the intact femur would fail at the base of the neck at a load of 3618 N. The strength was increased 100 % bythe first implant, 80% bythe secondand 15 % by the third.

Conclusions: In this study the ability of three implants to strengthen the proximal femur was assessed in the hope of preventing a second hip fracture inhip fracture patients. The study suggests that the first and second implants significantly strengthened the femur.

DIFFERENTIAL DIAGNOSIS OF MARFAN SYNDROME, EHLERS-DANLOS SYNDROME AND OSTEOGENESIS IMPERFECTA

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662 pacients with inherited connective tissue diseases and bone dysplasias were examined by means of a diagnostic system based on revised criteria for Marfan and Ehlers-Danlos syndromes as well asforosteogenesis imperfecta, benignjointhyperelasticity and juvenile osteoporosis. In 541 patients all data necessary for differential diagnostics were obtained: 145 patients met the criteria for Marfan syndrome (MFS), 82 patients for Ehlers Danlos syndrome (EDS) and 62 persons for osteogenesis imperfecta (OI). 159 patients had benign joint hypere-lasticity (BJH) and the remaining patients demonstrated other diagnoses. Examined biochemical parameters, e.g., osteocalcin OC was significantly increased in patients with type IV of OI when compared with type I and significantly lower level of PICP in patients with OI when compared to other groups. Crosslinks were significantly higher in patients with OI as well as in patients with Marfan syndrome upto 13 years, but in older children no difference was found. The highly specific marker for Marfan syndrome was bird chest and thumb test. On the other hand in osteogenesis imperfecta drum chest and larger head circumference were typical. Decreased vital pulmonary capacity was found in all severe chest deformities and in scolioses greater than 25 degrees Cobb angle. Patients with Marfan syndrome were tall and had longer extremities to trunk, the highest incidence of hernias and in addition to that, they had also longer anteroposterior bulbus length measured by ultrasonography. Acetabulum protrusion or spondylolisthesis also occur only in MFS patients. Recurrent luxations, varicose veins and chronic pains were observed only in Ehlers-Danlos syndrome. The presented diagnostic system including clinical, biochemical, densitometric, radiologic and ultrasonic parameters seems to be adequate for differential diagnosis of connective tissue diseases. Molecular genetic examination was indicated only in few unclear cases.

QUANTITATIVE ULTRASONOMETRY OF THE CALCANEUS IN CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS

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Objectives: To evaluate bone quality by means of quantitative ultrasonometry (QUS) in children with juvenile idiopathic arthritis (JIA).

Methods: 70 children (37 with oligoarticular JIA, mean age 10.54±3.42 SD; and 33 with polyarticular JIA, mean age 11.33±2.88 SD) were enrolled. QUS was measured on both heels with Cuba Clinical portable device. Body height, weight and BMI were recorded together with disease duration and cummulative dose of prednisone.

Results: The lowest QUS parameters were observed in children with polyarticular JIA ($p<0.001$ and 0.01 when compared to reference data and oligoarticular JIA, respectively). In children with oligoarticular JIA, the QUS values were also significantly lower in comparison with the reference data ($p<0.002$). QUS parameters were strongly influenced by body height and to a lesser degree by body weight. In children with polyarticular JIA there were significant inverse correlations between QUS parameters and disease duration ($r = – 0.57$, $p<0.01$ for broadband ultrasound attenuation – BUA; and$r=– 0.67$, $p<0.01$ for velocity of sound -VOS). Similarly,there were inversecorrelations betweenQUS and cummulative dose of prednisone ($r = –0.48$, $p< 0.05$ for BUA; and $r = –0.50$, $p< 0.01$ for VOS, respectively).

Conclusions: Disease duration and cummulative dose of prednisonein childrenwith polyarticular JIA are riskfactors of stunted growth and decreased QUS values of bone quality.

MARKERS OF BONE REMODELING CORRELATE NEGATIVELY WITH SERUM TSH IN POSTMENOPAUSAL WOMEN

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Recent in vitro studies have suggested that not only active thyroid hormone, but also thyrotropin (TSH) significantly regulates bone metabolism. The purpose of this cross-sectional study is to evaluate relationships between circulating TSH and parameters of bone metabolism in 60 untreated postmenopausal women. Besides the serum TSH levelsand parametersof boneremodeling,a numberof osteotropic hormones, such as free thyroxine (FT4), IGF-I, dehydroepiandrosterone sulfate (DHEAS) and sex hormone binding globulin (SHBG) levels was determined. Bone mineral density at the spine and at the hip was measured by DXA method. Pearson's correlations showed negative association between serum TSH and cross-linked telopeptide of type I collagen, urinary deoxypyridinoline/creatinine ratio or serum carboxy-terminal propetide of type I procollagen. No correlations were found between FT4 levels and parameters of bone remodeling. Additionally, 64.7 % variability in TSH levels and 41.1% variability in FT4 values in our cohort shared with the factor of bone remodeling (factor analysis). As to the bone mass, the negative correlations between bone density at the hip and SHBG levels and/or FT4 levels and

positive correlation between bone density at the hip and DHEAS levels were found. To conclude, this study suggests negative association between circulating TSH and biochemical markers of bone remodeling in postmenopausal women. In addition, it confirms the strong predictive value of serum SHBG levels for bone density at the hip in these women. The study was supported by grant NB/7391–3 of the Internal Grant Agency of the Czech Ministry of Health.

SERUM PTH IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Introduction: Parathormone (PTH) is secreted by parathyroids glands and is related with calcium metabolism and react to serum calcium variations; nowadays there is an increase interest in the relationship between serum PTH and bone reabsorption; what is the real impact of PTH enhancement and risk for osteoporosis bone?

Objective: Toassess serum PTH in postmenopausalwomen with osteoporosis.

Methods: We evaluate the results of serum PTH (pg/ml and normal range 10–65 pg/ml) in postmenopausal women with WHO criteria for osteoporosis. Data are represented mean sd, absolute and relative values.

Results: We found the following epidemiological data – age 60.3±7.7 years, menarche 13.5±1.5 years, menopause 48±6.03 years and BMI 26.6±4.17 kg/m2. Serum PTH above the upper levels of normal range was founded in 23 patients – 21%.

Conclusion: In this sample of postmenopausal women with osteoporosis, elevated serum PTH was found only in 21% of patients. With those data we can not directly relate serum PTH and risk of postmenopausal osteoporosis.

PREDICTION OF BONE LOSS WITH BIOCHEMICAL MARKERS OF BONE TURNOVER

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Aims: The association between baseline levels of eleven bone turnover markers and 5-year change of bone mass, as assessed by DXA (six skeletal regions) and ultrasound of the calcaneus (stiffness, speed of sound (SoS), broadband attenuation (BUA)) were studied in a population based random sample of 882 elderly women selected from the Malmö OPRA cohort. None of the selected women had been treated or were prospectively treated with any bone active medications.

Methods: At baseline all were 75-year old. They were investigated by assessing bone turnover with biochemical markers and bone density with DXA and ultrasound technique. Five years later, when all women had reached the age of 80, a follow-up investigation of bone density with DXA and ultrasound was performed.

Bone formation was assessed by serum bone specific alkaline phosphatase (S-Bone ALP), four different serum osteocalcins (S-OC) (including two different assays for S-Total OC, S-OC [1–49] and carboxylated OC (S-cOC)). Bone resorption was assessed by urinary deoxypyridinoline (U-DPD/crea), serum acid phosphatase (S-TRACP5b) and S-CTX (serum Crosslapst). Also three

different assays for urinary OC (U-OC) were analysed.

Results: After 5 years 610 (69%) of the women attended. The mean percentage yearly changes of BMD were in total body-0,32, the legs -0,57, the total hip -1,32, spine +0,38, and for the ultrasound variables; stiffness -1,17, SOS -1,5, BUA -1,26.

All markers (except S-Bone ALP) were correlated, with forthcoming bone loss, in particular such as assessed by BUA and by DXA of legs.

There were no clear patterns which of the markers that could best identify forthcoming bone loss (standardized regression coefficient (R 2) always <5), but all four serum S-OCs were correlated with all bone sites (except lumbar spine). High (above median value) bone turnover (in particular when assessed by U-DPD/crea) was predictive for high (above median) bone loss (in particular when assessed by DXA of the legs).

Conclusions: Although this study clearly indicates that several of the markers were clearly correlated with forthcoming bone loss, in particular as assessed by ultrasound of the calcaneus, the importance of this finding for clinical decision making, in elderly women, is not very strong.

BONE METABOLISM, CALCIUM REGULATING FACTORS, DAILY WALKING AMOUNT, AND GRIP STRENGTH IN OLD WOMEN

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Aims: Although the effects of exercise on osteoporosis are well known, its regulatory mechanism is poorly understood. We investigated the relationship between levels of bone markers, calcium regulating factors including nutritional status of vitamin D and physical activity level and muscle strength.

Methods: Ninety-four female volunteers with a mean age of 81 years participatedinthe investigation. Daily nutritionalintake and daily walking amount were recorded for one week. Subsequently, fasting blood and second urine samples were collected early in the morning, andbody height,weight, fat percentage andgrip strength were measured. In addition, the index of bone mineral density was evaluated by quantitative ultrasound, which determined the speed of sound (SOS) in the right calcaneus. The following blood and urinary markers of bone turnover were measured: serum bonespecific alkaline phosphatase (BAP) and osteocalcin(OC) for bone formation, and urinary crosslinked N-telopeptides of type I collagen (NTx) and deoxypiridinoline (DPD) for bone resorption. Serum intact parathyroid hormone (PTH-intact), calcitonin (CT), 25(OH)D and $1,25(OH)_2$ D were also determined.

Results: No significant correlations were observed between age and levels of bone markers, PTH-intact, CT in all subjects; however 25(OH)D and $1,25(OH)_2$ D levels were inversely correlated with age. A significant negative correlation was observed between grip strength and DPD level, while positive correlations were observed between grip strength and both 25(OH)D and 1,25(OH) 2 D levels.

In the high walking amount group (highest 25th percentile), NTx and DPD levels were significantly lower than in the low walking amount group (lowest 25th percentile). In the high grip strength group (highest 25th percentile), DPD level tended to be lower, and both 25(OH)D and $1,25(OH)_2$ D levels were significantly higher than in the low grip strebgth group (lowest 25th percentile). In contrast, no differences were observed for levels of SOS, bone formation markers, PTH-intact or CT.

Conclusions: These results demonstrate that physical activity and the maintenance of muscle strength may suppress increased boneresorption in elderly women, and be relatedto the nutritional status of vitamin D.

THE PREDICTIVE ROLE OF BIOCHEMICAL MARKERS IN BONE MINERAL DENSITY CHANGES IN MEN

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Aims: Theuseofbiochemical markersasindicators ofoverallbone metabolism has been suggested as a potentially valuable clinical method in osteoporosis screening, diagnosis and monitoring the effects of different interventions, as they reflect small changes in bone turnover in a short timeframe. The aims of this study were to determine whether bone formation (PINP and PICP), and bone resorption (ICTP) markers are predictive of changes in BMD over a 5-year period, and also the ability of bone resorption marker NTxto explain the variance in BMD changeoverthe prior 5 years.

Methods: Both prospective and retrospective cohort study designs were used.

Subjects were selected from the population-based Finnish Twin Cohort. The sample was composed of 203 monozygotic male twins 35–69 years old (mean 49.7, SD 8.4).

PINP, PICP and ICTP markers were determined from serum by radioimmunoassay (Orion Diagnostica, Finland); NTx was measured in urine using an ELISA resorption assay (Osteomarkt; Ostex International) (CV<10.0%). BMD was measured with DXA (Lunar DPX, Madison, WI), at the L1-L4 vertebrae (CV 0.9%) and femoral neck (CV 1.5%).

Data analysis. Pearson coeffcients assessed the correlation between change in BMD and baseline marker values in the whole group, and in the group of subjects older than 60. The ability of markers to explain change in BMD, with age, fat free weight, height and baseline BMD as possible confounding factors was examined using multiple linear regression.

Results: Among the markers analyzed in the whole group, only NTx correlated with change in femoral neck BMD($r= -0.21$, $p= 0.006$) and explained 3.8% of the variance. In the group of subjects older than 60 years (n=14), NTx and PICP significantly correlated with change in spine BMD ($r= 0.6$ and 0.5, $p<0.05$).

Conclusions: Among markers,only NTxexplained a statistically significant, yet quite limited portion of the variance in

change BMD inthe wholegroup of men 35 to 69 years old, and onlyat the femoral neck. The correlations of NTx and PICP with the change in spine BMD were notably higher in the group of subjects older than 60 than in the whole group.

THE BENEFICIAL EFFECT OF VITAMIN D SUPPLEMENTATION ON OPG/RANKL/RANK PATHWAY IN POSTMENOPAUSAL WOMEN

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Background: Receptor activator of nuclear factor κB ligand (RANKL) is a critical cytokine for osteoclast differentiation and activationand an essential regulatorof osteoblast-osteoclast crosstalks. RANKL activates its receptor RANK, which is located on osteoclastic lineage cells. This interaction is prevented by osteoprotegerin (OPG), which acts as an decoy receptor and blocks the RANKL effects. Thus, RANKL binding to RANK promotes osteoporosis by enhancing of bone resorption and OPG has opposite effect. The process of coordinated resorption and formation of bone may be regulated by systemic hormones, cytokines and growth factors.

Aim: To evaluate the influence of mild dose of vitamin D on OPG and RANKL, and possible relationships between them and other biochemical parameters.

Methods: 88 postmenopausal women were enrolled in the clinical study. Patients received calcium supplement (500 mg/d) and vitamin D (20 000 IU/week) for six months. Serum OPG, RANKL, iPTH, osteocalcin (OC), β-CrossLaps (CTx), alkaline phosphatase(ALP),bonespecificALP(BALP), serum and urinary Ca, Mg and P were measured at the beginning and end of the study.

Results: The 67 subjects of 88 were suffering from osteopenia/ osteoporosis. The average values of biochemical assays, CTx, OC and OPG were in reference range at the beginning, as well as at the end of the study. At month 0, mean serum 25(OH)D3 was in the range of vitamin D insuffciency (27.6 ng/ml) and iPTH was on the upper limit of normal range (64.9 ng/ml). At month 6, 25(OH)D3 was markedly increased (47.9 ng/ml; $p<0.001$) and iPTH was decreased (56.8 ng/ml; $p<0.02$). ALP and BALP were significantly higher after six months therapy, although still in normal range. RANKL was significantly decreased ($p<0.05$). Pearson's correlation coeffcients were significant for deltaRANKL vs. delta25(OH)D3 (0.488, $p<0.05$) and for deltaALP vs. delta25(OH)D3 (-0.547, $p<0.01$).

Conclusion: Administration of mild dose of vitamin D suppresses osteoclastogenesis by decreasing serum RANKL production, along with osteoblast function stimulation via changes in BALP and ALP. Thus, vitamin D is significantly involved in the OPG/RANKL/RANK pathway and effectively participates in osteopenia/osteoporosis treatment. This work was supported by STAA under the contract No. APVT-21-033002.

SUB-OPTIMAL VITAMIN D STATUS IN CHILDREN AND YOUTH WITH DISEASES ASSOCIATED WITH LOW BONE MASS

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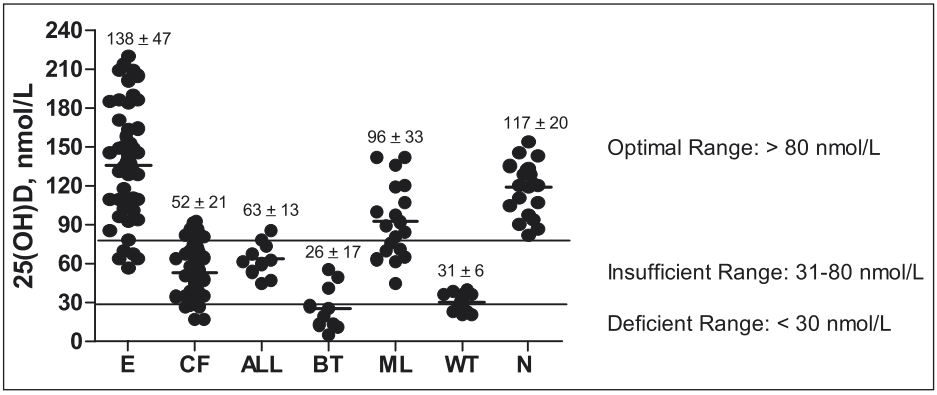
Aims: 1) To determine the vitamin D status of children and youth with various clinical disorders living in southern Ontario (latitude ~ 43 °N) in relation to the recent recommendations (Whiting and Calvo 2005) for cut-off values for plasma 25-hydroxyvitamin D (25OHD) to define deficiency (<30 nmol/L), insuffciency (30–80 nmol/L) and suffciency (>80 nmol/L) for vitamin D status. 2) To determine if differences in vitamin D status exist in children and youth (age = 2–18 yr) diagnosed with epilepsy treated with valproateand/orlamotrigine (En=52) pediatric, cysticfibrosis (CF n=48), acute lymphoblastic leukemia (ALL n=10), brain tumour (BT n=10), or survivors of treatment for malignant lymphoma (ML n=19) or Wilm's tumour (WT n=23), compared to healthy children at pre-pubertal age (N n=26).

Methods: Serum obtained as part of protocols to study bone and mineral metabolism within each disease group was assayed for 25OHD after acetonitrile extraction by RIA (Diasorin) or Nichols Advantage (for CF only) and PTH by IRMA (Nichols).

Results: Mean serum 25OHD was not different between winter (Nov-Mar) and summer (Apr-Oct) samples within disease groups but was lower in winter for all groups combined (57 45 vs. 77 33 nmol/L, p<0.03). The figure presents individual subject and mean SD values within disease groups, with horizontal lines indicating lower cut-off values for deficiency and insuffciency. Insuffcient status occurred in 12% of E, 71% of CF, 90% of ALL, 30% of BT, 37% of ML, 48% of WT. 25OHD status was inversely but weakly correlated with serum PTH (R = - 0.2, p = 0.005).

Conclusion: Vitamin D deficiency or insuffciency occurs frequently in some pediatric diseases and may be a factor in the low bone mass observed in these populations. The determinants of low vitamin D status and associated health risks for those in the insuffcient category require further investigation.



25OHD status in pediatric diseases in relation to proposed deficient, insuffcient and optimal ranges.

MILK SUPPLEMENTATION DECREASES BONE TURNOVER IN DANISH PRE-PUBERTAL BOYS

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The risk of osteoporosis later in life can be reduced by achieving high bone mass during growth. Milk supplementation was reported to increase bone mineral density when compared with habitual diet. It is unclear whether this effect is due to a higher protein intake by milk supplemented groups or due to other active compounds derived from milk (e.g. calcium). Furthermore, increased bone mineral density has been associated with reduced bone turnover. Our aim was to compare the effect of proteinbalanced milk and meat supplementation on bone turnover in pre-pubertal boys.

Twelve 8-year-old healthy Danish boys were assigned to consume 1.5 L of skimmed milk and twelve to consume 250 g of low fat meat daily. The 7-day intervention was designed to supplement participants' habitual diet with 53 g of protein per day. Daily intake of energy, macronutrients and selected micronutrients was calculated from 3-day weighted food record. Fasting serum was collected at baseline and after 7 days. Bone formation was measured by s-osteocalcin (OC) and s-bone-specific alkaline phosphatase (BAP). Bone resorption was measured by s-C-terminal telopeptides of type I collagen (CTX). We applied general linear model including baseline confounders for computation.

There was no significant difference in baseline s-OC ($p=0.9$), s-BAP($p=0.9$) and s-CTX ($p=0.3$) between the groups. Apart form energy percentage from carbohydrates ($p=0.007$) and fat ($p=0.02$), habitual dietary intake did not differ significantly between the groups (all $p>0.2$). During intervention, protein intake increased in both groups by 56–58 % ($p=0.4$). Only the milk group had increased total energy and selected micronutrients intake compared with baseline (all $p<0.005$). After the intervention, s-OC was reduced ($p=0.001$) in milk group compared with meat group (35.27 ng/ml 9.4 SD vs. 54.54 ng/ml 17.1 SD, respectively) and s-CTX was reduced ($p=0.037$) in milk group compared with meat group (1.78 ng/ml 0.4 SD vs. 1.97 ng/ml 0.3 SD, respectively). There was no significant change in s-BAP between the groups ($p=0.06$).

In conclusion, high milk intake in contrast to high meat intake decreases bone turnover in pre-pubertal boys already after seven days. Long term effect of presented treatment on bone turnover should be studied next.

SERUM LEVELS OF RECEPTOR ACTIVATOR OF NUCLEAR FACTOR KB LIGAND (RANKL) IN HEALTHY WOMEN AND MEN

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Background: The receptor activator of nuclear factor kB ligand (RANKL) is an important regulator of bone metabolism. The aim of this investigation was to evaluate potential ageand genderrelated changes in free RANKL and total RANKL and to determine correlations, if any, between these parameters and bone mineral density (BMD).

Methods: Two hundred and forty-five volunteers with a median age of 48 years were included in the study. Serum levels of free RANKL and total RANKL were evaluated. BMD of the spine and the right hip were measured.

Results: On average, men had a 1.53--fold higher free RANKL level and a 2.17--fold higher free/total RANKL ratio than women after correction for potential age differences. On the other hand, one subject compared to another who is five years younger had a freeRANKL level that isonly 0.89 times and atotal RANKL level that is only 0.91 times as high on average. In women, there was a minor significant negative correlation between total RANKL and the Z-score of the spinal BMD as well as the Z-score of the hip BMD. The correlation between the free/total RANKL ratio and the Z-score of the spinal BMD was positive. In men, a minor positive correlation existedbetween total RANKL and the Z-score of the spinal BMD.

Conclusion: This study showed that serum levels of free RANKL and total RANKL decrease with age, and also revealed some gender-related differences.

BONE REMODELING CHANGES AND VITAMIN D STATUS IN CHRONIC RENAL FAILURE PATIENTS WITH SECONDARY HYPERPARATHYROIDISM AFTER PARATHYROIDECTOMY

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Chronic renal failure (CRF) is often associated with bone disordersincluding secondary hyperparathyroidism (SHPT). This study was carried out in order to evaluate changes in bone remodeling after parathyroidectomy (PTX). Twelve adult patients, mean age 43.4±12.7 years old, both gender, were evaluated, before and 6 months after PTX. Biochemical markers of bone metabolism, such as total and ionized calcium, phosphorus, 25(OH)D3, total alkalinephosphatase (TAP), bonespecific alkali-

ne phosphatase (BAP), intact parathyroid hormone (iPTH), osteoprotegerin (OPG), and tartrate-resistant acid phosphatase isoform 5b (TRAcP) were performed. No changes were observed in the serum total and ionized calcium, TAP and BAP after PTX. After surgery there was a significant decrease in the serum phosphorus, iPTH, and TRAcP (6.7±1.8 mg/dl to 4.5±1.5 mg/dl, 1221.6±685.1pg/ml to 153.1±189.2 pg/ml, 9.07±6.17 U/l to 2.7±5.14 U/l, respectively; $p<0.001$). No significant changes were observed in the 25(OH)D3. However, the prevalence of the hypovitaminosis D (20–40 ng/ml) and vitamin D insuficiency (10–20 ng/ml) decrease from 50% and 30% to 16.7% and 25%, respectively. The patients with suggested "optimal" concentration of 25(OH)D3 (>40 ng/ml) increased from 20% to 58% after PTX. No significant change was observed in OPG, however there was a positive correlation between OPG and 25(OH)D3 before and after surgery ($r=0.774$, $p=0.014$; and $r=0.706$, $p=0.01$, respectively), also a negative correlation between OPG and TAP was observed after PTX ($r=-0.63$; $p=0,028$). The present study indicates that after 6 months after PTX the osteoclastic activity decreasens and the OPG remain elevated, suggesting a high index of bone formation. Furthermore, high iPTH seems to contribute to higher prevalence of the hypovitaminosis D and vitamin D insuficiency.

HIGH BONE REMODELLING ACCORDING TO VALUES OF C-TELOPEPTIDE IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS

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Ovarian suppression leads to an increase of markers of bone remodelling, this increase can be variable and stable for many years, in some cases during the whole life. High rates of bone turnover are associated with greater loss of bone mass and fractures. C-telopeptide is a collagen degradation product that reflects osteoclastic activity and is a specific marker of bone resorption. The objective of this study was to evaluate the values of C-telopeptide in postmenopausal osteoporotic women and compare them to healthy premenopausal women.

C-telopeptide (β Cross-Laps) was determined by electrochemiluminescence inmmunoassay "ECLIA" in a Elecsys 1010, Roche Laboratory (intra assay VC 2.6%), in 105 patients who attended for the first time a consultation of osteoporosis at the Clinical Research Centre UNILIME UC, from January 2004 to January 2005. They had not received previous treatment for osteoporosis nor hormonal replacement therapy; in addition there were determined risk factors and bone mineral density at lumbar spine and femoral neck by DXA (Lunar DPX. VC 1.5%). The average age was 58.69±10.84 years; mean age of menopause was 48.29±3.98 years. The most common risk factors for osteoporosis were: breast feeding: 88.6%; low dairy products consumption: 81%; sedentarism: 50.5% and smoking habit: 26.7%. The BMD values were: L1-L4 0.902 g/cm^2, T-score

-2.31, femoral neck 0.778 g/cm^2, T-score -1.74. 16.2% of patientshad previousfractures. The averagevalueofC-telopeptide was 0.421±0.22 ng/ml, percentile 10–90:0.160–0.792. 70.5% of the patients were over the premenopausal value (0.281±0.134) and 45.7% over 1 SD of this premenopausal average. There was significant correlation between CTx and Tartrate Resistant Acid Phosphatase r:0.660 p<0.001. In conclusion, mean value of C-telopeptide (b Cross Laps) in postmenopausal women with low BMD was 0.421±0.22 ng/ml. 70.5 % of them were over the premenopausal mean (0.281 ng/ml) obtained in healthy premenopausal Venezuelan women, with normal bone mineral density and 45.7% had values over 1 SD above this mean.

THE UTILITY OF BONE TURNOVER MARKERS IN OSTEOPOROTIC PATIENTS

Hulejova H.[1], Braun M.[1], Adam M.[1], Skacelova S.[1], Simkova G.[1], Pavelka K.[1], Dungl P.[2]

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Aims: Osteoporosis (OP) belongs to one of the most serious disorders of bone metabolism with very high and increasing incidence, and represents even significant economic consequence concerning aspects of its treatment. That is why a set of important biochemical markers are studied and new sophisticated and sensitive analytical methods are developed in effort to reduce the development of OP to late stages. The aim of this work was the comparison and evaluation of bone metabolism markers of osteoclastic activity – urinary deoxypyridinoline (UDPD), serum C-terminal telopeptide of type I collagen (CTX) and osteoblastic activity – bone alkaline phosphatase (BAP), osteocalcin (OC), C-terminal propeptide of collagen type I (PICP) in OP patients. From a clinical point of view, the influenceof conservative therapy of OP and aspects of lowering the risk of new fractures will be evaluated as well.

