

M U N I
M E D

Prosthetics

Field, its essentials and use in practice





MUNI
MED





**Acknowledgements to assoc prof Zdenek Rozkydal & assoc prof Ivan Muller
for database**

Orthopaedic Prosthetics

- Medical and technical production
- Distribution of rehabilitative care

Orthopaedic Prosthetics

- Proteometry – gets data for the design, production and application
- Prosthetics - the doctrine of replacement of lost parts of the body and function
- Orthotics - the doctrine of replacement of the lost functions of the body
- Epitetics - the doctrine of cosmetic covering of part of the body
- Kalceotika - the doctrine of orthopedic footwear
- Adjuvatics - the doctrine of operator aids

History

21st?



Proteometry

- History with a focus on social and work history
- Clinical examination
- Kinesiological analyses (GROSS a spol. 2005).
- Anthropometric examination
- Kartezian planes:
 - 3D, frontal, sagittal, transversal
 - orthopedic somatometry (base points, limb length, measuring sheets)

Protetika

doctrine on the replacement of lost body parts

□ Prothesis:

□ Replacement: body parts and functions

□ Requirements:

statics, dynamics, controllability
durability, aesthetics

□ Construction:

Stump bed
Module (thigh, leg, leg, joint)
Auxiliary parts: bandages, stools



Kurz- Oberschenkelstumpf



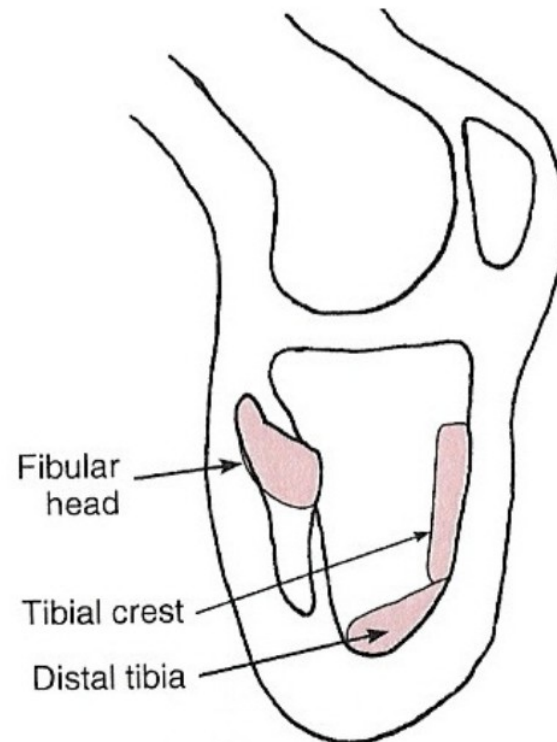
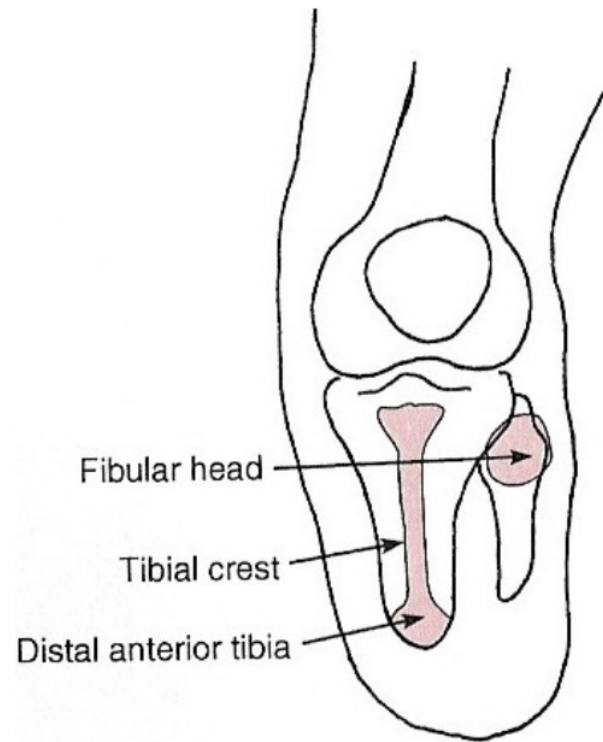
(3) Zum Anziehen der Prothese wird der Stumpf mit Hilfe eines Trikotschlauch in die Stumpfzelle eingezogen