Methods: UDPD and OC were determined by the IMMULITE Automated Immunoassay Analyser (DPC, Los Angeles, CA, USA), a continuous random access instrument which performs automated chemiluminescent immunoassays.

BAP, PICP and CTX were determined by ELISA kit (Metra Biosystems, Inc., USA and Nordic Bioscience Diagnostic A/S, Denmark).

Results: From the preliminary results it is clear that markers of osteoclastic activity were increased in comparison with healthy controls (UDPD=10.14±3.55 vs. 8.12±2.81 nmol/mmol creat.; CTX=1.10±0.68 vs. 0.32±0.25 ng/ml) as well as osteoblastic activity markers (BAP=0.75±0.36 vs. 0.31±0.11 μkat/l; OC=8.24±5.01 vs. 4.79±2.83 μg/l; PICP=186.77±141.26 vs. 125.10±50.21 ng/ml).

Conclusions: We can summarize that markers like UDPD, CTX, BAP, OC and PICP are valuable indicators of remodelling of bone tissues in OP and in other diseases as well. Obtaining data from wider groups of patients is the object of future study.
Supported by Ministry of Health of the Czech Republic (Research Programme No. 0002384101)

CLINICAL IMPORTANCE OF VITAMIN D IN OSTEOPOROSIS: ANALYTICAL ASPECTS OF ITS DETERMINATION

Braun M.[1], Hulejova H.[1], Adam M.[1], Skacelova S.[1], Simkova G.[1], Pavelka K.[1], Dungl P.[2]

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Aims: Vitamin D is necessary for regulation of calcium and phosphorus serum levels, and crucial for mineralization of bone tissues. The main forms, ergocalciferol and cholecalciferol are hydroxylated inliver to 25-hydroxyvitamin D2 or D3, inkidney to biologically active form (1,25--dihydroxyvitamin D3). Clinically relevant is determination of both 25-hydroxyvitamin D forms to evaluate effect of vitamin D supplementation. In osteoporosis (OP), vitamin D status is one of the most important parameters in differential diagnostics. In this work we explain both, the clinical importance of vitamin D and analytical aspects of determination of its forms. Advantages and limitations of different analytical approaches are discussed.

Methods: The first methods for determination of 25hydroxyvitamin D were based on RIA, later immunochemical EIA and ELISA methods appeared. They are fast, but burdened by nonspecific interactions (big interassay variations) and only one analyte can be measured. HPLC represents another modern approach – high efficiency, reproducibility, accuracy and economic aspects are its main advantages. In combination with sensitive detectors and shortened sample preparation procedures, HPLC became perspective for simultaneous measurement of different forms of calciferols and even other biochemical parameters in one chromatographicrun and provides highly reliable results. From all the methodsdeveloped for determination ofvitamin D, we decided to apply fast HPLC in reversed phase using C18 column and UV detection as the most suitable for our purpose to determine all the clinically important forms of vitamin D. In our OP group we focused on the differential diagnostics. Patients will be controlled in one-year intervals for five years, both clinically and by means of laboratory diagnostics, including assessment of vitamin D status, bone metabolism markers, calcium and phosphorus levels, and other biochemical parameters which will be mutually correlated.

Results and conclusions: In this study we summarized and discussed both the clinical importance of vitamin D and also the analytical approaches and aspects of determination of its different forms in osteoporotic patients. The results and correlations with the clinical aspects will be the subject of our further work.

Supported by Ministry of Health of the Czech Republic (Research Programme No.0002384101)

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Chairmen: KOROBOWICZ E., KARSKI J.

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14.00–16.00 – Visit ot Kozłówka Muzeum

18.00 – Concert

Lectures in English and/or in Czech 15 minutes with discussion, text slides in English

REVIEW ARTICLE
WITH CASE REPORTS

IDIOPATHIC AND CONGENITAL SCOLIOSES BRACING OF THE CZECH CHILDREN

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Abstract

During the period from 1992 to 2006, our orthotic facility treated more than 2,200 patients with scoliosis in total. At present, we have more than 6,000 X-ray pictures of scoliosis in our archive. Most treated patients can be included in the group of juvenile and adolescent scolioses with curves between 20° and 50° for all types of curvatures.

From the beginning of our activities, we have been using a modified Chêneau brace of type I, the form of brace was modified according to clinic claims and technology possibility of our workshop. We have developed in 1995 a dynamic correction spinal orthosis type Cerny, in 2000 a dynamic correction spinal orthosis for sitting type Kosteas and in 2002.

In this work are presented two cases of scoliosis are situated out of typical limit for bracing. These results are very interesting to consider about some possibility to increase the area for prosperous bracing.

Since 1998, we have been regularly meeting doctor J. Chêneau in Prague on symposiums as well as in our specialised facility where we exchange valuable experience, which cannot be gained otherwise than by many-year and intensive practicing.

Keywords: scoliosis, spinal brace, orthosis

Introduction

The facility of ORTOTIKA, s.r.o. (operating under the trade name of "Ing. Pavel Cerny – ortopedicka protetika" until 1997) cooperates mainly with the scoliotic consultation office of the Motol Faculty Hospital, the Outpatient Centre for Defects of Locomotor Apparatus in Prague 3 as well as with several other outpatient facilities specialising in congenital and acquired spinal defects. On a smaller scale, upon request, we also treat patients from many other non-specialised orthopaedic outpatient clinics from all over the Czech Republic.

The specialised orthotic facility for conservative treatment of scoliosis in Prague was established in 1992 when medical insurance was introduced, that is, when the possibility of having a medical product paid by medical insurance companies appeared. Until then, predominantly Milwaukee and NYOH braces were being made in the state-owned institutions in the Czech Republic. NYOH braces were sometimes shaped according to pictures in foreign magazines; they were even given names such as the Chêneau type, the CBW type and other types of orthoses but they lacked the typical correctional shape of the shells of the original types of orthoses.

Material and methods

During the period from 1992 to 2006, our orthotic facility treated more than 2,200 patients with scoliosis in total. At present, we have more than 6,000 X-ray pictures of scoliosis in our archive. Most

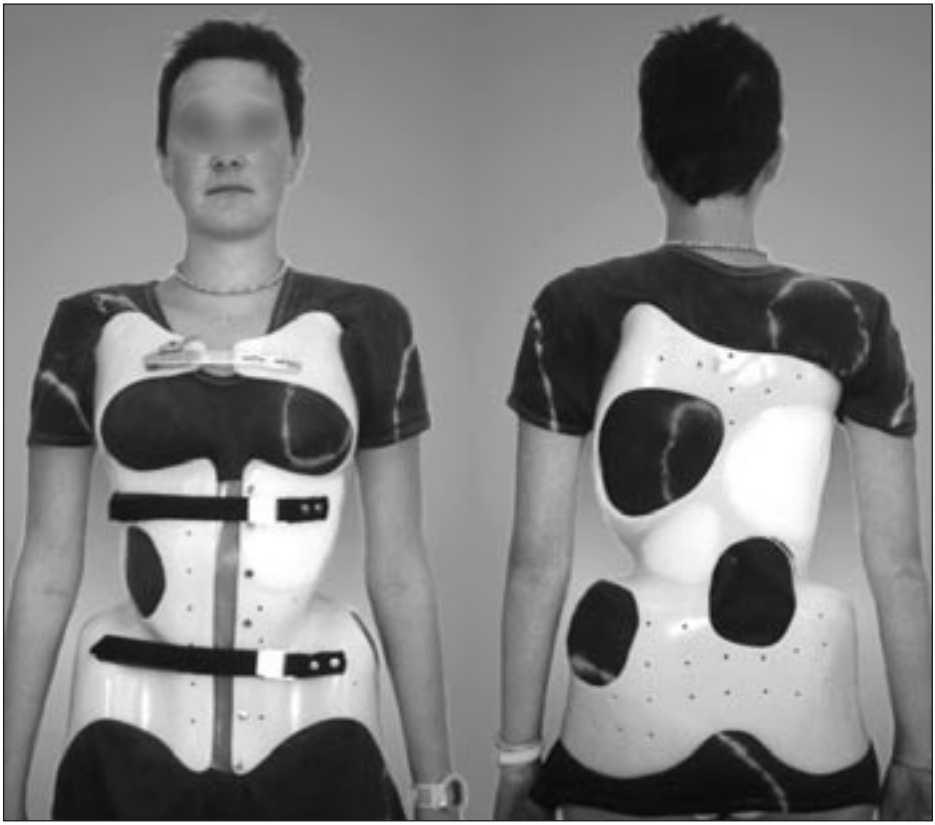

Fig. 1. Modified Chêneau brace type I, 1990th, with pelvis expand window under the lumbar pad.

of the pictures have been made in the long format, which means that the spine is captured in a single picture; some pictures of spines, mostly from smaller outpatient clinics, are composed of two pieces. Efforts were made to ensure that the pictures are read by means of the same methodology in order to minimise the error in reading the size of curvatures and in order to ensure that the pictures are comparable.

The age of patients ranges from infantile patients to juvenile and adolescent ones to adult patients, where corset therapy can only be provided only in the sense of supportive treatment. Most treated patients can be included in the group of juvenile and adolescent scolioses.

From the etiological point of view, most scolioses were idiopathic. The set also contains a low number of scolioses where the disease was discovered too late, not treated conservatively, primarily addressed by surgery. Such scolioses were only processed by us with a post-surgical orthosis. The set also contains a number of patients with a scoliosis of other type than a scoliosis

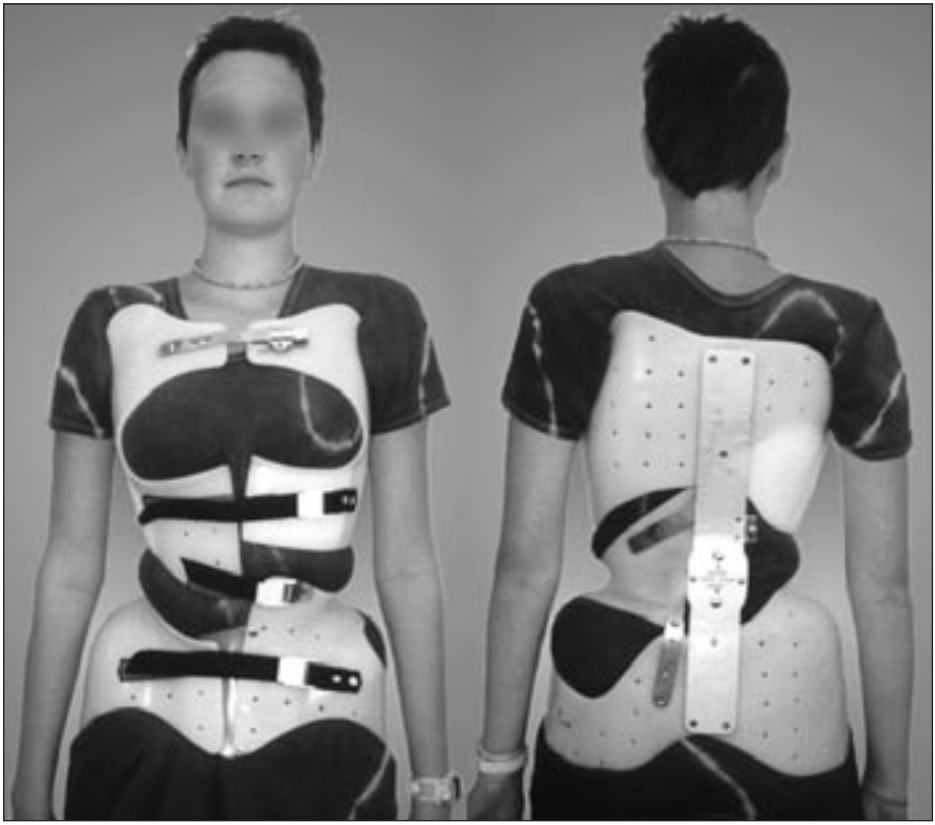

Fig. 2. Dynamic corrective spinal brace type Cerny, 1995, with dorsal joint.

with idiopathic aetiology, such as congenital, neurogenic and other scolioses.

The correction spinal braces were used prevailingly for curve between 20° and 50° for all types of curvatures. Reduction of curvatures at least by 30 % is regarded by us as a good correction result; correction by more than 50 % is regarded by us as an excellent result. Sometimes we achieve a nearly 100% correction, as well as a higher one (inversion of the curve). In some cases, spinal orthoses was applied below the officially recommended threshold for corset therapy and we achieved excellent results and complete straightening of spine, that is, recovery took place. If the patient rejected surgical solution, we applied successfully spinal brace with permanent correction in cases where the curve was higher than 50° not only in juvenile and infantile patients but also in adolescent patients.

From the beginning of our activities, we have been using a modified Chêneau brace of type I, **Fig. 1**, based on the experience gained during a one-year internship

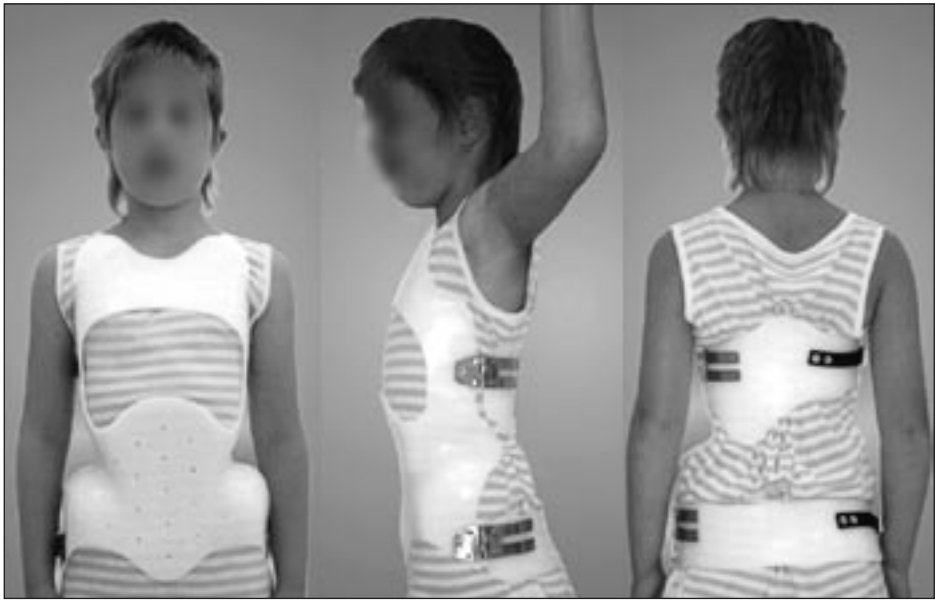

Fig. 3. Reclination Gschwend brace (modified by Zielke – Nusser), all plastics variant of our company.

at Nusser and Schall, a German company, in Werner-Wickers Klinik in Bad Wildungen in 1991. In the beginning, we achieved significant correctional effects and subsequently a strong curative effect, too. We have introduced softened padding, carefully baked into the shell, whereby we increased the acceptability of higher correct pressures for the patient and consequently we achieved an increase in the degree of correction. In addition to the high version of Chêneau brace type I for chest curves, we have also used the low version. For correction of a curve in the sagital plane, we use a modified reclination corset based on the Gschwend (Zielke-Nusser) type, Figure 2. Several new types of spinal braces have been developed for treatment of scoliosis and other defects, and a number of individual variations similar to types Chêneau II, Chêneau III and other types were developed according to specific requirements dictated by congenital as well as acquired spinal defects.

In an effort to make dynamic orthoses in addition to static body orthoses, a dynamic correction spinal orthosis, type Cerny (patent no. 281–800–CZ), was developed in 1995, **Fig. 2**; in 2000, a dynamic correction spinal orthosis for sitting, type Kosteas (UV: 12158, 2002–12778), was developed, **Fig. 4**; and in 2002. The dynamic spinal orthosis of the Cerny type has, like most modern orthoses, deeply moulded divided shell, connected with a dorsal joint allowing for inclination, **Fig. 5.** The dynamic orthosis is suitable for flexible curves, preferably of the King III type or even for the curvature types King 1, King II and King V where it is necessary to make

Fig. 4. Dynamic spinal brace for sitting type Kosteas, 2000, provide for correction of scoliosis and flexion and extension of trunk..

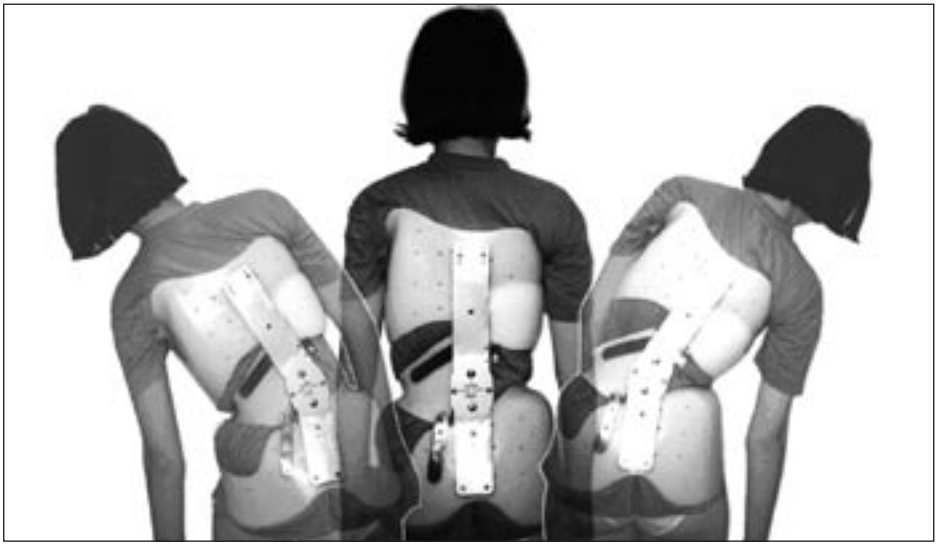

Fig. 5. Possibility of inclination in Cerny dynamic spinal brace. Stability of Cerny braces provide for lumbar pad system

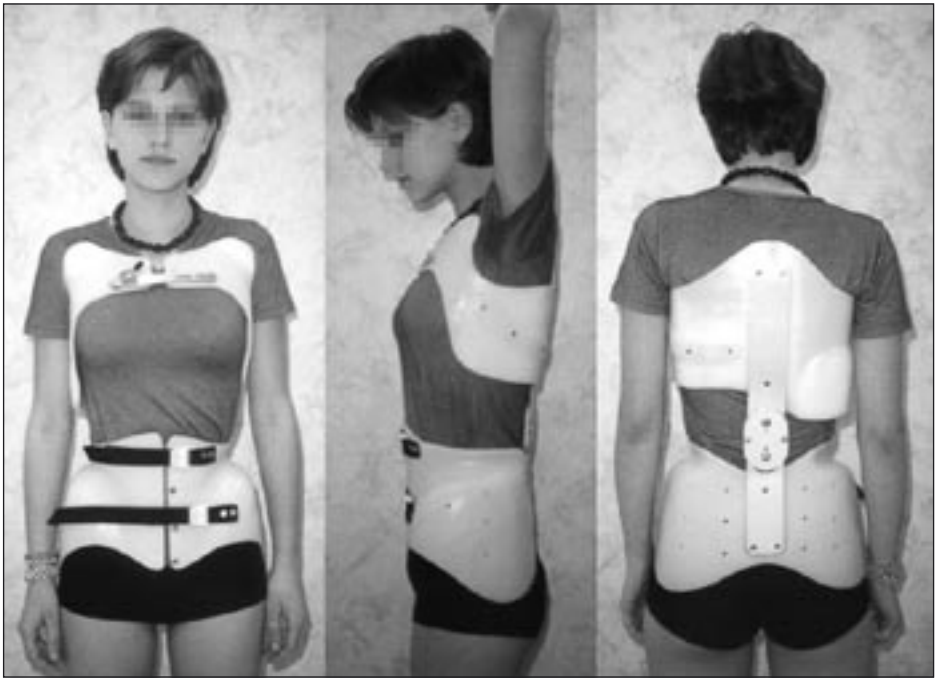

Fig. 6. Reclination modification of Cerny dynamic brace, without corrective pads in frontal level.

a highly individual decision on suitability of application. An interesting option is the night-time adjustment in hyper-correction, or the option of strengthening exercise in typical partial atrophy of lumbar muscles at the point of lumbar padding. The dynamic orthosis for sitting, type Kosteas can also be used in physically active wheel-chair users. It can correct primarily the chest curve and it also allows for flexion and extension of spinal, which significantly facilitates some of the patient's daily activities, while maintaining the correction of spine. The dynamic night-time orthosis is divided by transversal cuts and connected with special joints and adjustable or dynamic elements. Its therapeutic principle is night-time hyper-correction, similarly like with the Charleston or Caen braces.

For correction of spine in sagital plane, we commonly use an all-plastic variation of the reclination spinal orthosis of the Zielke-Nusser type, **Fig. 3.** It is capable of correcting chest kyphosis and lumbar lordosis simultaneously and very effectively. For reclination of spine, we some the dynamic spinal orthosis of the Cerny type, without correction in frontal plane, for some diagnoses. The effectiveness of the orthosis is lower in comparison with the rigid Zielke-Nusser type, but this brace is very effective for treatment of dorsolumbar kyphosis by achondroplasia, **Fig. 6.** For fine correction of chest hyper-kyphosis,

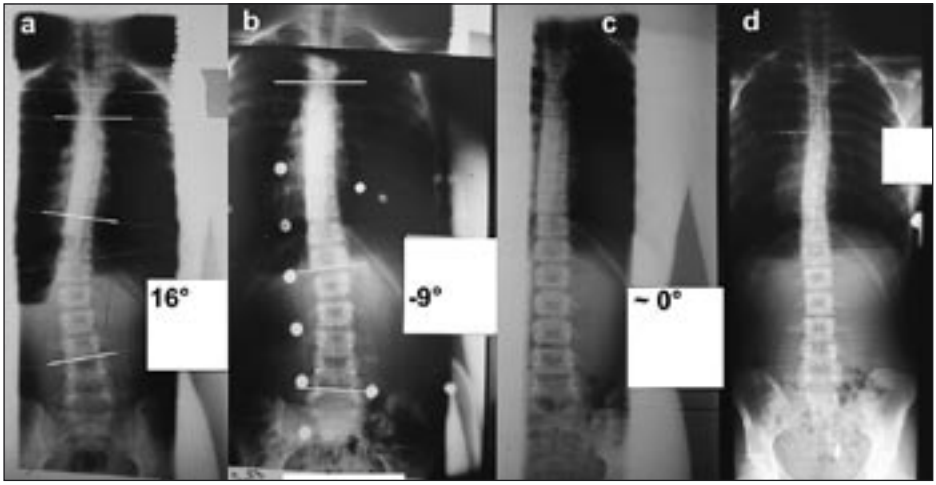

Fig. 7. Fig. 7a) – the spine at the start of corset therapy, Th-L curve = 16° sin. Fig. 7b) – the correction in Chêneau brace, Th-L = 9° dx! Fig. 7c) – the spine after half year of corset therapy, without any curves in frontal level. Spinal brace was taken off after next three months. Fig. 7d) – spine in age 18 years, curves are very small.

we beneficially use reclination backpack orthosis (UV: 9430, 1999–10062).

Case studies

It is generally known that if scoliosis appears, it is advantageous to take preventive action and not to wait until the curves reach the tabular value for application of an orthosis, which is set at 20°. In the first selected cases, an orthosis was applied to a patient A.H. with a curve of 16°, type King I, at the age of 10.5 years – juvenile scoliosis, **Fig. 7a** – an X-ray picture without brace. The orthosis was applied in spite of the resistance of physiotherapeutic department in a full 23-hour regimen. The applied low variation of the Chêneau brace over-corrected the curve into an inversely oriented curvature of 9°, **Fig. 7b** – an X-ray picture in brace. After conscientious half-year use of spinal orthosis, the scoliotic curves were completely eliminated and zero curvature was achieved, **Fig. 7c** – 3 hours without the brace. This was in the period before summer vacations and therefore the maintenance application of the existing orthosis was chosen – night-time regimen, until the orthosis is usable with respect to the size, but not later than by the next examination after vacations. After permanent removal of spinal orthosis, physiotherapeutic exercise was used throughout the adolescence period. On the verifying X-ray picture taken when the patient was 18 years old, **Fig. 7d** – without the brace, it is apparent that the curvature of the spine is minimum and measurable only in the chest area; the curve would theoretically fall into the category of King V. The original curvature is not visible. This example shows that timely, preventive application of a correction spinal orthosis can cure the starting disease, with the orthosis being

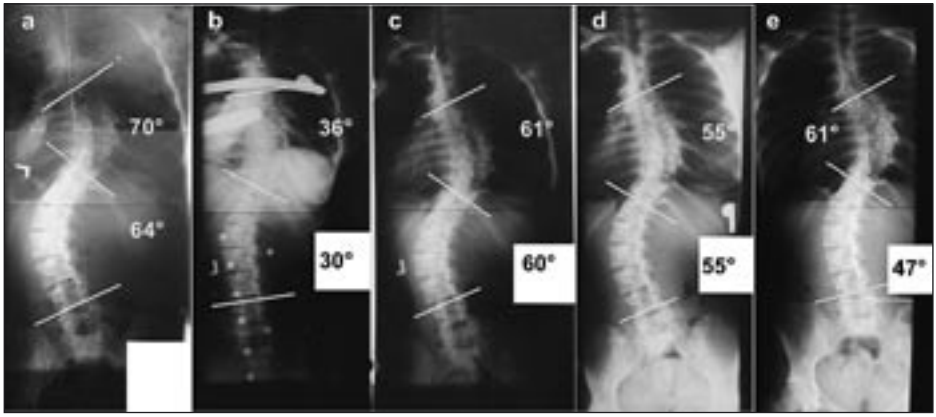

Fig. 8. Fig. 8a) – X-ray picture of spine before application of Chêneau brace, age over 16 years, Thoracic curve = 70° dx, lumbar curve = 64° sin. Fig. 8b) – the spine in Chêneau brace, Th = 36° dx, L = 30° sin. Fig. 8c) – over 1 year after conservative treatment of Chêneau brace, Th = 61° dx, L = 60° sin. Fig. 8d) – 24 hours after removal of the brace; age 18 years, Th = 55° dx, L = 55° sin. Fig. 8e) – the spine in age 26 years, Th = 61° dx, L = 47° sin.

used much less than it would be used in classical application later when the curvature values would reach the level stated in the applicable table.

The second example is on the opposite side of the spectrum of applicability of a spinal brace. The patient D. P. at the age of her 16 years, menarche at the age of 13 years, three years of unsuccessful corset therapy. The spine was without any signs of corrections after the bad orthoses of the NYOH type, which had been applied up until that time. The patient ceased to believe in favourable effect of corset therapy and did not use the orthoses. Since the progression continued and the curvatures reached an enormous level and since she refused to undergo surgery, corset therapy was offered to the patient as the last resort. The spinal orthosis was applied for curvature of type King II, with values of 70° in the chest section and 64° in the lumbar section, **Fig. 8a** – without a brace. With the spinal orthosis of the Chêneau I type, the curvature in the chest section was reduced to 36°and the curvature in the lumbar section was reduced to 30°, **Fig. 8b** – in a brace. Another orthosis of the Cerny type for daytime application was made, the Chêneau brace was used as a night-time aid. The patient fully cooperated as concerned corset therapy as well as reflex physiotherapy, which brought unexpected results, considering her age. After 1.5 year, permanent reduction to 61° in the chest spine and to 60° in the lumbar spine was achieved, **Fig. 8c** – 24 hours after removal of the brace; after another half a year, at the time of full age, curvature of 55° was achieved in both chest and lumbar sections, **Fig. 8d** – 24 hours after removal of the brace. On another picture, **Fig. 8e** – without the brace, this time at the age of 26 years, we can see

a chest curve of 61° and a lumbar curve of 47°. Until the patient's age of 22 years, the corset therapy was intensive; during the period from 22 to 26 years, the spinal brace was being used with decreasing intensity, sometimes during night, exceptionally and for short periods during the day when the patient had a subjective feeling that she had heavily tired back. This specific example shows the fact that even if indication of a correction spinal orthosis appears to be useless or downright non-productive, considering the level of curvature as well as the patient's age, there is still a chance for the patient to influence the disease successfully with a conservative solution. If a severe scoliosis is identified or if there is the possibility to apply an effective correction of orthosis in patients, who have not had such an option up until that time and are ready to fully cooperate, it is certainly worth applying such an orthosis at least once, as opposed to the automatic indication of surgical solution.

Discussion

The results of individual applications are always highly arguable. A high-quality correction orthosis is created in a demanding production process and the curative effectiveness of the aid does not only depend on objective factors. When a positive model is being created, which is the most important element in the production process, the personal experience, expertise, art and talent of the particular orthotic technician are reflected in the corset model. From a certain point of view, it is this very fact that plays a crucial role in making the difference between the facilities where effective spinal orthoses are made and the facilities where plastic shells are made, which can be applied but without any significant curative effect.

Another subjective factor sets in when feedback information on the actual use of the aid over a certain period is to be obtained. A correction spinal orthosis is a very unpleasant aid from the patient's point of view. In addition to that, it is used in the adolescent period when, for understandable reasons, the patient is liable to fail to observe the prescribed regimen of application and the aid is often used less intensively than the physician instructed. During regular examinations at the physician's office, inaccurate data on application are obtained, which effectively excludes the possibility to process statistically the results of a conservative corset therapy in an objective manner. Around 1995, we carried out a research into the application of spinal braces by using anonymous questionnaires, and this survey showed that the numbers of hours of daily application provided as anonymous information were lower than the numbers communicated orally in person. However, the survey clearly shows that a correction spinal orthosis correctly applied according to the physician's instructions has a fundamental therapeutic effect. If the prescribed regimen is observed, with the achieved necessary correction, fundamental permanent improvement of the scoliotic curvatures is achieved very often. If the aid is applied at the age of growth spurt and no known negative factors, which strongly decrease the chances of successful treatment, the permanent positive change in the curvature of spine is usually highly significant. If the scoliotic curvatures are successfully reduced to a significant degree, it is necessary to continue the corset therapy until the skeleton stops growing, that is, until it

is mature. There is the rule that the higher the curvature, the later the corset therapy is terminated. If the corset therapy is terminated too soon, the results achieved up until then are usually ruined and the curvatures regain the values that were present at the beginning of the corset therapy. The result is actually preservation of scoliotic curvatures during the adolescent period and even such a result is labelled as success in spite of the fact that it was realistic to achieve permanent correction.

Another arguable area is the defined spinal curvature limit for application of a correction spinal orthosis. In scoliosis, like in many other diseases, the rule of prevention applies. The lower the spinal curvature angle, the better the result of correction by an orthosis. If a scoliosis is identified, which is not yet indicated for the classical regimen of spinal brace application according to the tabular values, it is suitable to apply, for example, a night-time "special spinal brace", which has a hyper-correction effect and, in many cases, straightens the spine in short period of time in such a way that the orthosis can be permanently set aside and the classical corset therapy needs not be applied. On the other hand, it is suitable to try to remedy successfully even the curvatures, which are above the tabular threshold for application of orthoses in the cases of cooperative patients, who did not have the possibility of the application of a high-quality, maximally effective correction spinal orthosis.

Conclusion

According to the success of the conservative treatment of scoliosis and other spinal diseases, some employees of ORTOTIKA, s.r.o. have become trainers in the discipline of spinal orthotics within the professional orthotic-prosthetic community in the Czech Republic. At present, in many facilities in the Czech Republic, spinal braces are being made with somewhat higher curative effect than it was in the past when correction of chest curvatures was usually insignificant. In most cases, the reason was insufficient expertise and the above-mentioned individual characteristics of technicians, who often try to make a spinal orthosis according to the appearance of a certain model and not according to the affected spinal skeleton reflected in the positive model.

Meetings and discussions about the issues of scolioses among the leading experts on the conservative therapy of the disease bring invaluable experience. The conservative therapy of scolioses is commonly marginalised in comparison with a surgical solution because the results of the effects of modern spinal orthoses are not sufficiently known and are not sufficiently publicised. Regrettably, this is due to the fact that a large percentage of physicians understandably focus their activities on surgery and conservative therapy is sidelined. Specialised symposiums, which are focused on spinal diseases and where sufficient opportunity is given for the presentations of a broad spectrum of participating personalities, significantly contribute to compensating this imbalance.

Since 1998, we have been regularly meeting doctor J. Chêneau in Prague on symposiums as well as in our specialised facility where we exchange valuable experience, which cannot be gained otherwise than by many-year and intensive practicing. It is admirable and unique that Dr. J. Chêneau has worked and still works at his age in the field of scolioses in such a self-sacrificing

and assiduous manner, both in theory and practice, not only in his homeland but also all over the world, and he would certainly deserve gratitude from everyone engaged in the conservative treatment of scolioses.

Acknowledgment

Other facilities specialising in spinal defects participate in our practice, experience, results and creative inspiration, specifically the 2nd Orthopaedic Clinic of the Faculty Hospital in Prague Motol with its scoliotic consultation office where Doc. MUDr. Petr Korbelar, CSc., MUDr. Ing. Jan Nemec and MUDr. Ing. Tomas Trnavsky work, and the scoliotic consultation office of MUDr. Petr Zubina in the Therapeutic Rehabilitation Centre in Prague 4.

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REVIEW ARTICLE

PROPHYLAXIS IN HARMFUL POSTURES AND IN THE SO-CALLED IDIOPATHIC SCOLIOSIS. EASY CLINICAL TESTS. GENERAL RULES OF A NEW REHABILITATION THERAPY

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Introduction

The new approach to the therapy of harmful posture and of the so-called idiopathic scoliosis is based on discovery of their etiologic factors (Karski, 1995–2006). The biomechanical approach allows elaboration of new effective rehabilitation treatment and moreover of new prophylactic methods stressing necessity of removal of contractures with stretching exercises. At present in Poland there is a large interest in introduction of "karate stretching techniques" as prophylaxis against harmful posture and scoliosis in first classes of primary schools.

Etiopathogenesis of harmful postures

From orthopedic point of view harmful posture means not symmetrical, proper body built and disturbed function. It mostly refers to 1. shoulders with cervical and thoracic spine, 2. pelvis with lumbar spine and 3. knees and 4. feet. Clinical observations of harmful postures point that they are result of contractures of muscles, tendons and capsules causing asymmetry between flexors and extensors sides.

Examples: 1. Functional „round back" *dorsum rotundum* is a cause of ante-positioning contracture of shoulders but not a cause of weakening of back muscles extensors. At adult age this disorder causes cervical pain or "back pain" (**Fig. 1**). 2. Flexion contractures of hips cause protruding belly and shifted backwards buttocks with

Fig. 1. Clinical example of functional „round back". Shoulders moved forwards (contractura brachii utriusque in antepulsione and dorsum rotundum – round back).

lumbar hyper-lordosis. That is not the result of abdomen and buttock muscles weakening. Both of these disorders (shoulder & thoracic spine, pelvis & lumbar spine) develop at children with lack of sport, lack of movement activities and with habits of "sitting way" of life (Rogge – CIO, Urbanik, Walczak, Karski). Untreated at young age these harmful postures may result in different pain syndromes: back pain, cervical pain, *spondyloarthrosis lumbalis, spondylolisis, spondylolisthesis, ischialgia*. 3. Valgus deformity of knees is related to laxity of joints, overweight and overstressing but especially with child's wrong sitting habit: "Indian or TV-sitting" (germ. *Najaden Sitz*). This position leads to harmful posture and also causes disturbances of tissue oxygenation of lower extremities. All children from early age should be encouraged to "tailor's sitting" or "Polish sitting" (**Fig. 2**). 4. Valgus deformity of feet is mostly connected with shortening of Achilles tendon. During gait compensatory pronation movement of foot happens in stance phase of gait resulting from Achilles shortening and leading with time to valgus deformity. This deformity develops at children with joints laxity – other children with normal joints show rather simple "equinus deformity" of feet. All children from four groups of harmful posture require special prophylactic exercises.

Etiopathogenesis of the so-called idiopathic scoliosis

Biomechanical etiology of the so-called idiopathic scoliosis was described by Karski in years 1995–2006. The spine deformity is a result of anatomical and functional asymmetry between both hips and both sides (left and right) of pelvis. Contractures at the right hip cause


Fig. 2a


Fig. 2b


Fig. 2c

Fig. 2. Different types of sitting positions. Wrong sittiing position („indian (TV) sitting") – fig. 2a, proper sitting positions – fig. 2b, 2c.

limitation of adduction, internal rotation and extension movements. This asymmetry during walking (gait) provokes compensatory movement of pelvis and spine. Asymmetry of loading and growth leads to development of spine curves. Scoliosis can be classified into three etiopathological groups (epg) (Ist, IInd/A type, IInd/B type & IIIrd epg) (Karski, 2001–2004–2006) which is crucial in prophylaxis and rehabilitation management:

Ist etiopathological group of scoliosis ("S" deformity = double curve scoliosis). In children from this group there is a real abduction contracture of the right hip 5–10 degree or adduction only 0 degree and large adduction of the left hip 40–45–50 degrees (examination in extension position of the joint). The missing (restricted) adduction movement of the right hip is transferred from the right hip to pelvis and spine during gait. Additionally pathological influence is connected with stand position "at ease" only on the right leg and lasts many years. Every scoliosis starts in small children at 3–4 year of life. The first is rotation deformity confirmed in computer gait analysis. As result of rotational deformity and in sagital plane – firstly the spine becomes to be stiff with "flat back". In children aged 5–7 years we observe the development of the rib hump on the right side (*gibbous costalis*). Both curves, lumbar left convex and thoracic right convex, develop at the same time. This type of scoliosis is progressive especially in acceleration period of growth. We want to underline that this type of scoliosis is connected with two causes: gait and permanent stand "at ease" position only on the right leg.

IInd etiopathological group of scoliosis – A type – "C" left convex one curve scoliosis – lumbar or lumbo-sacral or lumbo-thoracic; **B type** – "S" scoliosis with two curves but without stiffness of spine and without rib hump. The thoracic curve is the secondary one. In these children there is only limited adduction of the right hip in comparison the left side. Adduction of the right side is 10–15–25 degree, adduction of the left side 35–45–50 degree (examination in extension position of the hip joint). Firstly physiologic side movement of spine to the left by "stand position of the right leg", next gradual fixation of "C" shaped spine curve with clinical symptoms and changes of spine axis in X-ray picture in older children – at age 10–12–14 years. Pathological influence is connected only with the permanent habit of stand "at ease" on the right leg through many years. This type of scoliosis is not "paralytic scoliosis" as described by many authors. It is also not "degenerative scoliosis" as thought some others authors (lecture of Prof. Stewart Weinstein at SICOT September/2005 in Istanbul). To patients with "spondyloarthrosis", it should be explained that scoliosis is the first deformity and degenerative changes occur later. The patients from this group are without progression or small but with pain problems at adult age typical for *spondyloarthrosis lumbalis, lumbago, ischias*. **IInd/B type** – development of scoliosis in early stage is similar as in IInd epg/A type but in children with general laxity of joints and in children with wrong, especially pathological for scoliosis, habit of standing, the secondary right convex curve develops. The secondary thoracic right convex curve mostly is smaller than lumbar left convex curve. This type of scoliosis is without rigidity of spine and without rib hump or only small, not important clinically. The patients from this group are also without progression

or with very small. We want to underline that both these types are related only with permanent habit of standing "at ease" only on the right leg.

IIIrd etiopathological group of scoliosis – "scoliosis without curves". The main symptom in this group is the "stiffness of spine". In this type of scoliosis there is special restriction of movement of both hips. At the right hip there is abduction contracture, at the left hip the adduction movement is also limited of 20–25 degrees. In this group clinically and in X-ray examination we see no curves or only slight. We see also no rib hump or slight. So, there can be "scoliosis without any curves" or with "sight curves" unimportant clinically. These patients were mostly not treated before and through many years they did not know about the "spine problem". In youth period they have problems with sport activities. At adult age they show very large range of "back pain". The patients from this group need "differential diagnosis" because some general doctors or internists diagnosed rheumatism, heart pain, circulatory problems, and pulmonary illnesses like bronchitis or pleuritis, neurological or gynecologic problems. (*Tomasz Karski: "Recent observations in biomechanical etiology of the so-called idiopathic scoliosis. New classification of spine deformity – Ist, IInd and*

Fig. 3. Clinical example of "kneeing test" with hands up at healthy child and child with flexion contractures of pelvis region

III[rd] etiopathological groups"; Studies in Technology and Informatics, Research into Spinal Deformities 5, Vol. 123., IOS Press 2006, Amsterdam, Berlin, Oxford, Tokyo, Washington DC, 473–482). We want to underline that this type of scoliosis is connected only with gait.

Tests for harmful postures for doctors, sport coaches and parents

a) „*bending test for scoliosis*" (Adams, 1856) – evaluation of shape of spine in flexion, evaluation of distance between floor and fingers
b) "*side bending test for scoliosis*" (Lublin test, 1995–2004) – evaluation of shape of spine in flexion to right and left leg (more sensible than Adams test), evaluation of distance between floor and fingers
c) "kneeing test" with hands up – evaluation of axis of thigh, pelvis and spine (**Fig. 3**)
d) „butterfly sitting" test („Polish" sitting) – evaluation of hips abduction and shape of spine
e) rotation movements of pelvis and hips (comparison of internal rotation / versus external rotation) in standing position with feet together (new test – 2006)
f) evaluation of standing „at ease" habit on right or left leg
g) evaluation of general body anatomy
h) child's approach to athletics and sport activities at schools

General rules of new rehabilitation therapy of the so-called idiopathic scoliosis and of preventive programs of harmful postures

a) removal of contractures of right hip region
b) removal of flexion contractures of both hips / especially of the right hip
c) removal of contractures of concave sides of each spine curve (**Fig. 4**)
d) removal of extension contracture of spine ("stiff spine" – as beginning symptom in I & III epg)
e) sitting „relaxed" (with flexed, kyphotic spine) and not „upright" (!) at school and home
f) sleeping in fetal position with knees at the chin
g) stand „at ease" only on the left leg
h) promotion among all societies of beneficial influence of athletics and sport activities at schools and necessity to practice sport each day – especially stretching exercises like in: Karate, Yoga, Tai chi, Taekwondo, Aikido, Judo and others (Urbanik, Walczak, Karski, Kwieciński, Maciejewski, Kałakucki).

Conclusions

Harmful postures and so-called idiopathic scoliosis at children are caused by asymmetric contractures and asymmetry of function of different parts of movement apparatus. The asymmetry front:back causes harmful postures; the asymmetry left side:right side causes scoliosis.

The so-called idiopathic scoliosis, until the discovery of its biomechanical etiology, used to be a social, diagnostic and therapeutic problem. The progression of double curve „S" scoliosis (I[st] epg) with rib hump

and rigidity of spine was often related to wrong „extension exercises" applied widely in past years. Forbidding children with scoliosis to practice sport at schools was

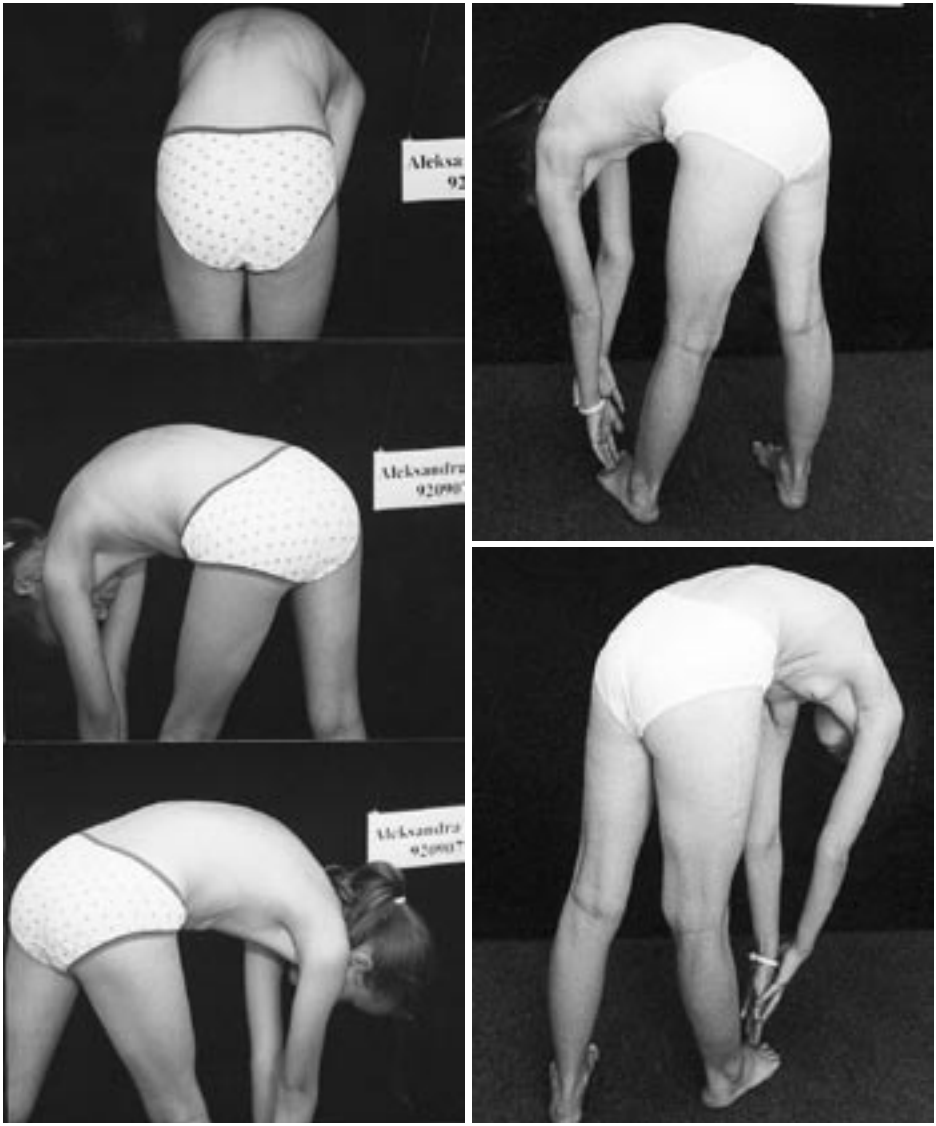

Fig. 4. Clinical example of flexion-rotation exercises in prophylaxis and new rehabilitation management of the so-called idiopathic scoliosis.

another big mistake! Lack of knowledge of etiology resulted in wrong concept of scoliosis treatment leading at numerous patients to iatrogenic deformity in many countries.

In therapy of harmful postures and so-called idiopathic scoliosis it is necessary to care for full symmetry of movements which enable symmetrical loading and function and growing up of child's body. Strengthening of muscles is not any more the primary goal. Application of stretching exercises in pediatric orthopedics allows effective prophylaxis and treatment (*Karski T. Biomechanical Explanation of Etiology of the So-Called Idiopathic Scoliosis. Two etiopahtological Groups – Important for Treatment and Neo-Prophylaxis Pan Arab Journal Vol. (9) No. (1)/ January 2005 pp 123–135*). Therefore children and people at all ages should be encouraged to practicing stretching exercises and such techniques as Karate, Yoga, Tai chi, Taekwondo, Aikido, Judo and others.

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REVIEW ARTICLE

NEUROGRAPHIC EXAMINATION (ENG) AND ELECTROMYOGRAPHY (EMG) IN DIAGNOSTIC OF NEUROLOGICAL AND ORTHOPEDIC DISEASES

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Abstract

In most neurological and neuro-orthopedic illnesses a clinical examination in usually sufficient. The article presents cases when neurographic and electromyography examinations are necessary.

Key words: Electromyography, electroneurography, neurology disease

Introduction

Electromyography uses a diagnostic method to determine the bioelectrical function of muscles. Clinical electromyography is widely used to evaluate and diagnose various orthopedic and neurological diseases. Electromyography precisely determines the increased or decreased tone of the muscles and allows establishing which movements are accompanied by pathological synergies and which are not. Thus, it is a unique and basic method in neuro-muscular disorders, which enables to register the functionality of the active groups of muscles and simultaneously provides a function of other groups of muscles. Electromiography has proved to be useful due to its effectiveness and repeatability which leads to localize the lesions and to determine the severity of a single muscle damage.

Main goals

Electromyography (EMG) is an examination focused on the motor unit study (**3**). Motor unit is a neurofunctional entity constituted by a neuron located in the spinal horn and by all the muscle fibers innervated by that axon. EMG is useful in:

1. Diagnostic differentiation of healthy and affected muscles
2. Differentiation of primary neuropathy and primary muscular diseases.
3. EMG studies are of great interest in the evaluation and localization of single nerve pathology or generalization disease process.
4. Evaluation of particular pathology dynamics.

Coverage and methods of examination

One of the methods to diagnose nerve pathology is neurography (ENG). It determines such nerves' function as excitability, speed and ability of neurotransmission. Additionally it visualizes sequence of imaging changes following nerve injuries and correlation with the functional deficit. Neurography is a tissue-selective imaging directed at identifying and evaluating characteristics of nerve morphology after injury. Visualization of the nerves fascicular structure is made possible by exploiting differences in the water content and in the connective tissue structure of the fascicles and perineurium compared with the surrounding epineurium. It is very helpful in evaluating of the level of nerve supply, grade of nerve and muscle injury. Neurography also shows range of denervation and extent of reinervation. Thus, it brings precise indications for conservative or operative treatment and after all to the rehabilitation procedures. Neurography might be widely used as a modern diagnostic

method in treatment of neuro-muscular pathologies in neurology and orthopedics.

Clinical use of EMG and ENG

EMG measures skeletal muscle activity during rest and during voluntary muscle contraction.

During clinical examination we may distinguish:

1. Comparison and analysis of the amplitude, duration, number, and configuration of the muscle activity enable disorders of the motor units to be detected and characterized as myopathic (4). It characterized of "sparing" of motor units as integrity. EMG and nerve conduction studies can help to determine the site of a nerve injury (e.g. distinguish between a peripheral nerve and a nerve root lesion). From there during EMG we can see most characteristic features of that kind of diagnostic tool: long activity of the motor unit, polymorphism of decreased motor unit predefined by temporary, constant or reversible fall-out of function, damage to individual membrane of muscles' fibers resulting in changes of the muscles' excitability.
   To primary muscle diseases (myopathy) we include:
   – congenital myopathy
   – dystrophy
   – metabolic myopathy
   – hormonal myopathy

2. The secondary process classified as muscles pathology consists of:
   A. Neurogenic damage – where we find structural lesions of smallest or greatest numbers of motor units and altering of the function in the remaining units. EMG's image of neuritic atrophy depends on how many motor units are involved, on which level it appears and what is the dynamics of the specific pathology.
   B. Neurogenic diseases in this group are: medullar muscle atrophy (Werdning-Hoffman and Kubelgerg-Welander type)
      – polineuropathy
      – poliomyelitis
      – spinal lateral atrophy (SLA)
   C. Neurography is also widely used in diagnosing of the peripheral's nervous system diseases:

a. ENG is very useful in case of children and adults when it is not possible to perform EMG examination due to of the lack of co-operation,
b. This method allows finding pathologies in asymptomatic neurological diseases (asymptomatic polineuropathy, passive disease carrier),
c. ENG enables to distinguish lesion of neural trunk from lesion of anterior horns of the spinal cord,
d. In case of a local pathology ENG localizes the place and the level of the nerves' damage,
e. It generally informs about the suspected nature of pathological changes in the nerves' morphology (demeylinization or neuroaxonal process),
f. It detects the general nature of neural diseases where the clinical's course suggests mononeuropathy,
h. It describes the damage ratio between: motor - neuronal fibers and sense -neuronal fibers, proximal nerves' section and distal, nerves' of upper and lower extremities.

i. ENG shows the dynamics of the biological process, which occurs, in a single nerve as regeneration or demeylinization. Thus, it allows to make diagnose and to determine the indication for operative surgical treatment,
j. In neurophysiology ENG enables to perform "in vivo" examination. It also reveals very subtle pathologies, which occurs, in small biological structures without the necessity to use the invasive diagnostic methods.

Diagnostics of particular neurological diseases

"Constriction neuropathy" is a special type of neuropathy where a neurologist or especially orthopedic surgeon seems to be interested most. It is called the "tunnel syndrome" where a nerve is damaged by the nearby lying structures such as bones, hypertrophy fascia, tendons, scar or muscles (**2**). The degree of lesion depends on: the magnitude of pathological force, the period of operation and the length of the constricted nerves' section. Diagnostics of the neurotransmission in a particular nerves' section enables to localize the position of nerves' constriction or its damage. The ulnar nerve is open on compression especially on the level of the elbow region (ulnar canal – *sulcus n. ulnaris*). The median nerve might be constricted in the wrist's canal. It also happens to the peroneal nerve in the region below the head of fibula bone.

EMG plays very important role in traumatology in case of peripheral nerves or plexus injuries (**1**). The most significant issue is a possibility to locate the level of the nerves' lesion and to estimate of its activity, which allows taking proper decisions concerning prognosis and further treatment. This study points out that EMG an ENG examination play important role in the daily work of a neurologist and an orthopedist.

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REVIEW ARTICLE

CEREBRAL PALSY – RISK FACTORS AND CLASSIFICATION

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Key words: cerebral palsy, risk factors, motor function, nervous system

Abstract

The term of cerebral palsy (CP) refers to a group of nonprogressive brain injuries primarily affecting motor function. The worldwide prevalence is 2 to 2,5 per 1000 live births. Studies have shown several prenatal risk factors for cerebral palsy. The injury to the developing brain may be prenatal, natal and postnatal. There are several classification of CP: functional, topographic, based on the type of neuromuscular deficit, and the Gross Motor Function Classification System. Cerebral palsy can't be cured, but the treatment can improve a child's capabilities.