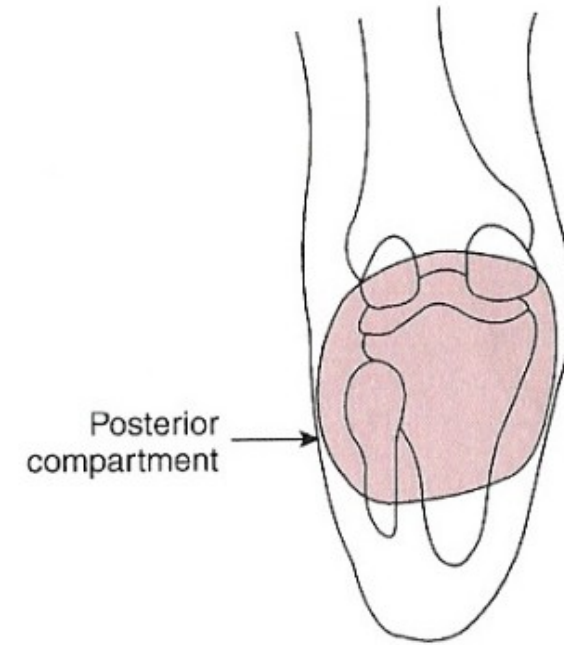
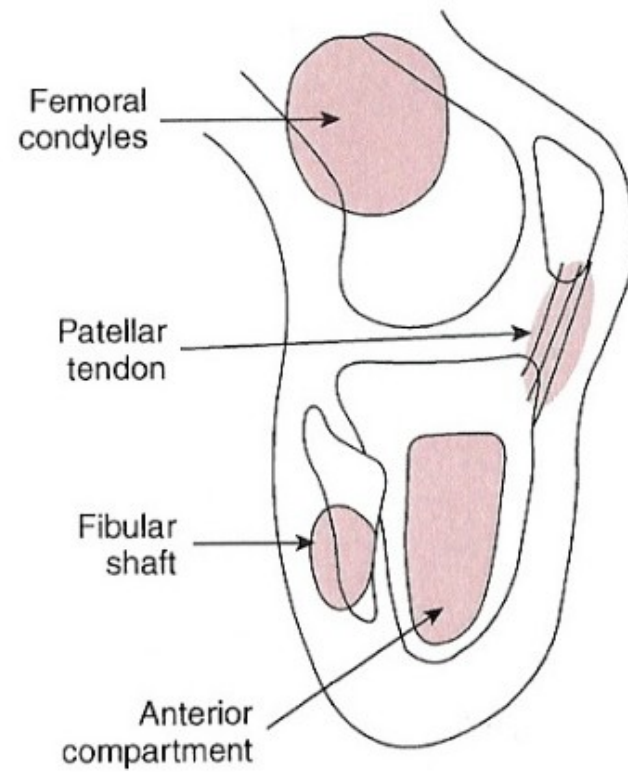
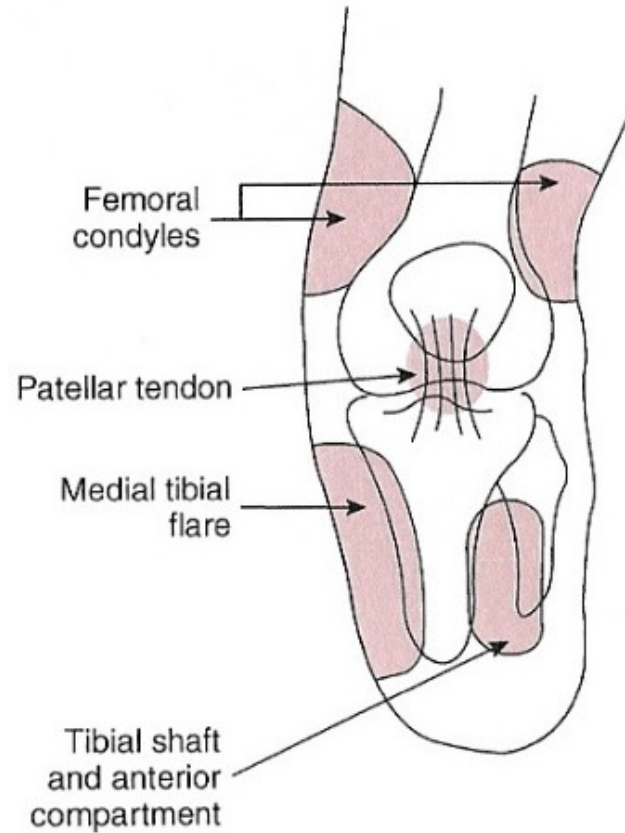
Protetika