Definition

The term of cerebral palsy (CP) refers to a group of nonprogressive brain injuries primarily affecting motor function. It is defined as "umbrella term covering a group of non-progressive, but often changing, motor impairment syndromes secondary to lesions or anomalies of the brain arising in the early stages of its development" (**1**). It is a symptom rather than a specific disease first described by William Little in the 1840s. CP is a static encephalopathy. However, the clinical manifestation of CP is changing as children and their nervous system mature.

Frequency and etiology

Cerebral palsy affects all races and it is a common problem. The worldwide prevalence is 2 to 2,5 per 1000 live births (**2**). The injury to the developing brain may be prenatal, natal and postnatal. Approximately half of all causes of CP occurred in children who were born at term, with full weight and no symptoms of brain damage (**3, 4**). However, studies have shown several prenatal risk factors for cerebral palsy such as:

- Perinatal hypoxia
- Long menstrual cycle
- Placental complications
- Rh incompatibility
- Infections in the mother during pregnancy (such as rubella, sexually transmitted diseases and other bacterial and viral infections)
- Maternal anemia
- Medications taken by the mother
- Alcohol and drug abuse
- Smoking by the mother
- Teratogenic exposures
- Premature birth
- Multiple births
- Low birth weight
- Difficult or abnormal delivery
- Maternal conditions such as mental retardation, seizures, or hyperthyroidism
- History of delivering a child with motor deficit, mental retardation, or sensory deficit.

Epidemiologic studies suggest that prenatal factors play a significant role in the etiology of CP. Approximately 75–80 % of CP causes are due to prenatal injury with than 10 % being due to severe birth trauma or asphyxia. Perlman has shown that perinatal hypoxic-ischemic cerebral injury, secondary to interruption of placental blood flow that results in cerebral palsy (CP), is a rare event (**5**). According to Perlman the ability to link an intrapartum event to subsequent CP should include a history of a sentinel event during labor, followed by the delivery of a depressed acidemic infant, and the subsequent evolution of neonatal encephalopathy, syste-

mic organ injury, and acute neuroimaging abnormalities (**5**).

The strongest risk factors include prematurity and low birth weight (**6**). During the past 20 years, major advances in improvements in maternal and neonatal care have resulted. Despites these advances in prenatal and neonatal care, the prevalence of cerebral palsy has remained constant. In studies of Michael cerebral palsy is seen in 10–18 % of babies with 500–999 g birth weight (**7**). Prenatal maternal chorioamnionitis is the next significant risk factor accountable for 12 % of cerebral palsy in term infants and 28 % in premature infants (**8, 9**). Meta-analysis by Wu and Colford indicated that chorioamnionitis is a risk factor also for cystic periventricular leukomalacia (cPVL) (**8**). Cystic periventricular leukomalacia is a serious risk factor for CP (60 %–100 % of patients with cPVL develop CP) (**9**).

Factors during pregnancy that also can correlate with CP include polyhydramnions, treatment of the mother with estrogen or progesteron, a fetus with congenital malformation, severe bleeding in the third trimester.

Perinatal and postnatal risk factors include:

- Infections (meningitis, encephalitis)
- Hypoxia-ischemia from meconium aspiration and persistent fetal circulation
- Seizures
- Parenchymal-intraparenchymal hemorrhage
- Hyperbilirubinemia
- Hypoglycemia
- Severe birth asphyxia
- Head injury following falls, car accidents or abuse
- Drowning accidents.

Complications associated with CP

There are many complications of cerebral palsy such as:

1. Neurological

- 35 % to 62 % of children with CP develop epilepsy. The most often incidence of epilepsy occurs in children with spastic quadriplegia (50 % to 94 %) (**10**).

2. Psychological/behavioral

- Depression
- Autism
- Increased incidence of mental retardation, attention deficit hyperactivity disorder (ADHD), learning difficulties. Mental retardiation is observed in up to 72,5 % of the CP cases (**11**). Also behavioral problems are documented.

3. Vision

- Abnormalities of vision are common in children with CP (28 % patients). There is an increased presence of strabismus, nystagmus, reffractive errors, amblyopa and optic atrophy (**10**).

4. Hearing loss

- Difficulties with hearing occur in approximately 12 % CP patients and there are more commonly if the etiology of CP is related to the prematurity, kernicterus, asphyxia and meningitis (**10**).

5. Sensory integration difficulties

6. Gastrointestinal and nutritional

- Dental caries
- Slowed growth due to feeding and swallowing difficulties secondary to poor oromotor control (**12**).
- Obesity

- Constipation
- Gastroesophageal reflux with associated aspiration pneumonia

7. Respiratory
- Aspiration pneumonia because of oromotor dysfunction
- Bronchopulmonary dysplasia
- Bronchiolitis
- Asthma

8. Orthopedic
- Contractures
- Hip dislocation
- Scoliosis

9. Speech deficit
- Articulation disorders and impaired speech are observed in 38 % children with CP.

10. Early death
- CP may cause complications that result in an early death. For example, adults with severe forms of CP, such as spastic quadriplegia, may not live longer than 40 years (**13**).

Classification of CP

There are several classification of CP. **Functional classification** system generally divides patients into mild, moderate and severe types.

The second type of CP classification is **topographic classification** (**10**). It is classification by number of limbs involved.

1. Quadriplegia – where all four limbs are affected with truncal hypotonia and appendicular hypertonia or full-body hypertonia. The legs are generally affected equally or more than arms. If arms are more involved than legs, that type is categorized as double hemiplegic. This is the most severe form of CP. This type is associated with extensive cystic degeneration of the brain, diffuse cortical atrophy, and hydrocephalus. The patients often have a history of a difficult delivery with acute hypoxic intrapartum asphyxia. Quadriplegia is often associated with pseudobulbar signs such as oromotor dysfunction with difficulties in swallowing and recurrent aspiration of food. Half of quadriplegic patients have seizures and optic atrophy. Approximately 50 % of cases are prenatal, 30 % perinatal, and only 20 % postnatal in origin.

2. Diplegia – where all four limbs are involved but lower limbs are more severely affected than the upper limbs. In this condition scissoring gait pattern with hips flexed and adducted, knees flexed with valgus and ankles in equinus is observed. Learning difficulties and seizures are less commonly than in spastic hemiplegia. In the premature infant, spastic diplegia may result from periventricular leukomalacia or intracranial hemorrhage. In the term infant, no risk factors may be identifiable or the pathophysiology might be multifactorial.

3. Hemiplegia – one side of the body is affected. The upper limb is usually more involved than the lower limb. Hemiplegic CP is associated with seizures (occur in more than 50 % hemiplgic patients), oromotor dysfunction, visual field defects cranial nerve abnormalities and learning disabilities. Of all cases, 70–90 % are congenital and 10–30 % acquired. It is seen in 56 % of term infants with CP and 17 % of preterm infants. The structural brain abnormalities include unilateral lesions of the brain with the middle cerebral artery affected. Left side is more often involved than the right. Other structural brain abnormalities include posthemorrhagic porencephaly and

hemibrain atrophy. In premature infants hemiplegic CP may results from asymmetric periventricular leukomalacia.

4. Triplegia – three limbs are involved, usually both arms and one leg.

5. Monoplegia – only one limb is affected, usually one upper limb.

The next type of CP classification is **classification based on the type of neuromuscular deficit** (**10**). This division classifies CP into spastic, dyskinetic, ataxic, hypotonic and mixed.

1. Spastic CP exibits pyramidal involvement with upper motor neuronal signs, hypertonia, hyperreflexia and positive Babinski. It is the most common form of CP especially observed in low birth weight or premature babies.

2. Dyskinetic CP – in this type hypotonia with movement disorder is observed. Upper limbs are more affected than lower limbs. Other observed symptoms are rigidity, chorea, choreoathetosis and dystonic movements. Primitive reflexes are more prominent and persist for a longer time. This type may be associated with hyperbilirubinemia and kernicterus and also with severe birth asphyxia (**14**). Dyskinetic cerebral palsy results from damage to the basal ganglia in the midbrain. Hypoxia affecting the basal ganglia and thalamus may affect more often the term infant than the premature infant.

3. Ataxic CP – in this type the main characteristic feature is lack of balance and coordination and disturbed depth perception. Ataxic CP is the least common form of cerebral palsy. Ataxia results from damage to the cerebellum that is the brain's major centre for balance and coordination.

4. Hypotonic CP is characterized by generalized muscular hypotnia that does not result from damage of muscle and peripheral nerve. The deep tendon reflexes are normal or hyperactive.

5. Mixed CP.

The Gross Motor Function Classification System (GMFCS)

The GMFCS is a recently developed classification system that classifies children with cerebral palsy by their age-specific gross motor activity. It is based on self-initiated movement with particular emphasis on sitting and walking. The GMFCS describes the motor function in five levels, from I to V in the following age groups: before 2 years, 2–4 years, 4–6 years and between 6 to 12 years. Level I is the mildest in the appropriate age group (**15**).

Treatment

Cerebral palsy can't be cured, but the treatment can improve a child's capabilities. Treatment may include physical therapy, biofeedback, occupational therapy, speech and language therapy, surgery to correct anatomical abnormalities or release tight muscles, orthopedic devices (wheelchairs, walkers, braces), and drugs to control seizures, relax muscle spasms, and alleviate pain. Also important to both child and parents are counseling, which can offer relief of stress.

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ORIGINAL PAPER

DISEASE – RELATED KNOWLEGDE OF CHILDREN DIAGNOSED AS HAVING CANCER

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Key words: children, cancer, presenting diagnosis, disease–related knowledge

Summary

Presenting of cancer diagnosis to a sick child should be an important issue during primary admission to the onco-hematology ward. The aim of the study was to estimate the level of disease–related knowledge in

cancer children. In total 137 children with cancer treated in 7 pediatric onco-hematology centers entered the study. All studied children were supposed to be informed on the diagnosis according to the protocol. Children were asked in open-ended questions to explain the reasons of their admission to the ward. The emotional status of "informed" patients was also examined. „Acceptable" level of the disease-related knowledge achieved 31.68 % of patients. However, almost half of all studied patients had an "inappropriate" level of knowledge. The remaining 22 % of children showed "none" level of information. Children with "acceptable" level of knowledge exhibited significantly higher manifest anxiety than children with "none" information level. Children classified to both younger age group (6–12 yrs) and older one (13–18 yrs) showed significant differences as trait and state anxiety were examined. Older patients with "acceptable" or "inappropriate" level of knowledge exhibited significantly higher ratings when state anxiety is considered.

Background

The transmission of adequate information about the disease to a child was established as a standard in pediatric onco/hematology (**1, 2**). The main aim of cancer diagnosis disclosure to a child should be an improvement of the quality of life during treatment and after completion of therapy as well. The medical professionals became aware of the importance of the proper way to present the information on the nature of the disease, its treatment and possible side effects to a child with cancer. The initial talk with a doctor and presented disease-related information has a great influence on the patient's understanding of the illness. Therefore, communication process with a sick child should be undertaken during primary admission to the onco-hematology ward immediately following the diagnosis. A child with adequate disease-related knowledge has an opportunity to cope more sufficiently with the disease.

Only few proposals how to present the diagnosis to a child with cancer has been published (**3–10**). According to ASCO and SIOP recommendations, the information transmitted to children should include the name of the disease, principles of therapy, expected toxicities and late effects. In fact, only Jancovic et al. (**4**), Eiser et al. (**8**) and Blacklay et al. (**9**) have presented detailed proposals, how to inform sick children about their diseases. Research methods employed in patient-doctor communication studies were classified by Carlson et al. as non-experimental or experimental (**11**). Non-experimental designs including observational studies (audio- or videotaping) and retrospective/introspective descriptions (self-report questionnaires or qualitative interview methods**)** were used in most studies of pediatric cancer patients.

In former time, it was not custom in Polish hospitals to provide a patient with details of diagnosis. The Polish Pediatric Leukemia and Lymphoma Group established the unified model of presentation of diagnosis to a child with cancer and parents. The efforts to introduce that model were undertaken in all cooperating pediatric onco-hematology centers during last 10 years (**7**). The principle of that model is to adjust the type and way of information to the cognitive development of each patient. Recently, several studies were undertaken to estimate the level of disease-related

knowledge. Most of these studies were related to survivors (**9, 12–14**).

The aim of our study was to estimate the level of disease – related knowledge in cancer children while on treatment in Polish centers.

Patients and Methods

Patients

Children with cancer were recruited from the seven cooperating pediatric onco/hematology wards. It was decided that consecutive children diagnosed as having cancer would be included into the study. Children younger than 5 years at the moment of diagnosis were excluded from the study due to their preoperational stage of cognitive development. Also children with brain tumors were excluded. In total 137 consecutive children with cancer entered the study. The children were diagnosed from January 1997 to April 2000. The median age at diagnosis was 12.05 yrs with the range from 5.5 to 18.2 years. The most of children had been diagnosed with leukemia and lymphoma (69.8 %), or Hodgkin disease (16.6 %). The remaining patients had bone tumors (5.7 %), soft tissues sarcomas (5.0 %), or other types of tumors (2.8 %).

The most patients (94.4 %) had both parents living together and single parent cared for 5.6 % of children. Most children with cancer (85.7 %) had healthy siblings and 15.3 % were the only child. Sixty seven percent of children attended primary school at the moment of cancer diagnosis. Thirty-three percent of patients were in the different types of secondary school at that moment. Good scholastic achievement was detected in 80.1 % of patients.

Among mothers of patients, 45.2 % reached secondary, and 9.6 % higher education level. The remaining mothers (45.2 %) had a basic education only. Fathers with secondary and higher education level represented 34.8 % of them.

Procedure

All studied children were informed about the diagnosis according to the protocol introduced within Polish Pediatric Leukemia and Lymphoma Study Group (PPLL SG). The PPLL SG model of presentation the diagnosis to children was based on the SIOP recommendations and our previous experience (**1, 2**). In general, the physician in charge communicates the initial diagnosis to parents, and than the informed consent to present the information to a child is obtained. Simultaneously, the psychologist collects data on the initial adaptation of the child at the ward. Finally, the meeting with parents and their child with medical team is arranged. During this meeting, the physician in charge adjusts the mode of presentation of the diagnosis to a child in the developmentally - appropriate way. Each step of this protocol is documented by psychologist in the special report form.

The questionnaire items were related to the range of information obtained on the disease. The children were asked with open-ended questions in which were explained the reasons of their admission to the onco-hematology ward. Concurrently, the Manifest Anxiety Scale (Choynowski, Skrzypek), and Spielberger Trait – State Anxiety Inventory were used to estimate patients emotional status. Each child received the questionnaire which was expected to be filled – up independently

and personally. The questionnaires were administered to children with the median of 58 days following diagnosis.

Answers related to main reason of admission to onco-hematology ward given by children were categorized arbitrary into 5 groups: 1. adequate description of medical diagnosis *("adequate diagnosis")*, 2. description of the clinical symptoms *("clinical symptoms")*, 3. general description of the situation *("general description")*, 4. "other reasons", 5. „no explanation". When a child was able to call up the diagnosis or to characterize the main clinical symptoms of the disease (category of answers 1–2) he or she was classified as having an "acceptable" level of disease--related knowledge. Answers which were composed of general description of the situation or indicated *"other reasons"* for the explanation of illness – were classified as "inappropriate" level of disease – related knowledge. All answers with "no explanation" were classified as a "none" level of disease-related knowledge.

Because of the limited sample size, and heterogeneous group, descriptive statistics were used for the analysis. The means for patient's age and disease-related knowledge levels were analyzed with Student's t-test.

Results

All studied children were supposed to be informed about their disease. Each patient received questionnaire with items helpful investigation of disease-related knowledge. Only 101 patients (73.7 %) responded to all questions. Data obtained from questionnaires were analyzed with means of qualitative statistical tools. It gave us the framework to divide patients into 3 groups depending on the disease-related knowledge level. Patients with "acceptable" knowledge level were able to recall diagnosis properly, or characterize the main clinical symptoms of the disease. Children having "inappropriate" level of disease-related knowledge were able to give only general description of the situation. And, the third group of patients, with "none" disease-related knowledge level, did not disclose any information about their illness.

„Acceptable" level of the disease–related knowledge achieved 31.68 % of patients. However, almost half of all studied patients had an "inappropriate" level of knowledge. The remaining 22 % of children showed "none" level of information. Detailed information is presented in the **table 1.**

Children's knowledge category			**Disease-related knowledge category**		
	N	%		N	%
1. "adequate diagnosis"	17	16.83	I. "acceptable"	32	31.68
2. "clinical symptoms"	15	14.85			
3. "general description"	18	17.82	II ."inappropriate"	47	46.53
4. "other reasons"	29	28.71			
5. "no explanation"	22	21.78	III. "none"	22	21.78

Table 1. Disease - related knowledge in children with cancer.

No correlations were found between parent's education, their age and children classified to each group of disease – related knowledge level. However, fathers aged 40-49 years had children with „acceptable" level of disease-related knowledge more frequently than younger or older ones. Differences between fathers age groups were statistically relevant ($Chi^2 = 212.84$, $p<.05$).

The level of disease-related knowledge correlated with patient age. It was found the tendency to increase the knowledge about illness with patient age (**Figure 1**). Children, who exhibited lack of information about the disease ("none" level), seemed to be younger (M of age =11.28) than children, who presented "acceptable" disease-related knowledge (M of age = 14.18, $p<.05$).

The effort was undertaken to compare the emotional functioning of patients with different disease-related knowledge level. Manifest anxiety scale and trait-state anxiety inventory were used for estimating the emotional status of children. Manifest anxiety, defensiveness, trait and state anxiety were analyzed according to disease-related knowledge levels and patients age. All findings on the emotional status of children were placed in the **Table 2.**

Children classified to younger age group (6–12 yrs) and older one (13–18 yrs) did not show any significant differences as manifest anxiety was considered. In contrary, the level of knowledge influenced this feature. Children with "acceptable" level of knowledge exhibited significantly higher manifest anxiety than children with

Disease-related kowledge level	**"acceptable"**		**"inappropriate"**		**"none"**	
Age group	6–12 yrs	13–18 yrs	6–12 yrs	13–18 yrs	6–12 yrs	13–18 yrs
Manifest Anxiety - M	51.9	54.47	56.5	58.58	24.75	42.4
SD	27.27	23.57	23.54	28.07	24.99	25.56
	N=10	N=20	N=10	N=24	N=4	N=10
Test T	ns		ns		ns	
Defensiveness - M	41.8	53.21	49.3	44.79	78	45.8
SD	20.04	26.46	26.75	28.44	32	21.63
Test T	ns		ns		ns	
Trait Anxiety - M	26.36	53.05	25	40.91	8.25	27.8
SD	22.26	30.97	30.03	30.61	10.87	21.17
	N=11	N=19	N=9	N=22	N=4	N=10
Test T	p<.005		ns		p<.05	
State Anxiety – M	44.36	74.89	59.89	61.45	15	57.9
SD	22.15	20.18	27.91	27.72	16.37	41.08
Test T	p<.000		ns		p<.005	

Table 2. Disease - related knowledge in relation to emotional status of children with cancer.

"none" information level. Nevertheless, we were not able to find any differences in tendency to defensiveness in relation both to level of knowledge and age of children.

The age differences we observed also when trait and state anxiety were examined. Trait anxiety was significantly increased in older patient group regardless of disease-related knowledge level. In younger children the trait anxiety was significantly lower in children in "none" group compared to "acceptable" or "inappropriate" groups. However, children with "acceptable" or "inappropriate" level of knowledge did not differ in trait anxiety rating/level. Significant differences in state anxiety were found also between groups of children with "acceptable" or "none" level of knowledge. In addition, older patients in both groups exhibited significantly higher ratings of state anxiety.

Discussion

The psychosocial support is regarded as an important part of the treatment protocols. The program of the planned psychosocial support was introduced in Poland to all cooperating institutions since 1998. The model of the initial presentation of diagnosis was established as a main component of this program. Our protocol for diagnosis presentation was based on the SIOP recommendations (**1, 2**).

The efficacy of the initial communication of diagnosis is a difficult matter to elaborate. Barlow and Ellard (2004) provided an overview of the current literature regarding the effectiveness of psycho-educational interventions for children and adolescents with chronic disease, and for their parents and siblings (**15**). Only one paper dealing with informational intervention for pediatric cancer patients was found (**10**). The different models of diagnosis presentation and disease-related information was suggested (**4, 6–7, 10, 16–17**). Also, different tools of transmission of the information topics were tried to be used: booklets (**10, 16**), audio taping and videotaping (**6**), cartoons and slides (**4**). Lately, interactive multimedia formats (e.g. video games) were cited as having the best potential (**10**). Bradlyn et al. concluded that information transfer methods should be highly interactive and individualized

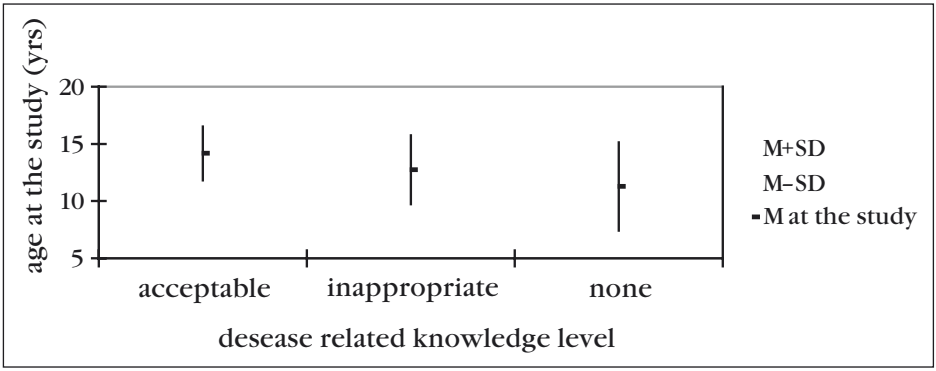

Figure 1. Relation of the disease-related knowledge and patients' age.

(**10**). Gaisser and Humbert presented an interesting project based on the "triple brochure" model: 1. A patient's brochure on general and experimental options of cancer treatment, 2. A brochure for doctors with psychooncological background information and, 3. A brochure for the patient's specific type of cancer. This kind of "triple brochure" model is expected to be a useful tool to establish and keep up a trusting doctor-patient relationship and efficient communication that meets the patient's needs (**16**).

Preceding interventions were focused mainly on transfer of information management with less attention being paid to the patients psycho-social well-being, disease related knowledge, or quality of life during this procedures.

We rated disease-related knowledge of cancer children following the meeting of a child and parents with professionals when the diagnosis was explained.

Generally, cancer patients showed "poor" and "inappropriate" level of disease-related knowledge (**12–14**). Eiser (**12**) stated that illness-related knowledge in different groups of childhood cancer survivors was mostly insufficient. In that study, childhood cancer survivors were able to recall the name of disease more often then our actually on-treatment children. In our study, only one third of newly diagnosed children with cancer presented the "acceptable" level of knowledge on their disease. In Eiser et al. study, survivors group presented only superficial or very poor cancer related knowledge (**12**). Similarly, in our study, almost half of patients showed up an "inappropriate" level of disease-related knowledge, or did not able to disclose any explanation of their illness (22 %).

The talk with a child about the diagnosis and prognosis should improve the child's well being. Only few studies have examined the impact of information disclosure on functioning of cancer children. In these papers, the impact of patient's age, or patients' cancer-related knowledge on their distress level was analyzed. Ong et al. stated

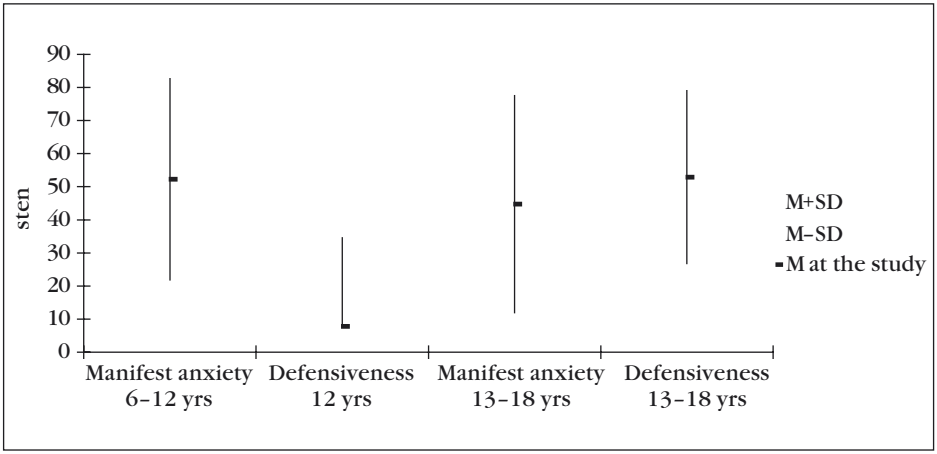

Figure 2. Manifest anxiety, defensiveness level in relation to age of "informed" patiens group.

that poor-informed younger children and well-informed older ones showed the similar level of distress (**18**). Similarly, in our study, children classified as younger age group (6–12 yrs) and older one (13–18 yrs) did not show any significant differences in manifest anxiety level. In our study, the age differences we observed in trait and state anxiety ratings. Trait anxiety was significantly increased in older patient group regardless of disease-related knowledge level. In younger children the trait anxiety was significantly lower in children in "none" group compared to "acceptable" or "inappropriate" groups.

In our study, the level of knowledge also influenced manifest anxiety level. Children with "acceptable" level of disease-related knowledge showed higher level of manifest anxiety than "none" information patients group. We can conclude, that "none" information group of patients showed better emotional functioning features, no trait anxiety, and no manifest anxiety signs. All these findings are in contrary to Last et al. study, in which the authors concluded that giving full information to children had a positive impact on their emotions and behavior (**5**).

The defense mechanisms leading to selection of some information could be one of the reasons that patient remembers only general explanation of their illness (**19–22**). The avoidance tendency as a coping strategy was also observed in some studies within the cohorts of cancer patients. Phipps at al. (**20–22**) observed a positive relationship between avoidance expressed with means of blunting scores and the time interval from diagnosis. The authors suggested that the increased tendency to avoidance in children with cancer could be a reactive phenomenon. These findings may provide an alternative interpretation of increased defensiveness and repression in children with cancer reported in previous studies (**20–22**). The constructs of repressive adaptive style and avoidant coping (blunting) were assessed as possible explanatory factors for previously

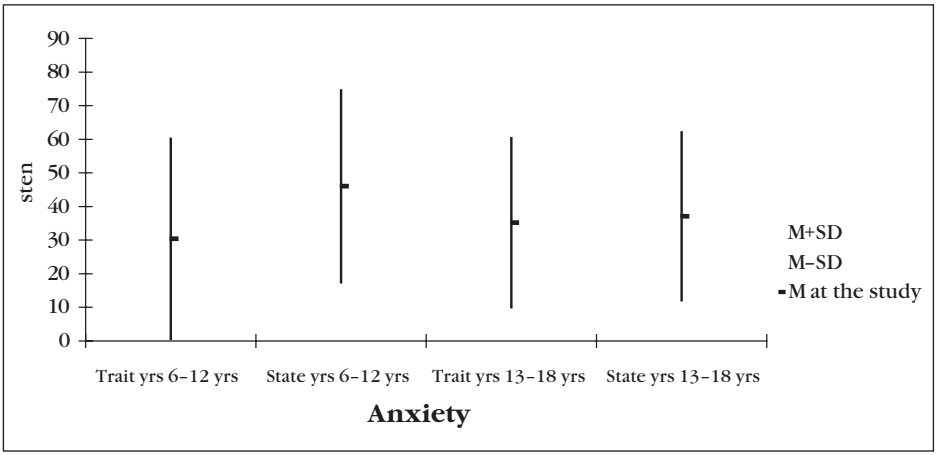

Figure 3. State/trait anxiety in relation to age of "informed" patiens group.

published findings of lower self-reported depression in children with cancer.

All medical teams involved in our study were multidisciplinary. Psychologist was working as a member of the medical team on each ward. The psychologists were responsible to control the level of realization of the information transmission model. In addition, the deviations from protocol were discussed regularly by all psychologists, during bi-annual meetings. Our results show that even if there is an agreement to provide the information to all patients according to specific protocol the additional supplementary efforts need to be made.

Communication of cancer diagnosis to a sick child and their parents requires not only well-prepared model, but also skilled medical staff, and good receptiveness of patient and parents (**17**). Thus, repetition and clarification of information are required until patients and their parents adapt to new situation, and they are able to comprehend comprehend complex knowledge. Written or video material, interactive games, taped interviews can help in this process.

The emotional state of a child and parents determine strongly their abilities to hear and comprehend the information given (**3, 17**). Therefore, the informational process should be preceded by full psychological recognition of a child. Only in this way, the best impact of disease-related knowledge on patient's well-being could be achieved.

Conclusions

1. One third of newly diagnosed children with cancer presented the acceptable level of knowledge on their disease.
2. Children with acceptable level of disease-related knowledge exhibit significantly higher manifest anxiety than children which do not disclose any information about their disease.
3. Children with low disease-related knowledge level at the same time present low level of trait-state anxiety.

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ORIGINAL PAPER

ANTERIOR RADICAL DEBRIDEMENT, INTERBODY AUTOGRAFTING AND ANTERIOR PLATING FOR THE TREATMENT OF DORSOLUMBAR SPINAL TUBERCULOSIS.

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Abstract

There is considerable agreement in the literature on the indications for surgical treatment of tuberculous spondylodiscitis. An anterior approach usually is recommended for debridement and bone grafting**.** There are controversy concerning anterior instrumentation in the surgical management of spinal tuberculosis because of the risk of persistence and recurrence of infection. Over the last four years ,18 patients with dorsolumber spinal tuberculosis were treated using anterior debridement, autograft and anterior plating to evaluate the results of one-stage interbody autografting and anterior plating in the surgical management of dorsolumbar spinal tuberculosis. They were 10 men and 8 women, aged from 22 to 55 years (mean 36 years). The involved spines included thoracic spine (**11**), thoracic-lumbar spine (**1**), and lumbar spine (**6**). MRI showed evident collapse of the vertebrae because of tuberculous destruction and paravertebral abscess. Neurological deficits were found in 6 patients. One case was graded B,two cases were graded C,and three cases were graded D according to Frankel classification. Before surgery, patients received standard anti-tuberculosis chemotherapy for 2 to 3 weeks. Retroperitoneal or extrapleural approach was chosen according to the tuberculosis lesion segment. Anterior radical deprimtment, iliac or rib autografting and anterior plating was used. Anti-tuberculosis chemotherapy was continued for at least 9 months, and the patients were supported with thoracolumbosacral orthosis for 6 months after surgery. All patients were followed up for an average of 18 months. All cases were healed without any recurrence of tuberculosis during the follow-up period. Spinal fusion occurred at a mean of 4 months after surgery. All patients with neurological deficits, showed obvious improvement.No implant loosening or deep wound infection were noted. During the follow-up period, a mean of 16 degrees of kyphosis correction was achieved after surgery. There was a mild loss (2 degrees – 5 degrees) of kyphosis correction during follow-up period

This study concluded that anterior plating with anterior autologous strut grafting following anterior radical debridement a safe and good treatment option with high correction rate, and high fusion rate in treatment of dosolumber spinal tuberculosis.

Introduction

Tuberculosis is once more widespread with an estimated world wide total of eight million new cases in 1990. Spinal tuberculosis accounts for about 2 % of cases of tuberculosis. Specific and effective chemotherapy is now the mainstay of treatment... (**11, 17, 19, 23**). There is considerable agreement in the literature on the indications for surgical treatment of tuberculous spondylodiscitis. Increased deformity, recurrence of the disease, and development of neurologic impairment

are significantly less common in patients treated with surgery and antituberculosis therapy However, graft choice and postoperative kyphosis are still problems (**25**). An anterior approach usually is recommended for debridement and bone grafting.There are controversy concerning anterior instrumentation in the surgical management of spinal tuberculosis because of the risk of persistence and recurrence of infection (**7, 16**). From an anterior approach, abscesses can be evacuated, all avascular material can be excised and anterior decompression of the spinal cord can be performed safely, also the kyphosis can be corrected or at least stabilized with the use of autogenous bone graft (**1**).

Parameter	No.	Percent %
Age incidence (years)		
22–33	5	27.7
34–45	8	44.6
46–55	5	27.7
Sex incidence		
Male	10	55.4
Female	8	44.6
Level affected		
Thoracic		
D. 8–9	5	27.7
D. 9–10	4	22.3
D. 6–7	2	11.1
Lumbar		
L 3–4	3	16.6
L 4–5	2	11.1
L 2–3	1	5.6
thoracolumber	1	5.6
Occupation		
Workers	9	50.0
House wives	7	33.9
Students	2	11.1
Total	18	100.0

Table 1. Data of the patients.

Anterior instrumentation for tuberculosis of thoracic and thoracolumbar spine has been well described in the literature (**21, 26**). Anterior debridement, strut grafting and instrumentation have an increasing popularity in the treatment of tuberculosis of spine (**3**). Anterior instrumentation in thoracolumbar spine tuberculosis has been shown to be associated with a high fusion rate, low complication rate and increased correction rate in kyphosis (**22**). There are few articles in the literature concerning anterior instrumentation in the surgical management of spinal tuberculosis in the exudative stage (**9**). Oga M, and Sugioka Y in 1993 conducted a study evaluating the risk of instrumentation as a foreign body in spinal tuberculosis. They found no adherence of mycobacterium to stainless steel (**18**). Ha et al. (**6**) also found that M. tuberculosis is rarely adherent to stainless steel.

The purpose of this study is to summarize the clinical results in the treatment of spinal tuberculosis with debridement, bone grafting and anterior fixation and To evaluate the safety and the value of this procedure.

Patients & methods

The 18 operations were per formed in orthopaedic department, Sohag University, Egypt. The age of our patients ranged from 22 to 55 years (mean 36 years) (**Table 1**). There were 10 men and 8 women. The patients were followed for at least 18 months. The eighteen patients included in this study had active dosolumber tuberculosis; the thoracic spine was involved in 11 patients (**5** cases dorsal 8–9, **4** cases dorsal 9–10, and **2** cases dorsal 6–7 vertebrae), the lumber spine was involved in **6** patients (**3** cases L 3–4, **2** cases L 4–5, and **one** cases

Frankle Classification	Before Surgery	After Surgery
A (Complet paraplegia)	—	—
B (Preserved sensation)	1	—
C (Useless motor)	2	—
D (Useful motor)	3	—
E (Normal)	12	18
Total	18	18

Table 2. Neurological state before and after surgery.

L 2–3 vertebrae and thorcolumber spine was involved in **one** case.

All patients had clinical and radiological evidence of active dorsolumber tuberculosis. Twelve patients were neurologically free; Neurological deficits were found in 6 patients. **One** case was graded B, **two** cases were graded C, and **three** cases were graded D according to Frankel classification (**Table 2**). MRI was done for all patients. Tuberculin test was positive and ESR was very high in all cases. All the patients had received a course of antituberculous drugs after radiographic and laboratory investigations.

All patients had anterior radical resection through retroperitoneal approaches to the lumber spine and thoracotomy to the dorsal spine). The tuberculous focus was resected until healthy bleeding cancellous bone was exposed. The resultant gap was reconstructed with strut bone graft; the graft was fixed in cancellous bone slots. We used rib graft for dorsal spine and strut iliac graft for lumber spine. Specimens of excised tissues were sent for histopathological studies. In all patients Broad AO DCP Plae was used which is Cheep and small sized compared with other bulky anterior system. Postoperative plaster shell was used until removal of the stitches. After surgery all patients continued antituberculous treatment for at least 9 months.

Postoperative care

The patient was kept for two nights in the ICU until lung inflation and removal of intercostal tube. Physiotherapy for the chest and lower limbs was done, stitches were removed at 2 weeks then The patient is mobilized with an appropriate Thoracolumbar support for 12 weeks.

Follow up

All patients were assessed clinically at monthly interval up to three months and at three months interval up to 24 months and at 6 months interval up to the final follow up. On each assessment, data related to drug regimen and its side effects if any, abscess or sinus formation, improvement of back pain and tenderness were recorded. Postoperative neurological assessment was reported and compared with the preoperative state (**Table 2**). The activity of the disease was assisted by ESR at monthly intervals for the first 3 months, then once every 3 months during the first year, and every 6 months until the final follow up. Anteroposterior and lateral radiographs of the spine were obtained each visit and studied for the angle of kyphosis and the progress of healing.

Results (Fig. 1, 2 and 3)

Histological studies of the excised tissues confirmed the diagnosis in all cases. The average follow up was 20 months (range 18–36 m). All the patients achieved full clinical and radiological cure of infection and satisfactory correction. of the

deformity. There was no case of recurrence of infection. All cases presented with neurological deficit showed complete neurological recovery within the first 3 months following surgery and the other patients remained neurologically free. Clinical improvement was markedly evident in all cases after surgery with gradual improvement of back pain. No patient had pain or tenderness on the most recent follow up; there was no signs of reactivation.

Spinal fusion occurred at a mean of 4 months after surgery. A diagnosis of fusion was made if there was

a) no significant loss of correction,
b) no graft resorption,
c) no graft bed resorption and
d) visible graft remodeling such as trabecular re-arrangement between the graft bed and the graft.

In the patients with involvement of thoracic spine, the mean angle of kyphosis was reduced from 40 degrees preoperatively to a mean 25 degrees after surgery and to a mean 30 degrees at the final follow up. In patients with involvement of the lumber spine, the mean angle of kyphosis was -10 degrees preoperatively which improved to a mean of –12 degrees at the final follow up (**Table 3**). We followed the method of Dikson (**4**). to measure the angle of kyphosis.

Complications

- one superficial wound infection which responded to parenteral antibiotics
- backing out of screws in 1 patient (**fig. 2d**)
- transient dysesthia in the distribution of the genitofemoral nerve in one patient
- accidental opening of the peritoneum which was repaired immediately

Non of the patients had an iatrogenic neurological injury, vascular injury or loosing of the hardware other than in one patient with backing out of the screw. Non of the implants needed to be removed

Discussion

Tuberculosis of the spine is a wide world problem not only in the third world but also in the developed countries (**10**). The dorsal spine is the most commonly affected area in which kyphosis is marked (**20**). Non operative and operative methods have been extensively evaluated by the Medical Research Council Working Party. Their reports indicated better results as regard deformity, recurrence, development of paralysis when radical surgery is performed with chemotherapeutic coverage (**13**). The results of conservative treatment of tuberculosis, of the spine have not been completely satisfactory even with availability of new drugs. It is observed, that tuberculous kyphus is a major problem among patients who have conservative treatment

Site	Preoperative	Postoperative	Final follow up
Thoracic	40	25	30
Lumber	-10	–12	–12

Table 3. The mean angle of kyphosis.

in the form of chemotherapy,and rest or plaster jackets (**7, 15**). Since Hodgeson and Stock (**7**). reported the anterior arthrodesis for treatment of tuberculosis of the spine in 1956; anterior fusion for treatment of spinal tuberculosis gained its popularity and has been advocated as the treatment of choice. For successful anterior radical surgery they showed that surgical removal of all necrotic tissues; bone sequestra and tuberculous granulation tissues should be carried out effectively before insertion of the graft (**7**). This method of radical surgery was used in this study. As regard the source of the graft; rib graft was used in cases, with dorsal spine involvement and tricortical strut iliac graft in cases with lumber spine involvement. Vertebral spreader was used to achieve correction of the kyphus and then the graft was placed under maximum compression and fixed in cancellous bone slots in the superior and inferior vertebrae. This technique was the reason behind the good results and the low incidence of graft dislodgement in this series. In all patients Broad AO DCP Plae was used which is Cheep and small sized compared with other bulky anterior system and suitable specially in thoracic vertebrae as there is Lack of adequate space anteriorly to put in bulky anterior implants in thoracic vertebrae particularly above T9 of small stature patients. From the practical point of view,the plate can be fixed to anterior or lateral aspect of the vertebral body without any difference in stability (**12**). Tuli (**24**) reported 27 % loss of immediate postoperative correction in their study on 120 patients which is much more than what is reported in the current study. The good results in this study are explained by the use of vertebral spreader and making cancellous bone slots in the superior and inferior vertebrae and the use of anterior plating. Al-Sebai (**2**). reported that Together with anterior fusion, additional anterior instrumentation has the following advantages: proper correction and stable alignment are maintained, graft-related complications are minimized, spinal cord decompression is facilitated, rigid stability is provided. Complications related to the posterior procedure are eliminated and Fusion is stimulated by rigid fixation. Yogesh (**27**) concluded that whenever possible anterior debridement, decompression and strut grafting should be combined with anterior instrumentation as both, instrumentation and grafting done as a single stage surgery through the same incision, minimizing the total blood loss and the surgery time, also no risk of graft slipping out on turning the patient for posterior instrumentation. H. Mustafa Özdemir (**8**). concluded that, the use of allograft fibula and anterior spinal instrumentation in Pott disease after proper surgical débridement provides effective spinal alignment, correction, and maintenance, also Spinal cord decompression is facilitated., Rigid stability is provided. Complications related to the posterior procedure are eliminated. Oga M, and Sugioka Y in 1993 conducted a study evaluating the risk of instrumentation as a foreign body in spinal tuberculosis. They found no adherence of mycobacterium to stainless steel (**9**). Ha et al. (**6**). also found that M. tuberculosis is rarely adherent to stainless steel. Aggressive double (anterior and posterior) attacks to the site of infection carries a lot of advantages but at the same time is surrounded by many complications specially in patients with lowered resistance and bad general condition. The main advantage is the guarantee against graft dislodgement especially when

using long graft to compensate for large defects of anterior column (**7, 14**). In this study; with the use of anterior plating high incidence of solid union; only one case of graft dislodgement was reported. Again the degree :of loss of the main kyphotic-angle in the final follow up is only 16 %. Keeping in mind the complications and the cost of internal fixation if aggressive anterior and posterior surgery is done; we think that anterior debridement, autograft and anterior plating a safe and good treatment, in treatment of dosolumber spinal tuberculosis.This is in agreement with the conclusion of Hadjipavlou (**5**).

Conclusion

This study showed that anterior plating with anterior autologous strut grafting following anterior radical debridement is a safe and good treatment option with high correction rate, and high fusion rate in treatment of dosolumber spinal tuberculosis. A satisfactory segmental stability and fusion is achieved by this technique. The use of broad AO DCP is suitable for our patient as it is cheep. Relatively small sized compared with other bulky anterior system as there is Lack of adequate space anteriorly to put in the bulky anterior implants in the thoracic vertebrae particularly above T9 of small stature patients.

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REVIEW ARTICLE

PARALYTIC HIP LUXATION IN CHILDREN WITH CEREBRAL PALSY

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Abstract

Authors present problem of hip luxation in children with cerebral palsy. They pointed out some difficulties, which might be encounter by pediatric orthopedic surgeons. On the material from Department of Pediatric Orthopedics and Rehabilitation Medical University of Lublin authors discuss: symptoms, diagnostic problems and types of treatment. They emphasize role of

prophylactic against hip decentration and if present adequate treatment.

Key words: cerebral palsy, hip luxation

Introduction

Cerebral palsy (CP) in children is constantly a difficult orthopedic problem. Asymmetric spasticity of muscles may cause contractures of joints, deformities and decentration (dislocation) of developing hip joint. Among others spastic hip luxation remains one of main therapeutic problems in children with cerebral palsy. Paralytic luxation of the joint draws a child back in time and in normal evolution. A child can no longer stand or walk properly. Nevertheless, a hip joint is usually normal (stable and congruent) in newborns and baby period and any deformity including luxation comes as secondary. Later, at the age of 4–7 years, dislocation process can begin, leading with time to subluxation and luxation. The dislocation of femoral head in these children happens gradually and "secretly" and can sometimes be overlooked even by medical team. Some authors consider this spastic hip luxation as one of the clinical symptoms of "natural history of cerebral palsy", but this opinion is not supported by our Department (**4, 7, 8**).

Fig. 1a. Weickert trousers for infants with hip joint decentration;
Fig 1b. Sponge wedge for walking used as orthotic apparatus at older children with hip decentartion and at children after operative procedures on hip joints.

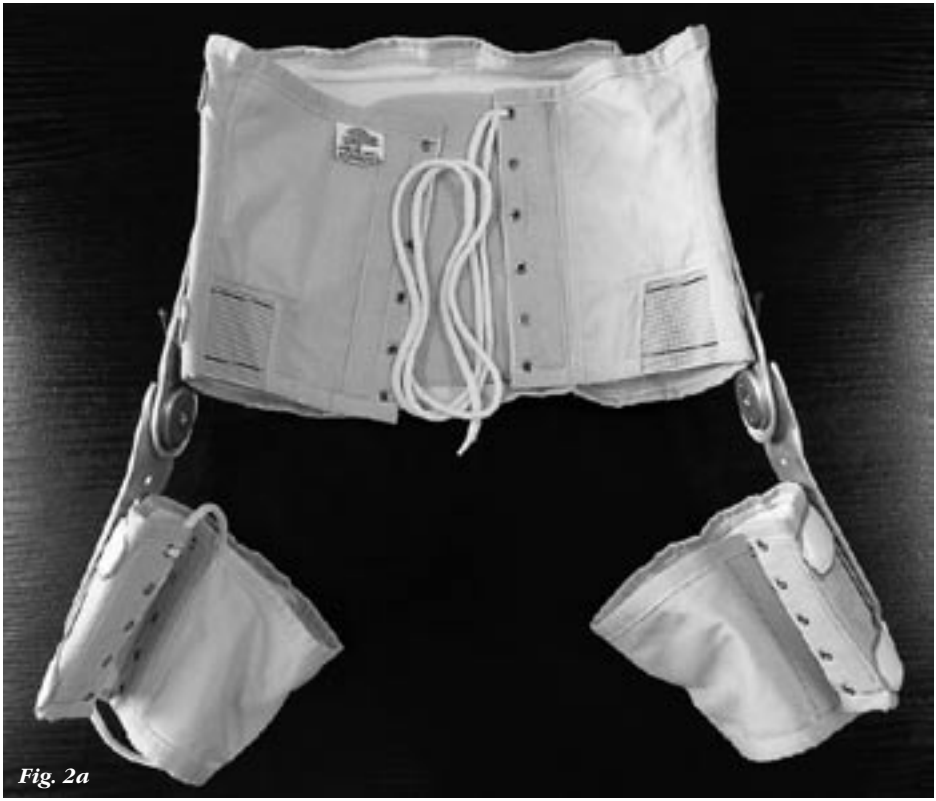

Fig. 2a

Material

In the years 1999–2005 479 children with cerebral palsy were treated in Department of Pediatric Orthopedics and Rehabilitation in Lublin. About 32% of them showed different abnormalities, deformations and decentrations of the hip joint. A radiological evaluation (Reimers index) was made of range of hip joint decentration.

Treatment

Since no treatment method is considered optimal in spastic hip joint decentration, it is crucial that we concentrate on prevention of luxation of the hip (**1, 4, 6**).

In the early stages of hip joint decentration we also used locally botulin toxin for injection into adductor muscles and drugs with general effect (eg. Baclofen, Miolastan) (**2**). Slight efficiency of such procedure seems to be advisable only in some cases. In smaller children we used orthotic devices as Frejka pillow, Weickert's trousers or Koszla splint. In older children

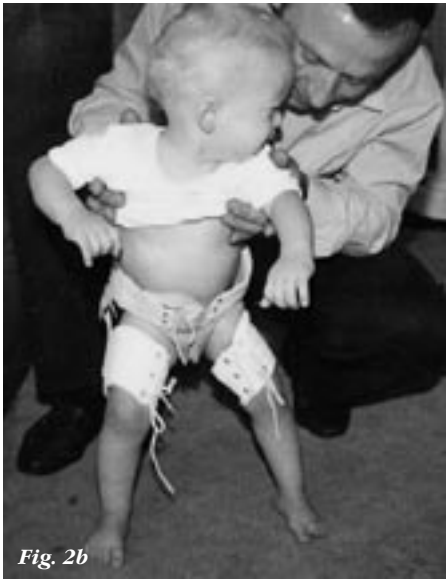

Fig. 2a, 2b, 2c, 2d
Abduction apparatus for walking and its practical applications.

we used sponge wedge for lying or walking patients (originally invented by T. Karski Lublin) and abduction apparatus for walking (originally invented by M. Okoński Lublin) or sometimes soft cast abduction splint. The devices are used primarily and after operative treatment (**Fig. 1., Fig. 2a, 2b, 2c, 2d**) (**5**).

The applied surgical treatment consists of preventive procedures on soft tissues like: adductor muscles tenotomy, hamstring muscles tenotomy, hip or knee flexors fasciotomy. In reconstructive surgery of dislocated hip we mostly use: open reduction, derotation and varus femur bone osteoto-

my, pelvis osteotomy according to Dega or Salter or femur angular osteotomy (Schanz osteotomy) (**3, 4, 5, 9**).

Discussion to the treatment

The problem of hip luxation among the children with cerebral palsy is very common. The dislocation of the hip is a very serious problem in child's movement apparatus development because it causes serious disturbances in walking and in standing. It is also the reason of secondary paralytic scoliosis which causes another very serious problem.

Some orthopedic surgeons have controversial ideas in this subject. They see dislocation of the hip as "normal" symptom of that particular disease. That problem has been many times discussed on Orthopaedic Meetings in Poland – so, the actual point of view of our Department is the following:

a) Not every child with cerebral palsy must have a dislocation of the hip
b) Every child with CP needs very early management for the hips protection.
c) Every orthopedic surgeon should examine hip joints in every child with CP very often and advise specific orthotic devices as protective management.
d) Our Department advises rehabilitation doctors to make X-ray picture of hip joints of children with CP every year in order not to miss sub-luxation or luxation.
e) Only lack of proper treatment in older children with CP causes dislocation of the hip.

Conclusions

1. Any functional and later anatomical asymmetry in hip region may lead to hip joint displacements. Adduction contracture of hips is especially dangerous is it persists for many years.
2. Spastic luxation of the hip is not an indispensable symptom of cerebral palsy. It is a sign of insufficient or incorrect therapy or sometimes even of absence of necessary preventive treatment.
3. Surgical treatment of spastic hip luxation (*luxatio coxae paralytica inveterata*) is difficult and does not give satisfactory results.
4. Prophylactics against hip decentration is the most important task in treatment of children with CP.
5. Decentration of the hip joint can be prevented through orthotic devices and prophylactic procedures but needs careful treatment for long time every day and for many years.

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ORIGINAL PAPER

THE PREVALENCE OF BONE AND JOINTS TUMOURS AND TUMOUR-LIKE LESIONS IN CHILDREN IN THE MATERIAL OF THE CHAIR AND DEPARTMENT OF CLINICAL PATHOMORPHOLOGY, MEDICAL UNIVERSITY IN LUBLIN OF THE YEARS 1997–2006 AS WELL AS THE METHODS APPLIED IN THE DIAGNOSTICS OF THE CHANGES

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Abstract

We retrospectively studied all bone and joints tumours and tumour- like lesions in children diagnosed in Chair and Department of Clinical Pathomorphology in Lublin between 1997–2006. 376 cases were collected. Bone tumours constituted 89 % of all the diagnosed changes (335 cases), whereas articular changes constituted 11 % (41 cases). The changes were more frequently observed in boys than in girls (M:F = 1.3:1). The most common benign tumours were: osteochondromas, constituting 60 % of bone and joint tumours in children, osteoid osteomas – 4 % and chondromas – 3 %. Among malignant tumours most common were Ewing's sarcoma –1 % and osteosarcoma –1 %. Synovial sarcoma and primary bone lymphoma constituted each of them 0.3 % of all tumours. Non-neoplastic bone and joints lesions constitu-

ted 26 % of all cases. The most commonly observed bone changes included: fibrous dysplasia –5 %, aneurysmal cyst –3 % and simple bone cyst –3 %. Among non-malignant joints lesions Baker's cyst was most common –4 %.

Keywords: bone tumours , joints tumours, children, tumour-like lesions

Introduction

Primary tumours as well as non-malignant changes of the osseous and articular system are rarely observed in children. Nevertheless, malignant tumours of the bones constitute as many as approx. 7 % of malignant tumours occurring in childhood (**1**). Osteosarcoma is the most frequently encountered malignant tumour, and the second most common type of neoplasm observed in children is Ewing's sarcoma (**1, 4, 5**). There are no detailed epidemiological data concerning benign tumours and non-malignant changes in the osseous and articular system in children.

Material and Results

In the material of the Chair and Department of Clinical Pathomorphology at Medical University in Lublin, within the time window of 10 years (1997–2006), 376 neoplastic and tumour-like lesions of the osseous and articular system were recognized in children and adolescents within the age range of 1–18 years. Bone tumours constituted 89 % of all the diagnosed changes (335 cases), whereas articular changes constituted the remaining 11 % (41 cases), **Tab. 1.** The changes were more frequently observed in boys than in girls (M:F = 1.3:1). The most abundantly represented neoplasms were benign tumours and they constituted 71 % (265 cases) of all the changes in the osseous and articular system. The most commonly observed benign tumours were: osteochondromas, constituting 60 % of bone and joint tumours in children, osteomas –4 % (17 cases) and chondromas –3 % (10 cases). Osteochondromas were more frequent in boys (M:F = 1.4:1), whereas osteomas and chondromas were more frequently observed in girls (M:F = 1:1.8; 1:2.3, respectively). Ewing's sarcoma (5 cases – 1 %) and osteosarcoma (3 cases – 1 %) were the most common among malignant tumours. Synovial sarcoma and primary bone lymphoma (represented by Hodgkin's lymphoma) were only individual, isolated cases and each of them constituted 0.3 % of all osseous-articular growths in children. Non-malignant osseous-articular changes constituted 26 % of all cases. The most commonly observed bone changes included: fibrous dysplasia of the bones (20 cases – 5 %), aneurysmal cyst (13 cases – 3 %) and simple bone cyst (11 cases – 3 %). The prevalence of fibrous dysplasia of the bones was similar in boys and girls (M : F= 1:1). Cysts, however, were significantly more often found in boys (the aneurysmal cyst was observed 3.3 times more often and simple cyst – 2.7 times more often) in comparison with girls. Among non-malignant changes Baker's cyst was most common (17 cases – 4 %), it more often developed in boys (M : F =1.4:1); the second most common was ganglion (11 cases – 3 %) which occurred more often in girls (M : F = 1:1.8).