Construction – stump bed

Intolerant

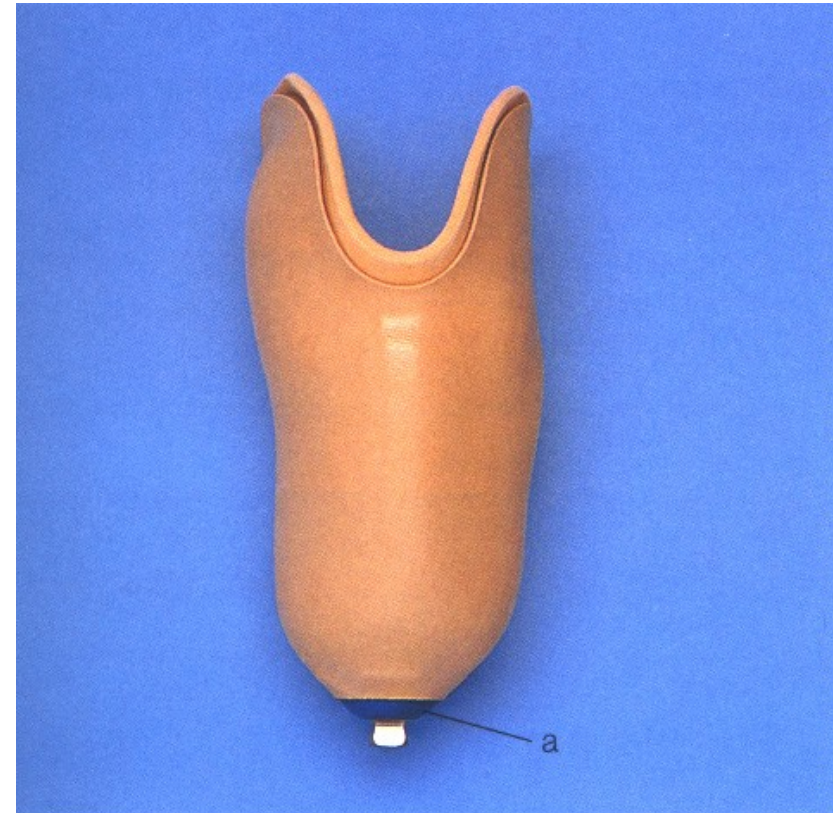
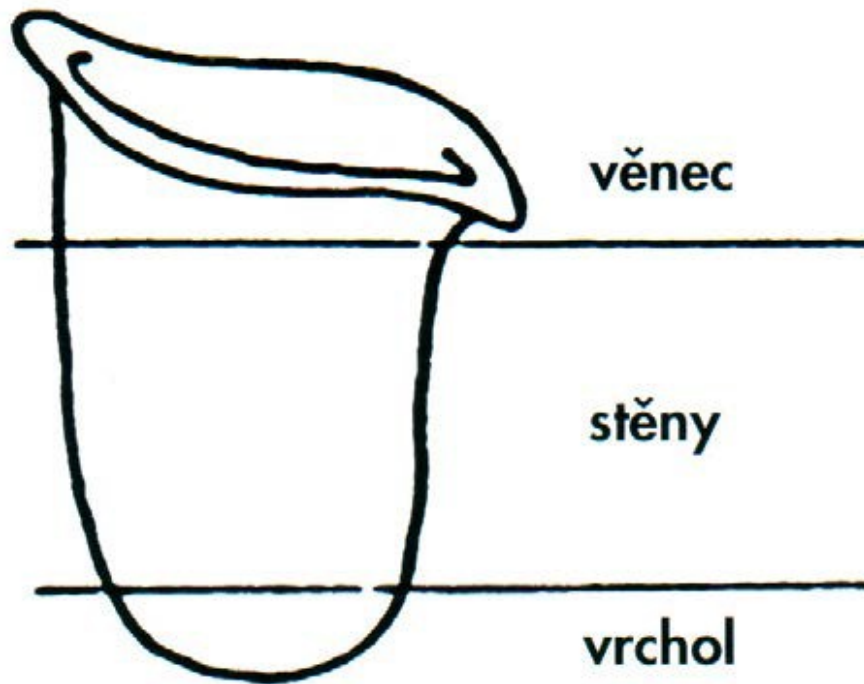