Discussion

Tumours developing in the osseous – articular system are quite often difficult to

diagnose. Therefore in order to recognize bone changes precisely, close cooperation of specialists involved in the diagnostic process, i.e. clinicists, laboratory diagnosticians, radiologists, pathomorphologists and even geneticists, is necessary.

Information collected during the interview, physical examination as well as the results of biochemical and radiological

Lesion	No	%	Sex			
			Female		Male	
			No	%	No	%
Cartilage tumours	236	63	101	43	135	57
Osteochondroma	226	60	94	42	132	58
Chondroma	10	3	7	70	3	30
Osteogenic tumours	24	6	13	54	11	46
Osteoid osteoma	17	4	11	65	6	35
Osteoblastoma	4	1	2	50	2	50
Osteosarcoma	3	1	0	0	3	100
Giant cell tumour	3	1	0	0	3	100
Ewing's sarcoma	5	1	4	80	1	20
Hodgkin lymphoma	1	0,3	1	100	0	0
Non neoplastic bone lesions	66	17	25	38	41	62
Fibrous dysplasia	20	5	10	50	10	50
Aneurysmal bone cyst	13	3	3	23	10	77
Simple bone cyst	11	3	3	27	8	73
Ossifying fibroma	4	1	3	75	1	25
Nonossifying fibroma	2	0,5	1	50	1	50
Langerhans cell histiocytosis	3	1	1	33	2	77
Fibro-osseous pseudotumor	1	0,3	0	0	1	100
Inflammatory bone lesions	10	3	3	30	7	70
Others	2	0,5	1	50	1	50
Synovial tumours	6	1	2	33	4	77
Tenosynovial giant cell tumour	4	1	1	25	3	75
Haemangioma	1	0,3	1	100	0	0
Synovial sarcoma	1	0,3	0	0	1	100
Non neoplastic synovial lesions	35	9	17	49	18	51
Ganglion	11	3	7	64	4	36
Baker's cyst	17	4	7	41	10	59
Inflammatory synovial lesions	7	2	3	43	4	57
TOTAL	376	100	163	43	213	57

Tab. 1. Bone and joints tumours and non neoplastic lesions in children in the material of the Chair and Department of Clinical Pathomorphology, Medical University in Lublin of the years 1997 – 2006.

examinations give the ground for making a tentative diagnosis. Final diagnosis is decided by histopatological examination of the tissues obtained from the tumour. It should be kept in mind, however, that in order to evaluate the microscopic image precisely and make a differential diagnosis, detailed clinical and radiological information is necessary.

Examinations enabling precise determination of the tumour's severity and its local extent are (**1, 2**):

- **radiological examination** - allows for proper evaluation of the changes in the bone structure and the presence of periosteal reactions
- **scintigraphy** is a method of high sensitivity but low specificity and is performed in order to determine local severity of the neoplastic process as well as to detect metastatic foci. This examination detects changes much earlier than other non-invasive methods but the possibility of differentiation between neoplastic and inflammatory or traumatic changes is small. However, osteoma, with extremely characteristic scintigraphic image, as well as aneurysmal cyst with quite a changeable image, are exceptions here.
- **computed tomography (CT scan)** allows for examining changes especially in the areas of complex anatomical structure, e.g. the shoulder, the spine, pelvis and the cranium, where precise evaluation of the reviewing images is harder. This examination reveals changes in the bones and periosteal reactions as well as the spread of neoplastic process in the marrow cavity and the surrounding tissues. CT scan of the chest (especially so called "spiral" one) enables detection of metastatic foci invisible in the radiological examination.
- magnetic resonance imaging (MRI) enables evaluation of the tumour's growth in the marrow cavity and in the surrounding soft tissues as well as evaluation of the tumour's relation to the nerves and blood vessels, where angiography may also be helpful.
- angiography is performed especially when sparing treatment is planned.
- positron – emission tomography (PET) is a combination of imagining and localizing metabolic changes in the tissue anatomical-functional examination. It enables precise localization of changes and identification of the type of pathology at the molecular level as well as determination of severity of the neoplastic change.

These methods are extremely helpful in diagnosing and essential in planning appropriate treatment and its later monitoring. Diagnosing tumours of the osseous--articular system should always be a collective endeavour that is based on close cooperation of a clinicist, radiologist and pathomorphologist**.** However, it must not be forgotten that it is the histopatological examination that is conclusive. Yet, this type of examination is highly restricted by the size and quality of the obtained biopsy specimen. Clinically unambiguous and radiologically benign changes may be operated on without performing preoperative biopsy and histopatological diagnosis may be made after the tumor has been removed. Other changes require biopsy. Material for examination is obtained by means of surgical biopsy or oligobiopsy. The choice of the biopsy site matters here since the obtained biopsy specimen should contain

diagnostic neoplastic tissue. In the case of osteogenic tumours, biopsy specimens should be collected from the biopsy sites which on radiological examination arouse suspicion of osteoid production. Moreover, biopsy specimens should be collected from the deep structures in order to avoid collecting reactive bone tissue. In the choice of the best biopsy site, the residual activity of (99 Technet) isotope may be made use of and it can be applied while scintigraphy is being performed; it can be determined intraoperatively with the use of a manual gamma-camera. The biopsy site should be planned so that it can be removed together with the primary tumour in the course of the ultimate surgical treatment. Biopsy cut should not: interfere with the later surgical treatment, cause undesirable and unnecessary widening of the radiation areas, it should not increase the risk of pathological fracture as well. In the group of patients with Ewing's sarcoma also the bone marrow should be collected for examination since its involvement is noted in over 10% of the patients suffering from this condition. Histopathological diagnostics of bone tumours in children often requires the use of the most sophisticated exploratory methods. This refers especially to poorly differentiated pediatric small cell tumours which may be both primary tumours and secondary metastases to the bones. Such tumours usually require the use of accessory diagnostic methods, i.e.:

- **immunophenotype examinations**
- **electron microscope**
- **cytogenetic examinations**
- **molecular biology**

These days genetic examinations are becoming more and more important while making a diagnosis and sometimes they are conclusive. The presence of specific chromosome aberrations may determine diagnosing a tumour, especially when the results of immunohistochemical and ultrastructural examinations are ambiguous. The most often observed chromosome aberration in bone tumour is t (11;22) in Ewing's sarcoma (**3**). Genetic examinations are also essential in differential diagnosis of metastatic small cell tumours of bone.

Conclusions

1. The most common benign tumours of bone and joints in children are: osteochondromas, osteoid osteomas and chondromas.
2. The most common malignant tumours of bone and joints in children are Ewing's sarcoma and osteosarcoma.
3. The most commonly observed non-neoplastic bone changes in children are: fibrous dysplasia, aneurysmal cyst and simple bone cyst and among non-malignant joints lesions – Baker's cyst.
4. In order to evaluate the microscopic image and make a correct differential diagnosis a detailed clinical and radiological information is necessary.

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REVIEW ARTICLE

ORTHOPAEDIC AND OPHTHALMOLOGIC DIFFERENTIAL DIAGNOSIS OF TORTICOLLIS (WRY NECK). EARLY ROTATION-STRETCHING TREATMENT AT NEWBORNS AND BABIES VERSUS OPERATIVE TREATMENT AT OLDER CHILDREN

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Abstract

The authors present differential diagnosis of torticollis (wry neck). They present an early method of treatment of *torticollis muscularis* with rotation-stretching therapy at newborns and babies. The authors give technical data of this conservative management – rotation-stretching therapy.

Key words: torticollis, rotation-stretching treatment

Introduction

Torticollis (wry neck) is a congenital or acquired condition of limited neck motion in which the child will hold the head to one side (deviation) with rotation of head (**Fig. 1**). There are many causes of torticollis and not all of them are "muscular problems". Torticollis can also be caused, albeit rarely, by bony abnormalities in the spine, vision problems (Ocular Torticollis) or neurological imbalance (Benign Paroxysmal Torticollis) (**1, 5**).

Congenital Muscular Torticollis (CMT) is, by far, the most common form in newborns and babies. Torticollis is the result of the shortening of the sternocleidomastoid muscle. In early infancy, a firm, non-tender mass may be felt in the midportion of the muscle – it is called *tumor neonatorum*. This muscle mass can be replaced with fibrous tissue. If untreated, torticollis causes limited neck and head motion and asymmetry of head and face development.

In Roman times torticollis was named *caput obstipum* or *scoliosis faciei.* In Middle Ages were created new Latin descriptions: torticollis dextra / sinistra! (good latin). Today we use neologism – torticollis dexter / sinister (should be torticollis dextra / sinistra!?).

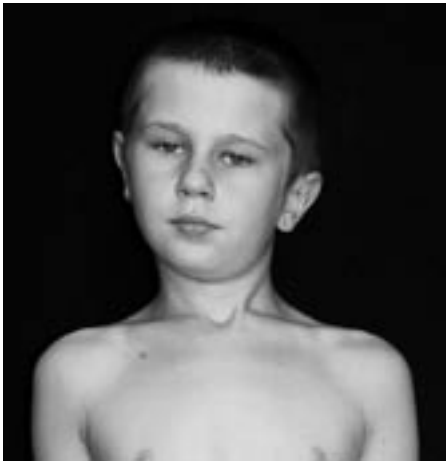

Fig. 1. Clinical picture of a child with left-sided torticollis muscularis: Limitation of neck rotation movements to the left (to torticollis), full rotation movement to the right, flattening of the left side of head, face asymmetry, eyes and ears asymmetry.

Types of torticollis

In general we can distinguish several types of torticollis basing on its etiological factors:

- torticollis myogenes (muscularis) – is the most common form in infants as result of shortening of the sternocleidomastoid muscle (SCM). There are 3 subtypes in this group (see below) according to causes.
- torticollis osseus (bony abnormalities in spine)
- torticollis ocularis (vision problems)
- torticollis neurological (spasticus)
- torticollis inflammatory
- torticollis reumatological
- torticollis habitual (histerical)

Differential diagnosis

Torticollis ocularis is caused by: muscles paresis and convergens or divergens strabismus, muscles spasticity (subspasticity), short-sightedness, *nystagmus*, *astigmatism*. Differential diagnosis: doesn't cause head asymmetry while sleeping. Differential diagnosis, through special clinical examination, is needed by ophthalmologists and orthopedic surgeons.

Torticollis muscularis (3 subtypes) is caused by: A. as result of „syndrome of contractures" (Mau, Green&Griffin, Karski) and wrong nursing habits; B. trauma of sternocleidomastoid muscle during delivery (Karski, Wośko) (3) – vacuum or mechanical extractors; C. real „torticollis muscularis congenitus" with *tumor neonatorum* (Dega, Piątkowski). Untreated torticollis leads to: limitation of neck rotation movements to torticollis side; limitation of deviation movements to "healthy side"; flattening of the head and face in result face asymmetry; eyes and ears asymmetry; shoulders asymmetry; sometimes *scoliosis cervicalis*.

Discussion about method of treatment

The problem of treatment and questions: A. what kind of conservative therapy should be applied? B. can the conservative therapy be fully effective? C. must we operate all cases of torticollis muscularis? (6) Answers: Old treatment through „deviation correction" mostly did not give satisfactory effects. After such old treatment there was mostly necessity to introduce operative treatment (Król, Modrzewski). Our experience with new conservative treatment coming from the years 1974–1991–2006

explains that "rotation-stretching position" towards torticollis side provides effective results (**2, 4**). This early rotation-stretching treatment is fully effective at newborns and small infants. At older infants it needs more time (6–18 months). The treatment at newborns and small infants should be applied for 8–12 hours daily (it is not difficult for newborn because they sleep 20 hours daily – it is only the proper nursing)! We would like to warn that repeated movements (exercises) are wrong and are not acceptable at small children! Only stretching-rotation position often with thermotherapy gives proper stretching of shortened sternocleidomastoid muscle and makes operative procedures unnecessary (**Fig. 2**). So, for the question: "Early rotation-stretching treatment at newborns and babies versus operative treatment at older children" we can answer that new conservative treatment has been proven very effective in last 33 years. In years 1955–1975 every week we operated 1–3 children (together 430 procedures); in years 1976–1990 (together 365 procedures). Now, after wide introduction of new conservative treatment (rotation stretching) we operate only 3–5 children per year. Early examination by pediatrician and early further differential diagnosis by orthopedic surgeons, neurologists and ophthalmologists is necessary for introduction of proper new therapy. The cooperation between pediatricians and orthopedic surgeons in Lublin District is excellent.

Conclusions

1. Gradual introduction of new therapy (rotation-stretching) since 1974 and wide introduction of this rotation--stretching treatment since 1991 (after publication in Orthopädische Praxix) gives good results.
2. We noticed visible reduction in number of operative procedures since 1991.

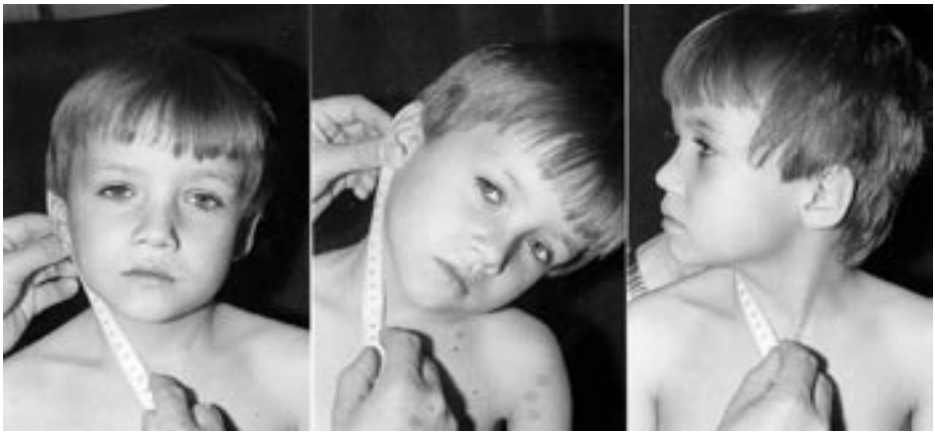

Fig. 2. Child with right-sided torticollis muscularis. Explanation of idea of rotation-stretching treatment. From left to right: Length of MSC muscle – 12 cm. Stretching by deviation – 14 cm. Stretching by rotation therapy – 17 cm. Rotation position towards torticollis provides more effective treatment.

3. We encourage introduction of new conservative therapy by orthopaedic surgeons, family doctors and paediatricians.

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PERSPECTIVE ARTICLE WITH A CASE REPORT

WILLINEGER DRAINAGE IN THERAPY OF OSTEOMYELITIS

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Abstract

The authors present the method of treatment of chronic osteomyelitis or chronic joint infections. The method was originally invented by Willineger from Switzerland. The authors give technical date of therapy and results of treatment of 27 patients.

Key words: osteomyelitis, drainage treatment

Introduction

Thought 50 years of activity of Pediatric Orthopaedic and Rehabilitation Department of Medical University of Lublin/Poland we have treated patients with deformities after osteomyelitis or/and arthritis. We have also treated acute cases or exacerbation of chronic ones. This last material is the subject for the article.

Material

In the years 1970-2003 we treated acute cases or exacerbation of chronic osteomyelitis at 27 patients – 17 boys and 10 girls. The upper extremity was effected in 4 cases and the lower extremity was effected in 23 cases. The age of patients was from 3 months to 15 years – average 9 years. The patients were mostly treated before in other Departments for 1–5 or even more years but without success. At some patients open or closed fistulas occurred, these were mostly cases of posttraumatic osteomyelitis. Several cases without fistulas had hematogenic background of osteomyelitis mostly at younger children.

Aim

Various methods of conservative and operative treatment of osteomyelitis are known. The most important rule is the evacuation of inflammatory fluid (*pus evacuatio*) from the source of inflammation. Applied methods in other Departments were: biopsy with evacuation of fluid, temporary outflow drainage, repeated irrigation with physiological solution, closed wound healing with cleaning of the focus of osteomyelitis and filing with spongy grafts (**1**), open wound healing (**4, 5**). Prof. Hans Willineger from Switzerland introduced the so-called "constant drainage" as a way of treatment of osteomyelitis. His method was widely applied in Orthopaedic

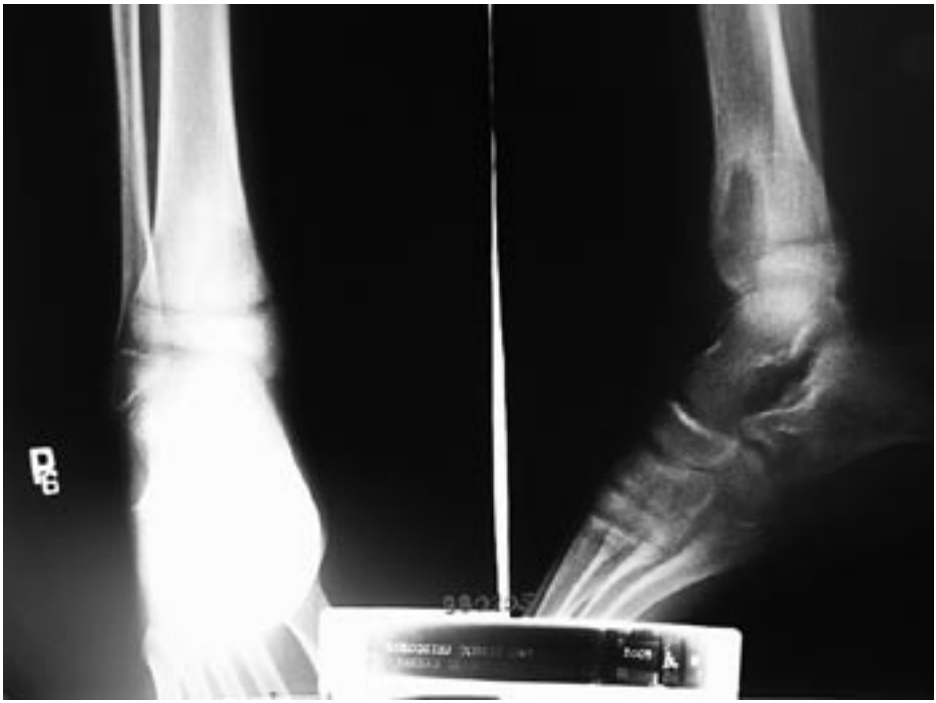

Fig. 1. Tomasz K. hist. number 880205 – osteomyelitis of distal part of right tibia treated without success for 12 months in other Department.

Department in Heidelber/Germany and was transferred to our Department in the years 1972–73 (**2, 3**).

Willineger drainage technique

The child is operated under general anesthesia. Exposure of focus of osteomyelitis – mostly by bone fenestration. Mechanical cleaning of bone or joint with physiological natrium salt and hyper-oxygenic water very exactly and for long time – approx. 30–45 minutes. Removal of *sequester*. Placing of two ends of drains in the remaining free space after extraction of sequester in focus of osteomyelitis. The drains should be crossed inside. Both drains are brought out through healthy soft tissue and healthy skin with a distance of 5–8 centimeters or more between them. The drainage through constant "washing" is begun immediately after the operative procedure. Physiological solution or Ringer solution should be used for drainage. It is important not to add any antibiotics or other medicines to the drainage since only physiological solutions can stimulate processes of bone healing (Heidelberg Department opinion). The flow of drainage should be of 60 drops per 1 minute or more, never fewer! (never slower!). The balance of water in infusion should be made constantly. The color of outflowing fluid is noted. In addition the microscopic

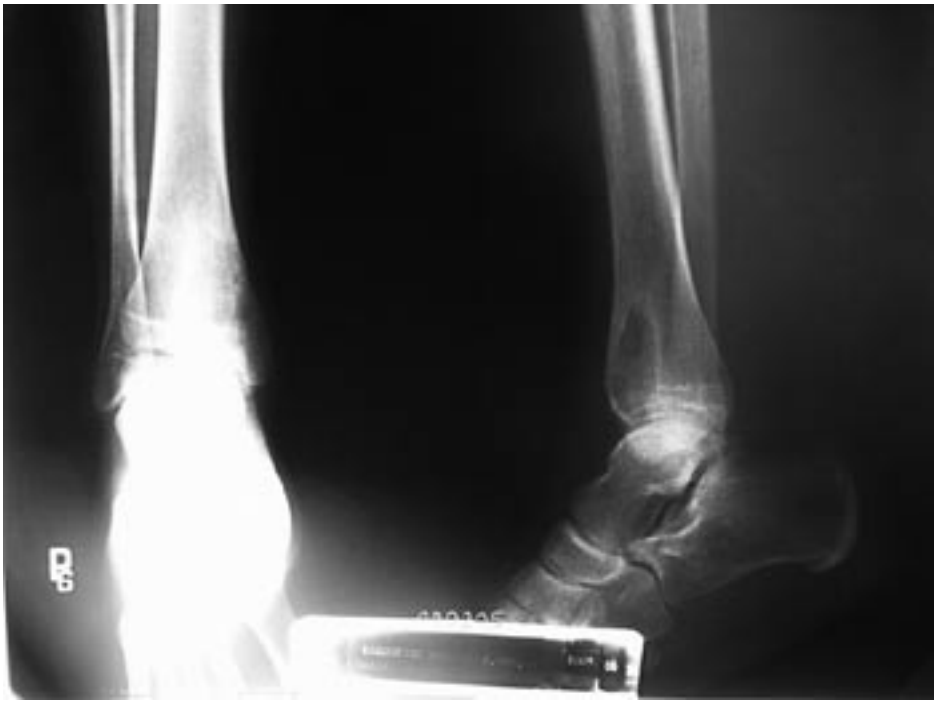

Fig. 2. Clinical example of Willineger drainage therapy. Tomasz K. hist. number 880205 – cleaning of infected bone and drainage according to Willineger for 4 weeks.

inoculation from the outflowing fluid is made as well as the test for blood sedimentation (OB). At four patients heparin was added to the drainage because of disturbances of flow. At all patients parallel to the drainage the antibiotics were given intravenously (mostly *Cefuroximi Axetilum*). Average time of drainage was 2 weeks ranging from 1 to 5 weeks.

Results

In all patients treated with Willineger drainage we noted good results: full healing of inflammation, no fistula remaining, wound closure *per primam intentionem*. Twenty one patients were reported to have full recovery. Remaining six patients, although the osteomyelitis was cured, reported minor extremity insufficiency and occasional pains. These signs occurred at patients after overstressing the extremity.

Discussion

Patients with bone or joint infections are not typical for orthopaedic wards but occasionally we treat such cases. The infections occure as complications after surgery or as hematogenous infections. Treatment of chronic osteomyelitis and arthritis remains a difficult subject in orthopaedic surgery. In our practice and literature three possible treatments are suggested: 1. "open

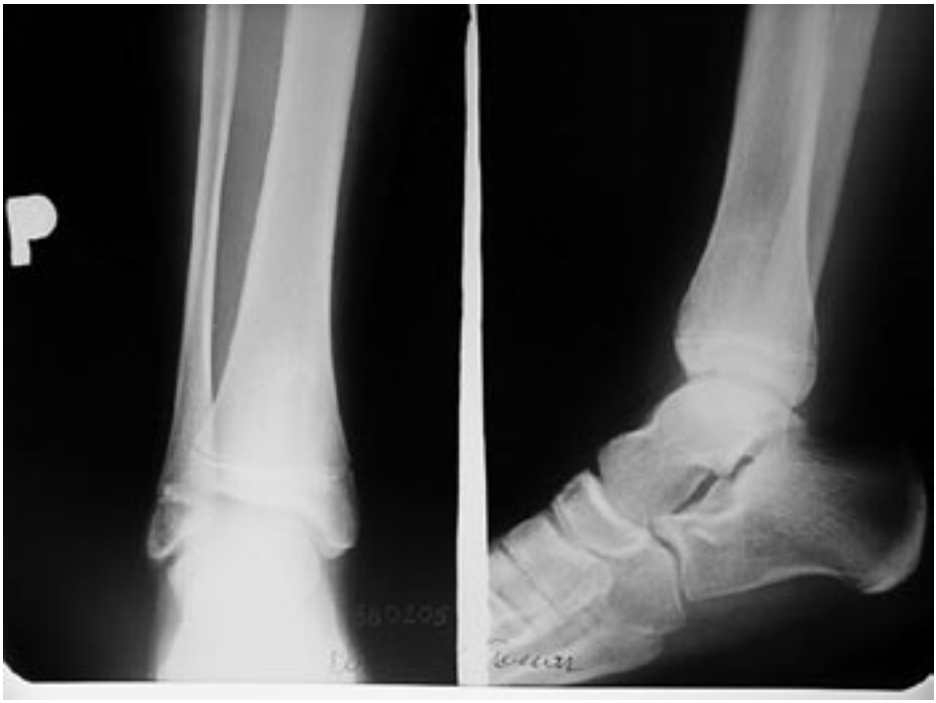

Fig. 3. Tomasz K. hist. number 880205 – full healing after 6 months; full ankle joint movements.

wound treatment", 2. cleaning and using of spongy grafts, 3. drainage (Willineger). The first method was suggested by old orthopaedic surgeons in Poland (**4, 5**). The second method was used sometimes in Heidelberg Department in Germany (**1, 3**). The last method of constant drainage was used very often in Heidelberg and in Pediatric Orthopaedic and Rehabilitation Department in Lublin/Poland (**2**) as the best method.

Conclusions

1. The Willineger drainage is a simple but highly effective method of treatment of osteomyelitis of bones and infections of joints.
2. At all patients we have received very good and good long-term results of treatment.
3. The "constant drainage" does not require costly procedures and should be considered at every patient with acute or exacerbated osteomyelitis regardless the age.

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REVIEW ARTICLE

COMPLEX DIAGNOSTICS AND TREATMENT OF BONE DYSPLASIAS

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The paper summarizes longstanding experience of the authors with the diagnosis and comprehensive treatment of children and adults with osteochondrodysplasias (bone or skeletal dysplasias). During 13 year existence of the Ambulant centre for defects of Locomotor Apparatus in Prague the authors diagnosed 77 nosologic units in a group of 411 patients with bone dysplasias and dysostoses. The own group of patients with bone dysplasias (BD) is classified according to the 6th version of International Nosology and Classification of Constitutional Disorders of Bone (2001) in this paper. For the majority of the men-

tioned patients the team of Ambulant Centre ensures therapeutic and preventive care, comprehensive treatment (paediatric, orthotic-prosthetic, orthopaedic and surgical) as well as genetic counselling. The affected family members are not counted into this cohort of patients.

In individual comprehensive care (from birth to death) participates a team of specialists (paediatrician, orthopaedic surgeon, orthopaedic prosthetic, clinical geneticist) and other specialists (e.g. children and plastic surgeon, spondylo-surgeon, endocrinologist, neurologist, cardiologist, ophthalmologist, stomatologist, etc.). There are necessary all modern biochemical and imaging methods, densitometry and also histological, histochemical, histomorphometry and electronmicroscopical investigation for confirmation of diagnosis.

In last 10 years, rapid advances have been made in identifying chromosomal locus and/or the molecular changes (e.g. FGFR mutations) responsible for definition of conditions that help further understand the pathogenesis of individual disorders. In this field we cooperate with some centres in Czech Republic and abroad.

In 2004 we delineated the new type of spondyloepiphyseal dysplasia published as Dominantly inherited progressive pseudorheumatoid dysplasia with hypoplastic metatarsals and later as Czech dysplasia metatarsal type. In 2006 G. Mortier with co-workers (Ghent, Belgium) identified Arg75Cys mutation (R75C mutation) in COL2A1 gene. It means that Czech dysplasia belongs to osteochondrodysplasias, subgroup 8, type II collagenopathies.

From the point of comprehensive treatment, an essential factor is collaboration with the family where birth of an affected child frequently has a profound impact on the psychic and social position in the family. The objective of comprehensive treatment is to prepare the child for a dignified, reasonable and happy life and to integrate him in society as a valuable subject with a safisfactory social background.

The lecture is supported by overview of diagnostic and therapeutic achievements.

Key words: osteochondrodysplasias, diagnosis, classification, surgical treatment, orthotic fitting, genetic counselling

Introduction (6, 10, 11, 14, 19, 24)

Bone dysplasias (BD) or osteochondrodysplasias (OCHD) comprise the main part of constitutional disorders of skeleton. OCHD are inherited metabolic disorders of cartilage, bone and fibrous tissues that originate on basis of endogenic factors (monogenic and polygenic inheritance) during conception by participation of teratogenic influences. OCHD are distinguished by:

- systemic developmental anomalies of cartilage, fibrous and bone tissue
- symmetrical abnormalities of the whole skeleton
- short disproportional stature
- abnormalities of shape of skull, thorax, vertebral column and extremities
- variously serious malfunction of joints
- incidence 0.30–0.45 : 1000 live birth

Achondroplasia is the most frequent BD and is diagnosed at 80 % of so-called little people suffering from a BD. Incidence is estimated 4–6 : 100 000 live birth. It can be approximately calculated that at the Earth live more than 500 000 at present.

According to epidemiological statistics of congenital developmental disorders in we calculated that in Czech Republic are

approximately born more than 100 newborns with any BD and it means that almost 2000 children from newborn period to adulthood need comprehensive treatment. There is necessary differentiate between term "bone dysplasia" and "dysostosis". Dysostoses may be defined as skeletal malformations occurring singly or in combination. The dysostoses are static and their malformations occur during blastogenesis (the first eight weeks of embryonal life). This is in contrast to the skeletal dysplasias which often present after this stage, have a more general skeletal involvement and continue to evolve as a result of active gene involvement throughout life. Incidence of dysostoses is higher approximately 1 : 1000 – 10 000 live birth. Dysostoses or malformations of single bones can arise as sequence of inflammation, irradiation, trauma, etc., too.

Genetically predetermined deformities of long bones and spine, malposition of joints, torsion of long bones of lower extremities develop during growth period. The severity of skeleton shape and structure changes depends mainly on congenital biochemical abnormalities of essential bone components (collagen, glycosaminoglycans, etc.). In other cases the conductive role plays teratogenic influence in critical sensitive periods of ontogenesis and/or hormonal, metabolic and enzymatic disorders. The final shape

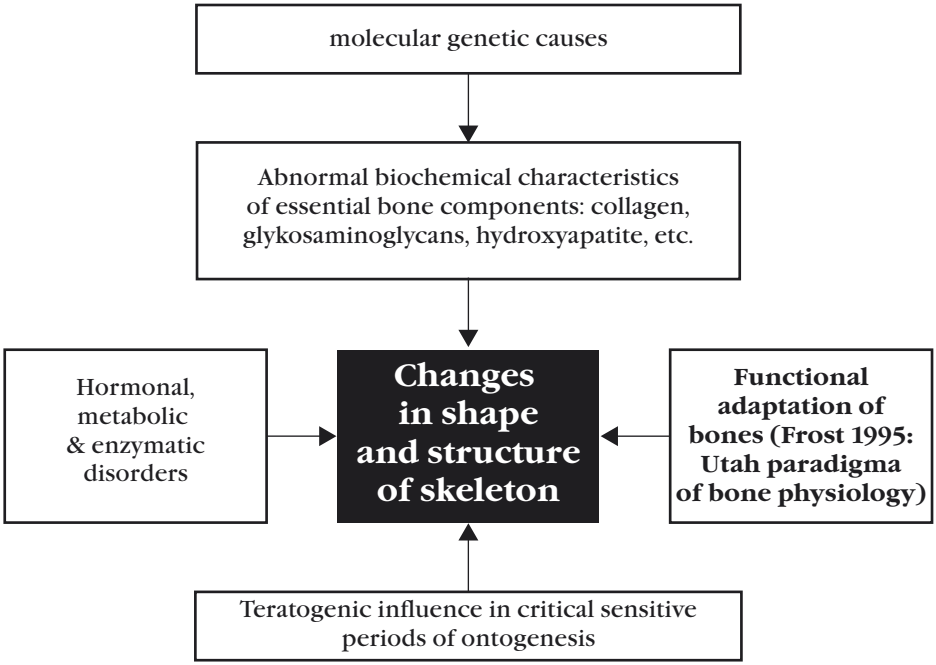

Fig. 1. Scheme of etiopathogenetic influences. The final shape of skeleton is consequence of functional adaptation of bones that was accepted in last decade of 20th century as Utah paradigma of bone physiology (**2**).

of skeleton is consequence of mechanical stimuli and functional adaptation of bones (**37, 38**) that was accepted in last decade of 20th century as Utah paradigma of bone physiology (**2, Fig. 1**).

Above mentioned skeletal and joint deformities are considered as arthritic disposition and lead to arthritis of big joints of legs and spondylarthritis of spine in early adulthood.

Disposition to osteoporosis is patognomonic symptom for concrete BD. That is why we can expect osteoporosis in these patients and also in all patients suffering from severe BD where the mobility and range of motion of spine and extremities are restricted.

Diagnostics (6, 10, 11, 14, 19, 23, 24, 39)

Diagnostics of bone dysplasias is still based on clinical, anthropological, genetic and radiological examination. Radiological diagnostics is possible only in growth period. For diagnosis the appropriate are films of long bones, one hand, lateral spine, chest and lateral skull where dysplastic changes of epiphyses, metaphyses and vertebral bodies can be assessed. There are broad variability of skeletal deformities, disproportion and malfunction of joints at the same nosologic unit and genetic heterogeneity at some BD (e.g. osteogenesis imperfecta). In last years, rapid advances have been made in identifying chromosomal locus and/or the molecular changes responsible for definition of conditions that help further understand the pathogenesis of individual disorders (**8, 33, 36**).

From the point of molecular genetic examination FGFR mutations are commonly diagnosed in CZ (**35, 36**). In 2004 we delineated the new type of spondyloepiphyseal dysplasia published as Dominantly inherited progressive pseudorheumatoid dysplasia with hypoplastic metatarsals (**21**) and next cases as Czech dysplasia metatarsal type (**4, 22**). In 2006 G. Mortier with coworkers (Ghent) identified Arg75Cys mutation (R75C mutation). It means that Czech dysplasia belongs to osteochondrodysplasias, subgroup 8, type II collagenopathies.

Aims of diagnosis are:

- categorization into nosologic units (genetic diagnosis)
- determination of etiopathogenesis
- investigation of associated congenital developmental defects of remaining systems (**12**)
- choice of appropriate therapy
- prenatal and presymptomatic diagnostics in affected families

After diagnosis of any BD according to typical phenotype (**11, 14**), short disproportionate stature (anthropometric examination is necessary – **11, 43**) and dysplastic changes of skeleton (X-ray survey) the pointed examination of further systems (cardiovascular, urinary, haematological, sense organs, etc) are indicated.

Classification (20)

1st classification of BD was performed by committee of experts for nomenclature of intrinsic disorders of bone of the European Society of Pediatric Radiology in Paris in 1969 (published in 1972). The last (6th version) International Nosology and Classification of Constitutional Disorders of Bone was done in 2001 (**3**). The reason to update on the classification was rapid advances in

identifying the molecular changes responsible for defined conditions. While this latest classification remains a combination of morphological and molecular grouping it is anticipated that two parallel but interacting classifications will evolve: one clinical, identifying accepted terminology or nosology, and the other molecular, to help further understand the pathogenesis of individual disorders. The major change in the classification has been the addition of genetically determined dysostoses (those which have an identified chromosomal locus have been included) to the skeletal dysplasias. The last classification contains 33 groups of OCHD, 3 groups of dysostoses. 33 groups of OCHD cover 250 units. A few of the more major changes to the OCHD classification were identified, e.g. **1.** in achondroplasia group SADDAN – severe achondroplasia, developmental delay and acanthosis nigricans has been included, **4.** Thoracolaryngopelvic dysplasia Barnes has been included in the short-rib dysplasia group, **23.** Microcephalic osteodysplastic dysplasia & the 3M syndrome were included to the low birth weight, slender bone group, **24.** Two new subtypes of osteogenesis imperfecta type V & VI were recognized). 3 groups of dysostoses cover 40 localized skeletal malformations: **1.** with predominant cranial and facial involvement (craniosynostoses – FGFR mutations), **2.** with predominant axial involvement (vertebral segmentation defect disorders) and **3.** with predominant involvement of extremities (ectrodactylys & Fanconi syndrome groups).

The authors already used the 3rd, 4th and 5th version of International Nomenclature and Classification of OCHD to classify their own group of patients with constitutional diseases of bone (**6, 10, 14, 19**). In this paper the group of patients with OCHD and dysostoses classified according to the last – sixth version of Constitutional Disorders of Bone Classification is introduced (**Table 1**).

Treatment (11, 14, 19, 24)

Medicament therapy is suitable only exceptionally at some metabolic osteopathies. According to mechanism of function we differentiate **substitution** (e.g. calcitriol and phosphates at *hypophosphatemic rickets,* agalsidase beta /Fabrazyme/*at Fabry disease /defect of the lysosomal enzyme alpha-galactosidasis/),* **prophylactic treatment** (diet at *phenylketonuria, alkaptonuria*) and **roborative effect** (pyridoxine at *galactosemia*, folate and cyanocobalamine at *hyperhomocysteinemia*, florides, parathormon, bisphosphonates, calcitonin, parathormon, strontium at *osteoporosis*)

Perspective at some bone dysplasias is hormonal treatment (growth hormone at *Turner syndrome &* at some further OCHD (**41**)), bone marrow transplantation (e.g. *mucopolysaccharidoses* – some types*, infantile AR osteopetrosis, etc.*). Gene therapy will be a future and probably the method of choice at some bone metabolic diseases.

Surgical treatment (40)

Aims of surgical treatment are correction of long bones deformities, shortening and hand and feet malformations. We use methods of corrective and multiple osteotomies (intramedullary nailing (**9**) – elastic nails in children, assured nailing in adults), lengthening of long bones (external fixators according to Ilizarov, Wagner type, etc.), epiphyseodesis (total or partial), suitable surgery of hip and knee joints and reconstruction surgery

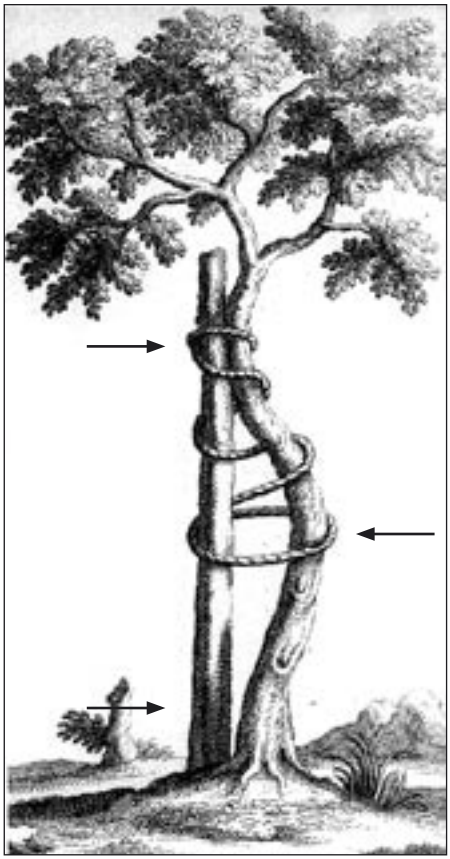

Fig. 2. Nicolas Andry (1658–1742) in Paris, France illustrated his book titled. Orthopaedia: or the art of Correcting and Preventing Deformities in Children with a figure of bend tree that was lashed to a straight stick. This represents the three point principle of orthosis function.

of hand and foot defects. Correction of progressive congenital scolioses (due to defects of formation and segmentation) and severe structural deformation of spine we indicate to the spine surgery methods (hemivertebra excision at L-S region, osteotomy of unsegmented bar, anterior or posterior wedged osteotomy and fusion with instrumentation, partial epiphyseodesis of vertebral plates – lateral, anterior, posterior, correction by instrumentation – Harrington distraction method and after growth spurt spondylodesis with segmental fixation – SSE Evolution). External fixators, intramedullary nailing and modern spinal systems enable partial or total 3D correction of long bones an d spine even in patients with decreased bone density and defective mineralization.

Orthotic therapy is based on three point principle that is used from the 17th century. Nicolas Andry (1658–1742) in Paris, France illustrated his book titled *"Orthopaedia: or the art of Correcting and Preventing Deformities in Children"* with a figure of bend tree that was lashed to a straight stick. At present orthoses are used to correction of long bone deformities in frontal plane, braces are made for correction of spine deformities with aim of 3D correction. Both orthoses and braces have to be construct according to the three point principle (see **Fig. 2**) and are applied before and after planned surgical treatment and as a part of physiotherapy, too (**1, 18**).

The lecture is illustrated by overview of our diagnostic and therapeutic achievements. Biomechanical and patho-biomechanical aspects are discussed (**1, 9, 18, 37, 38**). A lot of them were published in Czech and foreign literature (**5, 13, 15, 16, 17, 25, 26, 27, 28, 29, 30, 31, 32 a další**).

Conclusions

Clinical, anthropological, genetic and radiological examination together with laboratory examination (including markers of bone metabolism) and dual energy densitometry (DXA) with application of

child soft wear, remain the basic prerequisite to specify diagnosis and to monitor the course of bone disorders and comprehensive treatment.

At indicated cases the histological, histochemical, electron-microscopical investigation and histomorphometry are decisive. Development of clinical and radiological features of patients suffering from Systemic Density Disorders (SDD) lead to biomechanical severe deformities of extremities and spine with premature joint degenerative changes and osteoporosis.

The main aim of comprehensive treatment of SDD in childhood is early correction of bone deformities (physiotherapy, bracing, surgical procedures) and bone metabolism. (calciotropic drugs) to achieve an individual peak bone mass in adulthood.

The aim of comprehensive care for patients suffering from OCHD is to prepare handicapped children for a dignified, meaningful and satisfying life and help them to integrate themselves into society as individuals who can achieve their highest potential.

Osteochondrodysplasias	No
1. Achondroplasia group	
Achondroplasia	53
Hypochondroplasia	27
3. Metatropic dysplasia group	
Metatropic dysplasia (various forms)	
4. Short-rib dysplasia (SRD) (with or without polydactyly) group	
Chondroectodermal dysplasia (Ellis-van Creveld dysplasia)	5
Thoracolaryngopelvic dysplasia (Barnes)	1
6. Diastrophic dysplasia group	
Diastrophic dysplasia	5
8. Type II collagenopathies	
Spondyloepiphyseal dysplasia congenita	2
Czech dysplasia metatarsal type	8
9. Type XI collagenopathies	
Stickler dysplasia	1
10. Other spondyloepi-(meta)-physeal (SE/M/D) dysplasias	
X-linked SED tarda	10
Immuno-osseous dysplasia (Schimke)	1
Schwartz-Jampel syndrome	1
SEMD with joint laxity	2
11. Multiple epiphyseal dysplasias & pseudoachondroplasia	
Pseudoachondroplasia	11

Osteochondrodysplasias	No
Multiple epiphyseal dysplasia (MED)	
(Fairbanks and Ribbing types)	27
Familial hip dysplasia (Beukes)	16
12. Chondrodysplasia punctata (CDP) (stippled epiphyses group)	
CDP Conradi-Hünermann type	5
13. Metaphyseal dysplasias	
Schmid typ	12
Cartilage-Hair-Hypoplasia (McKusick)	2
Metaphyseal dysplasia with pancreatic insufficiency	
and cyclic neutropenia (Shwachmann Diamond)	2
Mild metaphyseal dysplasia	1
***14. Spondylometaphyseal dysplasias* (SMD)**	
Spondylometaphyseal dysplasia Kozlowski type	3
15. Brachyolmia spondylodysplasias	
Autosomal dominant type	2
16. Mesomelic dysplasias	
Dyschondrosteosis (Leri-Weill)	6
17. Akromelic dysplasias	
Trichorhinophalangeal dysplasia types I/III	6
Brachydactyly type E	3
Pseudohypoparathyroidism (Albright Hereditary Osteodystrophy)	2
Acrodysostosis	4
18. Acromesomelic dysplasias	
Cranioectodermal dysplasia (Hallermann-Streiff-Francois syndrome)	1
19. Dysplasias with predominant membranous bone involvement	
Cleidocranial dysplasia	3
21. Multiple dislocations with dysplasias	
Larsen syndrome	1
Larsen-like syndromes	1
22. Dysostosis multiplex group	
Mucopolysaccharidosis IH 1	1
Mucopolysaccharidosis II	1
Mucopolysaccharidosis IIIA	2

Osteochondrodysplasias	No
Mucopolysaccharidosis IVB	2
Mucopolysaccharidosis VI	1
a-Mannosidosis	2
Mucolipidosis II	1
Mucolipidosis III	1
23. Low birthweight slender bone group	
3M syndrome	2
24. Dysplasias with decreased bone density	
Osteogenesis imperfecta IA	38
Osteogenesis imperfecta IB	4
Osteogenesis imperfecta II	2
Osteogenesis imperfecta III	11
Osteogenesis imperfecta IVB	3
Osteogenesis imperfecta V	1
Osteogenesis imperfecta VII	1
Osteoporosis-pseudoglioma dysplasia	2
Idiopathic juvenile osteoporosis	19
25. Dysplasias with defective mineralization	
Hypophosphatasia – infantile forms	3
Hypophosphatasia – adult form	4
Hypophosphatemic rickets	16
26. Increased bone density without modification of bone shape	
Osteopetrosis – delayed form I	1
Melorheostosis	1
Osteopoikilosis	1
27. Increased bone density with diaphyseal involvement	
Kenny-Caffey dysplasia	1
Osteoektasia with hyperphosphatasia (Juvenile Paget disease)	1
28. Increased bone density with metaphyseal involvement	
Pyle dysplasia	1
Craniometaphyseal dysplasia – Mild type	2
29. Craniotubular digital dysplasias	
Osteodysplasty, Melnick-Needles	1

Osteochondrodysplasias	No
30. Neonatal severe osteosclerotic dysplasias	
Caffey disease with prenatal onset	1
31. Disorganized development of cartilaginous and fibrous components of the skeleton	
Multiple cartilaginous exostoses	18
Enchondromatosis (Ollier)	2
Enchondromatosis with hemagiomata (Maffucci)	2
Spondyloenchondromatosis	2
Fibrous dysplasia (McCune-Albright and others)	3
32. Osteolyses	
Multicentric-hands and feet	
Multicentric carpal-tarsal osteolysis with and without nephropathy	3
Distal phalanges	
Hajdu-Cheney syndrome	4
Diaphyses and metaphyses	
Familial expansile osteolysis	1
33. Patella dysplasias	
Nail patella dysplasia	6
Patella hypoplasia/aplasia	2

Localized Skeletal Malformations (Dysostoses)	
A. Localized disorders with predominant cranial and facial involvement	
Crouzon syndrome	4
Saethre-Chotzen syndrome	1
Craniosynostosis Muenke type	2
Mandibulo-facial dysostosis (Treacher Collins)	1
B. Localized disorders with predominant axial involvement	
Spondylocostal dysplasia	8
C. Localized disorders with predominant involvement of the extremities	
Fanconiho syndrome	1

Table 1. A group of patients with osteochondrodysplasias (bone dysplasias) and dysostoses. Classifcation according to the International Nosology and Classification of Constitutional Disorders of Bone (2001, 3). There were diagnosed 77 nosologic units in a group of 411 patients with bone dysplasias and dysostoses at the Ambulant Centre for Defects of Locomotor Apparatus in 1994–2006.

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Osteologická Akademie ČLS JEP Zlín

Obecně prospěšná společnost

Osteologická Akademie ČLS JEP Zlín (OAZ) je společnost při předsednictvu ČLS JEP, jejímž cílem je koordinace výuky metabolických onemocnění skeletu ve spolupráci s ostatními pracovními skupinami ČLS a SMOSu. Pro tento účel vytváří klastrové skupiny pro jednotlivé problematiky.

Díky stávajícím praktickým možnostem (největší skupiny pacientů v ČR, klinické ambulance, laboratorní a instrumentální diagnostika) vytváří integrální potenciál, který dává podmínky pro dosažení nejvyšší možné produktivity a efektivnosti lékařského a vědeckého poznání v oblasti metabolických onemocnění skeletu s postupnou aplikací na pacienta.

Tato klastrová organizace bude mít následující přínosy:

1. Pro pacienty

Budou obeznámeni s optimálním algoritmem prevence, resp. léčby onemocnění. Na základě těchto znalostí mohou spolupracovat s ošetřujícím týmem.

2. Pro lékaře

Bude místem a institucí, kde bude výše zmíněný cíl koordinován. Možnost měnlivosti složení clusteru bude dávat prostor pro nestandardní postupy, které budou ověřeny na modelech i v praxi. Výstupem budou konkrétní závěry jako podklad pro praktický postup směrem k pacientovi, k Ministerstvu zdravotnictví ČR a zdravotním pojišťovnám. Budou vytvářeny optimalizované modely léčby, které budou díky klastrovému uspořádání obsahovat závěry i z jiných oborů (např. dietetologie, gastroenterologie, onkologie, etc.).

Tento koncept umožnuje dosažení optimalizace medicínské i ekonomické.

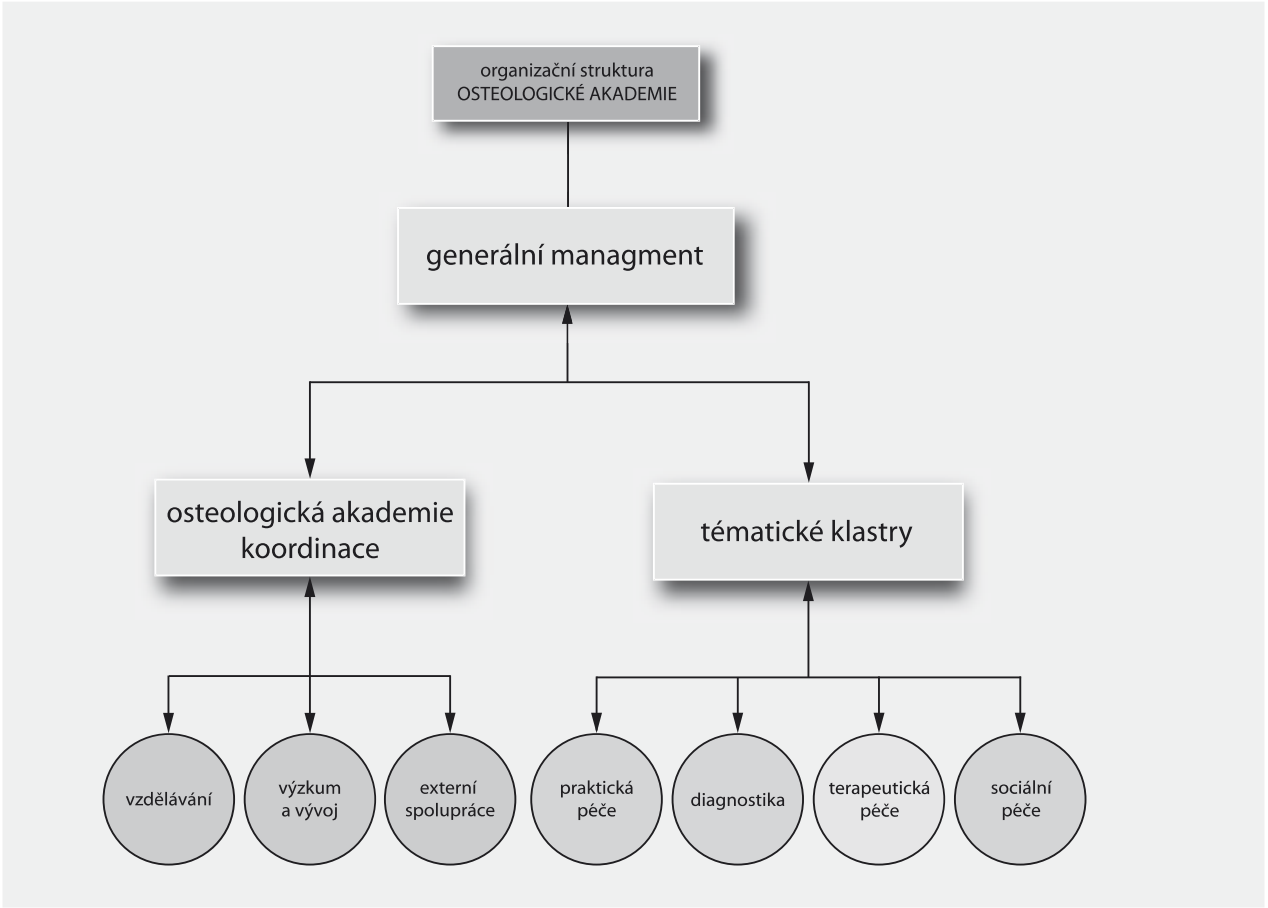
3. Pro ČSL JEP

Společnost může na modelu klastrové optimalizace ověřit řešení složitých mezioborových medicínských problematik – vyplývá to z organizační struktury klastru, její variability a rychlé schopnosti reakce v daném medicínském oboru.

4. Pro ČR

Vznikne optimalizovaná organizační struktura pro mezioborové problematiky, kde se prolíná rovina akademická, rovina soukromé medicíny, státní zprávy a pojišťoven. Organizační schéma managementu umožní maximálně optimalizovanou reakci na změny v diagnostice, prevenci a léčbě v ČR pro danou oblast medicíny. Může posloužit jako model pružného řešení složitých medicínských mezioborových problémů bez ekonomických ztrát.

Organizační struktura i ekonomická pravidla Osteologické Akademie Zlín budou plně v souladu s praktiky ČSL JEP a jejím etickým kodexem.


organizační struktura
OSTEOLOGICKÉ AKADEMIE
generální managment
osteologická akademie
koordinace
tématické klastry
vzdělávání
výzkum
a vývoj
externí
spolupráce
praktická
péče
diagnostika
terapeutická
péče
sociální
péče

Osteologic Academy of the Czech Medical Society of Jan Evangelista Purkyne in Zlin

Non-profit organization

The Osteologic Academy of Zlin (OAZ) established by the Czech Medical Society of Jan Evangelista Purkyne (CMS JEP) is an institution reporting to the board of directors of CMS JEP. The goal of OAZ is to coordinate the education in the field of metabolic skeletal diseases and collaborate with other departments of the Czech Medical Society and the Society for Metabolic Skeletal Diseases. OAZ creates clusters to address several problem areas.

Having the greatest number of patients in the Czech Republic, outpatient departments, laboratories, and instrumental diagnostics OAZ represents an integral potential enabling to achieve significant advancements resulting in a higher effectiveness and productivity of applied medical and scientific knowledge in the field of the metabolic skeletal diseases.

This cluster organization brings the following benefits:

1. For patients

They will learn correct procedures and optimal ways of preventive care, i.e., the treatment of their diseases. This improves patient's cooperation with their physicians.

2. For physicians

OAZ will coordinate the aforementioned goals. The possibility to adjust the composition of the cluster will allow for non-standard procedures that will be verified using models and in practice. Specific conclusions will serve as a basis for practical treatments of patients and for collaboration with the Ministry of Health of the Czech Republic and insurance companies. Optimized methods of treatment will be created and due to the cluster organization they will also include considerations and recommendations from other related specializations (for instance from dietetology, gastroenterology, oncology, etc.).

Such approach enables not only a medical but also overall economic effectiveness.

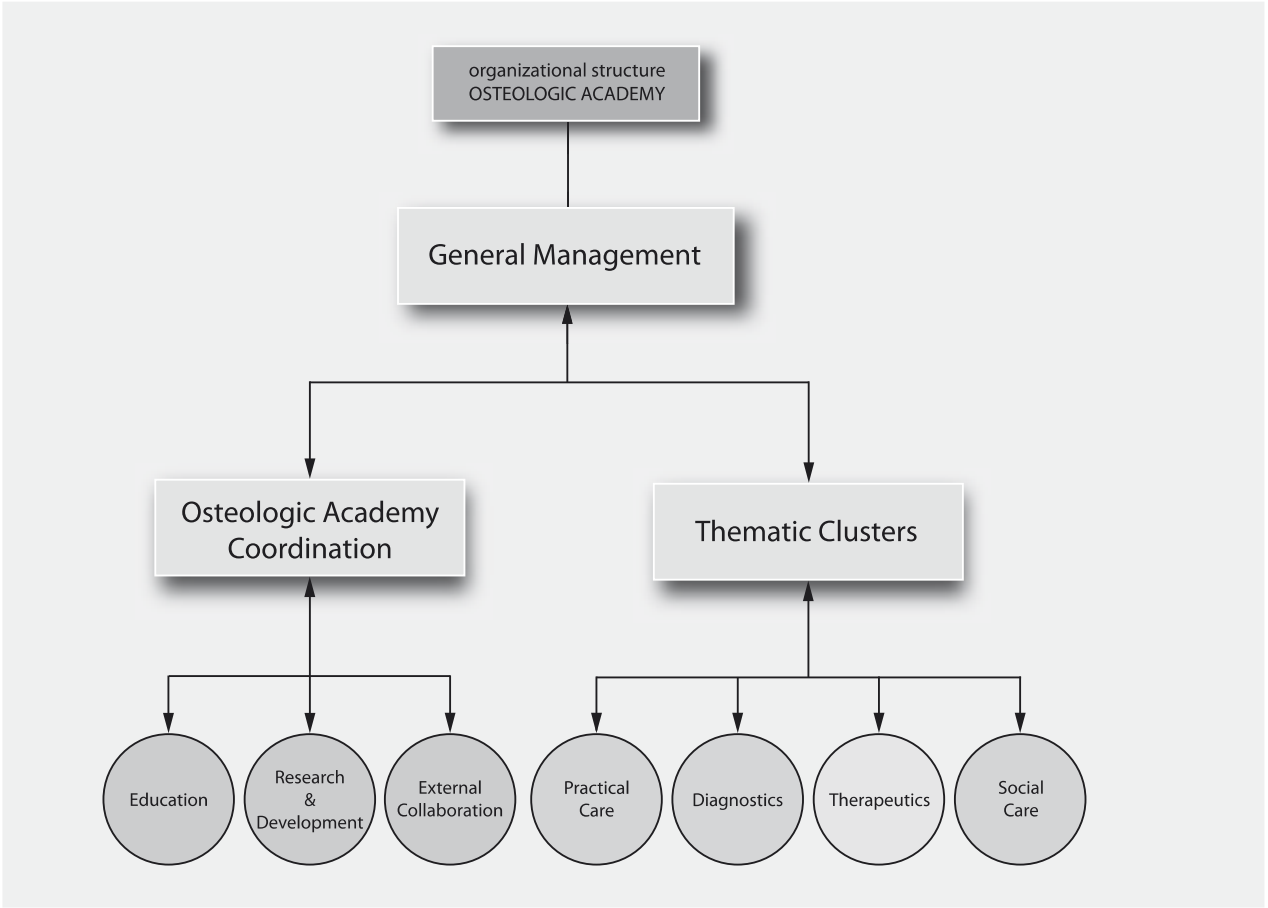
3. For CMS JEP

The organization will be able to validate solutions for complex interdisciplinary medical issues using the cluster optimization model. Cluster organization structure has a build-in flexibility and ability to react quickly in a given medical field.

4. For the Czech Republic

An effective organizational structure will be created to address interdisciplinary matters where the academic level, the private medical sector, the nation sector, and the insurance companies will cooperate and influence each other. Such management provides for optimized reaction to changes in diagnostics and recommended preventive care in the Czech Republic. This approach may serve as a model for a solution of really complex interdisciplinary medical issues while preventing economic losses.

The organization structure and the economic rules of the Osteologic Academy of Zlin will fully comply with regulations of CMS JEP and its ethical code.


organizational structure
OSTEOLOGIC ACADEMY
General Management
Osteologic Academy
Coordination
Thematic Clusters
Education
Research
&
Development
External
Collaboration
Practical
Care
Diagnostics
Therapeutics
Social
Care

The Utah Paradigm of Skeletal Physiology

Volume I
Bone and Bones and Associated Problems

Chapter 1: Introduction and format. Preamble; scientific, clinical and communication challenges; self test; fundamental idea; the book's format

Chapter 2. Wolff's law and related matters. The past, present and future.

Chapter 3: Bone modeling. Bone architecture, mechanical functions and effects, gains, conservation, IO-biomechanics. The three-way rule. Bone development, adaptations and functions; baseline conditions; strain histories; modeling drifts; macromodeling, minimodeling, micromodeling; mechanical usage effects; role of muscle strength; six principal adaptations; special features; a modeling analogy; modeling functions and rules; set points; chondral modeling barrier; overshoot; other matters.

Chapter 4: Bone remodeling. Architecture, turnover, mechanical functions and effects. Bone "mass" and strength, conservation, losses, IO-biomechanics. The four-way rule. Observations; the remodeling BMU; rho; marrow mediator mechanism; remodeling space; cement lines; mechanical effects; thresholds; disuse patterns; a remodeling analogy; remodeling functions and rules; feedback loops; transient and steady states; set points; adaptational slowdown; other matters.

Chapter 5: The skeleton's mechanical usage windows. Mechanical usage, strains, microdamage; biologic mechanisms; yardstick; disuse, adapted, mild overload and pathologic windows; bone strength; strength-safety factor; fatigue life; thresholds; variability; chronic states.

Chapter 6: Illustrative clinical problems (that involve the IO-biomechanics of bone). Design of endoprostheses; drugs, genetics and set points; stress fractures; osteomalacias and fatigue fractures; skeletal including bone pain; autocorrection of malunions; aseptic necrosis of the femoral head; homeostasis; the mechanostat; definitions of physiologic osteopenias and true osteoporoses; restoring bone to osteopenic skeletons; some clinical situations explained by the Utah paradigm; humoral and genetic effects; minimizing fatigue damage; brief recapitulation.

Volume II
Fibrous (Collagenous) Tissues, Cartilage, Synovial Joints and Associated Problems

Chapter 1: Introduction. Three lives of skeletons; basic functions; the Utah paradigm's index and organization functions; a self test; the book's organization.

Chapter 2: Some tissue-level fibrous (collagenous) tissue physiology. tendon, ligament, fascia, connective tissue, io-biomechanics. Observations; major functions; general IO-biomechanical relation; scar and mature tissue; baseline conditions; mechanical usage history; end, muscle and creep growth in length; diametric modeling; set points; the fibron; tension transfer fan-out; disuse-mode remodeling; turnover; creep; clinical implications; regional acceleratory phenomenon; microdamage detection, repair, balance and pain; overuse syndromes; mechanical usage rules; ultimate control; adaptational slowdown or lag; other things.

Chapter 3: Some tissue-level cartilage physiology. Growth plates, joint cartilage, limb alignment, ligament-tendon attachments, io-biomechanics. General functions; growth-modeling distinction; baseline conditions; loading history; chondral growth-force response curve; joint alignment; limb length errors; ball and socket ankle; hip dysplasia; epiphyseal height; joint surface congruence; perichondral ring roles; attachments of tendon, ligament and fascia to bone; joint size; Sharpey's fibers; cartilage-bone relationship; other things.

Chapter 4: Synovial joints: some principles of design, function, architecture and IO-biomechanics. Observations; primary purpose of joints; plan of synovial joints; baseline conditions; building materials; design considerations; momentarily loaded area; the MESm criterion; loading history; diametric growth; joint shape, curvature and congruence; stiffness adaptations; menisci; alignment adaptations; other matters; cartilage and bone maintenance; adaptational slowdown or lag;

Chapter 5: Some io-biomechanical causes of arthroses. (osteoarthritis, degenerative joint disease). Definition of arthroses; aging and time; obesity; joint malalignments; subchondral bone stiffness; role of a meniscus; high spots; underloading; true overloads; relative underloads; maintenance failures; mechanical usage windows; comments; lead times (sigmas); set points.

Chapter 6: Illustrative clinical problems. (that involve the IO-biomechanics of fibrous tissue and cartilage). Pes planus; obesity and arthroses; sports medicine; arachnodactyly; chondrodystrophies; trigger finger; osteochondritis dissecans; hallux rigidus; slipped capital femoral epiphysis; lateral patellar facet syndrome; long bone torsions; the paradigm's domain; relative roles of mechanical and nonmechanical influences; more on joint alignment; roles of humoral agents and genes; pseudarthrosis of the tibia; the frozen shoulder syndrome; ligament healing; more on fatigue damage; more about the mechanostats; recapitulation; conclusion.

HAROLD M. FROST,
M.D., D.Sc. (Hon)

Surgeon, Clinician, Investigator,
Theoretician and Teacher

The International Society of Musculoskeletal and Neuronal Interactions was most fortunate to be able to publish these 2 volumes entitled **"The Utah Paradigm of Skeletal Physiology"** by Harold M. Frost, a founding member and Honorary President of the Society at the time of his passing. **Harold M. Frost**, M.D., D.Sc.(Hon) called himself a Feisty, Eccentric, Old Dinosaur (F.E.O.D.). He was that except not old in mind. He never lost his lust for science. He was a smart orthopaedic surgeon with hobby of "corresponding and jawboning with clinical and research scientists regarding skeletal science, medicine and surgery".

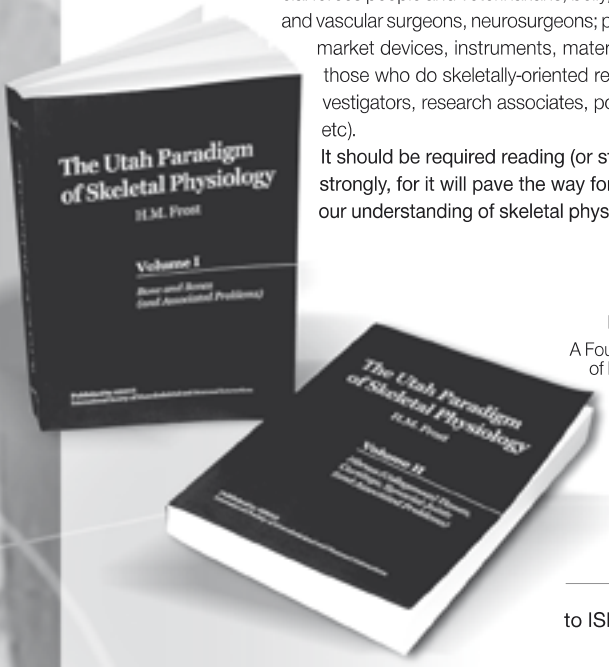
In these two volumes entitled **"The Utah Paradigm of Skeletal Physiology"**, **"Vol I: Bone and Bones and Associated Problems"** and **Vol II: Fibrous (Collagenous) Tissues, Cartilage, Synovial Joints and Associated Problems"**, Harold has documented his current understanding of skeletal physiology from his half century journey. The volumes should be a concern to all who manage, study and/or teach skeletal and related problems in clinical, laboratory, classroom and other settings and all who support the involved research and education: anatomists, anthropologists, biochemists, biomechanicians, cardiologists, coaches, trainers, dentists, endocrinologists, engineers, experimentalists, gastroenterologists, urologists, histologists, metabolic bone disease authorities, materials scientists, neurologists, nurses, orthodontists, oral surgeons, orthopaedic surgeons, their residents and professors, paleontologists, pathologists (experimental, forensic and clinical), pediatricians, phychiatrists, physical therapists, physiologists, pediatric and plastic surgeons, pulmonary disease specialists, radiologists, rehabilitation specialists, rheumatologists, space and sports medicine people, special forces people and veterinarians, belly, chest, ear-nose-throat, ophthalmologic and vascular surgeons, neurosurgeons; plus those who design, manufacture and market devices, instruments, materials and supplies for such people; and those who do skeletally-oriented research in the above areas (principal investigators, research associates, post-doctoral fellows, graduate students, etc).

It should be required reading (or study) for those above. I recommend it strongly, for it will pave the way for all to fill in the blanks and accelerate our understanding of skeletal physiology.

Webster S. S. Jee, Ph.D.
Professor of Anatomy

Co-Editor-in Chief of the Journal of
Musculoskeletal and Neuronal Interactions

A Founding Member of the International Society
of Musculoskeletal and Neuronal Interactions



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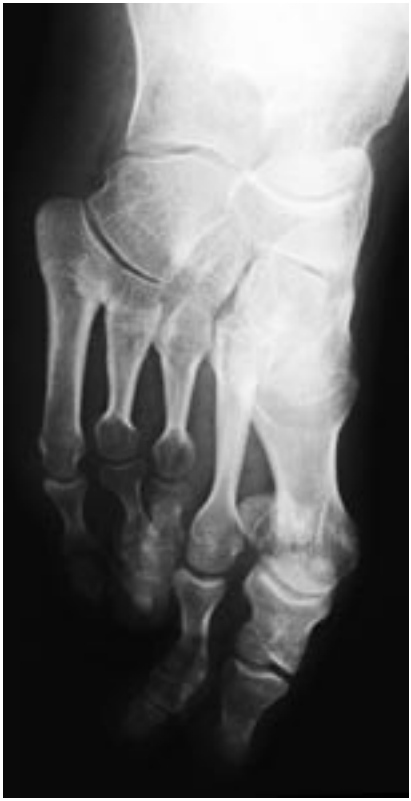

Fig. 1. X-ray of the right foot at the age of 28 years – hypoplastic/dysplastic 3rd and 4th metatarsals.

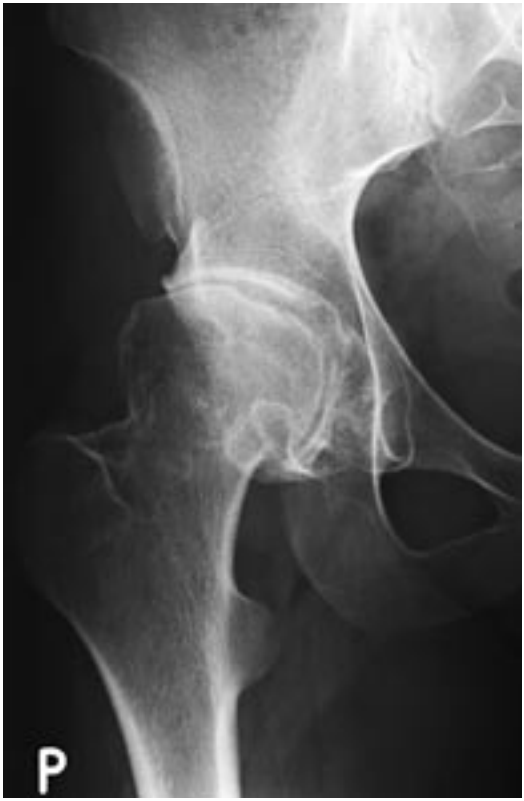

Fig. 2. X-ray of the right hip, 28 years. The lower portion of the ilia is short and broad. Marked narrowing of all joint spaces. Flattened, slightly irregular femoral head.

Figures 1, 2, 3, 4 demonstrate typical X-ray symptomatology of recently delineated new type of spondyloepiphyseal dysplasia that was published at first as the Dominantly inherited progressive pseudorheumatoid dysplasia with hypoplastic metatarsals in 2004 (**1**) and next cases as Czech dysplasia metatarsal type (**2, 3**). In 2006 G. Mortier with co-workers (Ghent, Belgium) identified Arg75Cys mutation (R75C mutation) in patients that originate from two pedigrees. It means that Czech dysplasia belongs to osteochondrodysplasias, subgroup 8, type II collagenopathies.

1. Marik I, Marikova O, Zemkova D, Kuklik M, Kozlowski K. Dominantly inherited progressive pseudorheumatoid dysplasia with hypoplastic toes. Skeletal Radiol 33, 2004, p. 157–164.

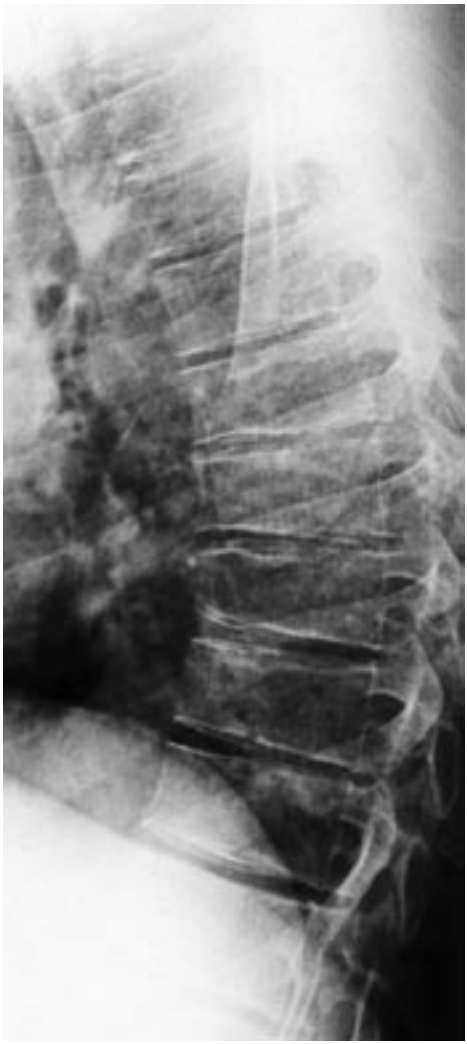

Fig. 3. X-ray of thoracic spine – lateral projection, 30 years. Flattened thoracic vertebral bodies with irregular vertebral plates.

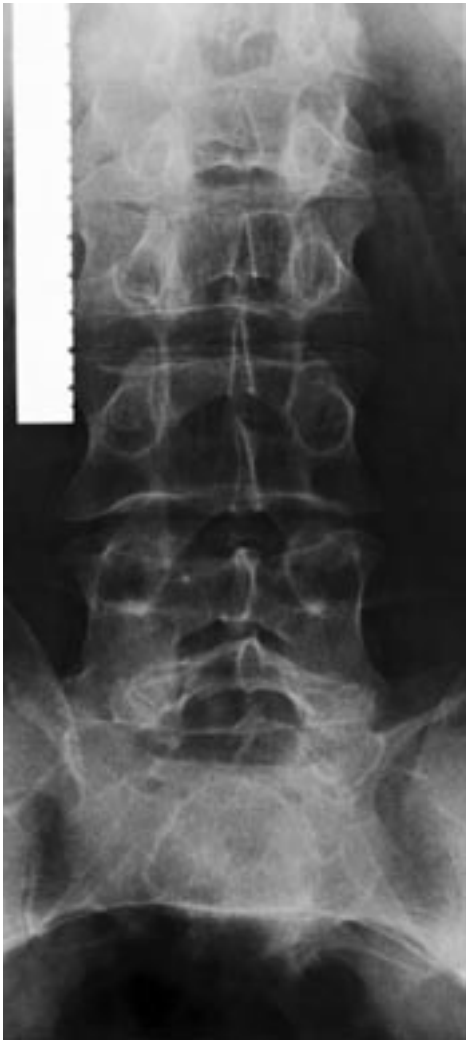

Fig. 4. X-ray of lumbar spine – AP projection, 30 years. Rectangular lumbar spine canal.

2. Kozlowski K, Marik I, Marikova O, Zemkova D, Kuklik M. Czech dysplasia - metatarsal type. Am J Med Genet, 2004, 129A, p. 87–91.

3. Marik I, Marikova O, Zemkova D, Kuklik M, Kozlowski K. Czech dysplasia metatarsal type. Hungarian Radiol 79, 2005, No.2, p. 89–93.

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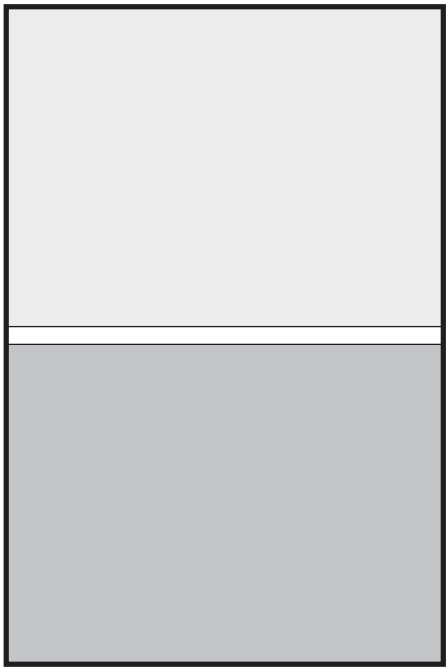

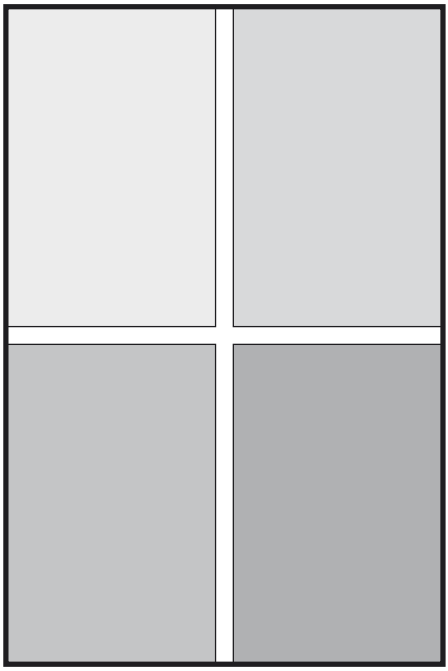

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Držitel registračního rozhodnutí: Roche Registration Ltd., Welwyn Garden City, Velká Británie. **Registrační čísla:** EU/1/03/265/003, EU/1/03/265/004. **Účinná látka:** Acidum ibandronicum 150 mg ut Natrii ibandronas monohydricus 168,75 mg. **Indikace:** Léčba osteoporózy u žen po menopauze se zvýšeným rizikem zlomenin. Bylo prokázáno snížení rizika zlomenin obratlů, účinnost na zlomeniny krčku proximálního femuru nebyla stanovena. **Kontraindikace:** Hypokalcémie, hypersenzitivita na ibandronovou kyselinu nebo na kteroukoli pomocnou látku. **Dávkování a způsob podávání:** K perorálnímu podání. Doporučená dávka je jedna 150mg tableta jednou měsíčně. Tableta by měla být užita každý měsíc ve stejný kalendářní den. **Zvláštní upozornění:** Před zahájením léčby přípravkem musí být upravena hypokalcémie. Stejně by měly být léčeny jiné poruchy kostního a minerálního metabolismu. U všech pacientek je důležitý dostatečný příjem vápníku a vitaminu D. Užívání bisfosfonátů může být spojeno s dysfagií, vznikem ezofagitidy a jícnových nebo žaludečních vředů. Zvýšená opatrnost při současném užívání s NSAIDS. Přípravek není doporučován u pacientek s hodnotami clearance kreatininu pod 30 ml/min. U některých pacientek (většinou onkologických) léčených bisfosfonáty byla hlášena osteonekróza čelisti. **Těhotenství a laktace:** Přípravek by neměl být podáván během těhotenství a kojení. **Klinicky významné interakce:** *Interakce s potravou:* Pacientky by měly před užitím přípravku dodržet celonoční lačnění (alespoň 6 hodin) a neměly by přijímat potravu další hodinu po požití přípravku. *Interakce s ostatními léčivými přípravky:* Pacientky by neměly užít jiný perorální léčivý přípravek alespoň 6 hodin před a 1 hodinu po užití přípravku. Nebyly prokázány interakce s tamoxifenem nebo hormonální substituční terapií (estrogeny). Při podání přípravku současně s H2 blokátory nebo jinými aktivními látkami zvyšujícími pH žaludku je nutná úprava dávkování. **Klinicky významné nežádoucí účinky:** Časté nežádoucí účinky léčivého přípravku (> 1/100, 1/10), které byly zaznamenány ve studiích a jejichž výskyt může dle zkoušejících souviset s léčbou přípravkem: dyspepsie, nausea, bolest břicha, průjem, nadýmání, gastroezofageální reflux, bolest hlavy, únava, myalgie, artralgie, vyrážka. **Dostupná balení:** Bonviva 150 mg 1 nebo 3 tablety. **Podmínky pro uchovávání:** Žádné zvláštní podmínky uchovávání. **Poslední revize textu:** 13. 10. 2006.

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