Transtibial: PTB Weightbearing



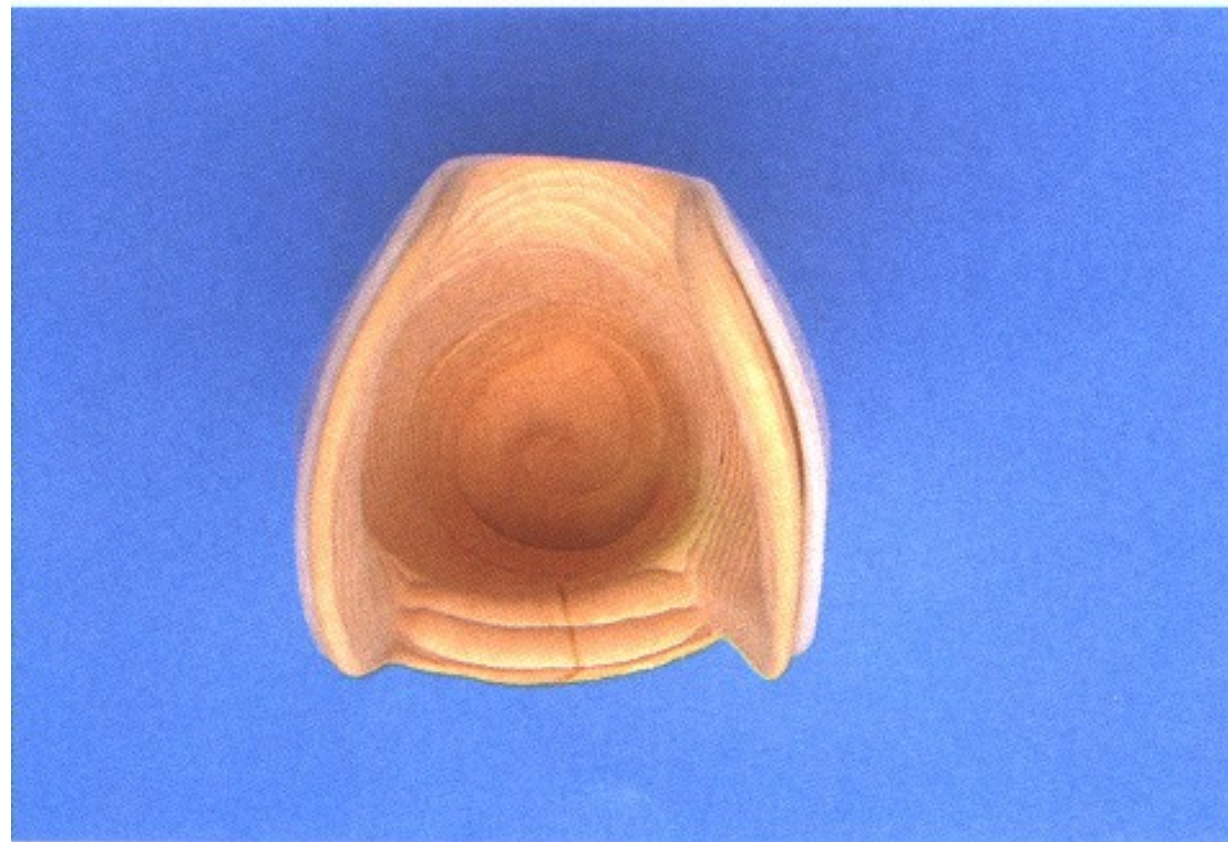
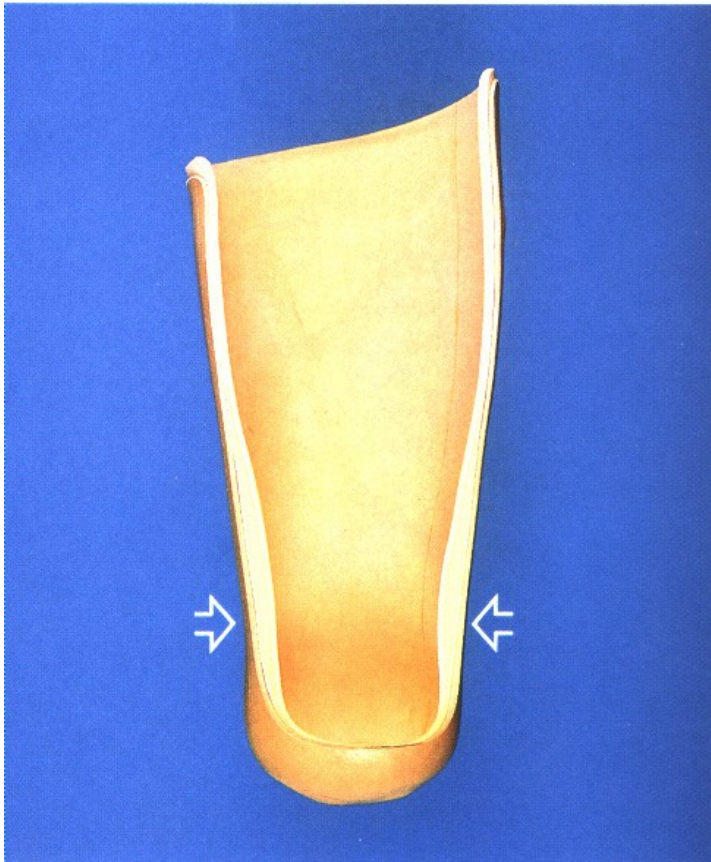
Protetika

Construction – stump bed



Protetika

Construction – stump bed



Protetika

Construction – stump bed

Interface material

- **Hard socket with ply socks or nylon**
 - **Themoplastic**
- **Gel Liner**
- **Soft inserts**
 - **Pelite (foam)**



Protetika

Stump moulding – stump bed



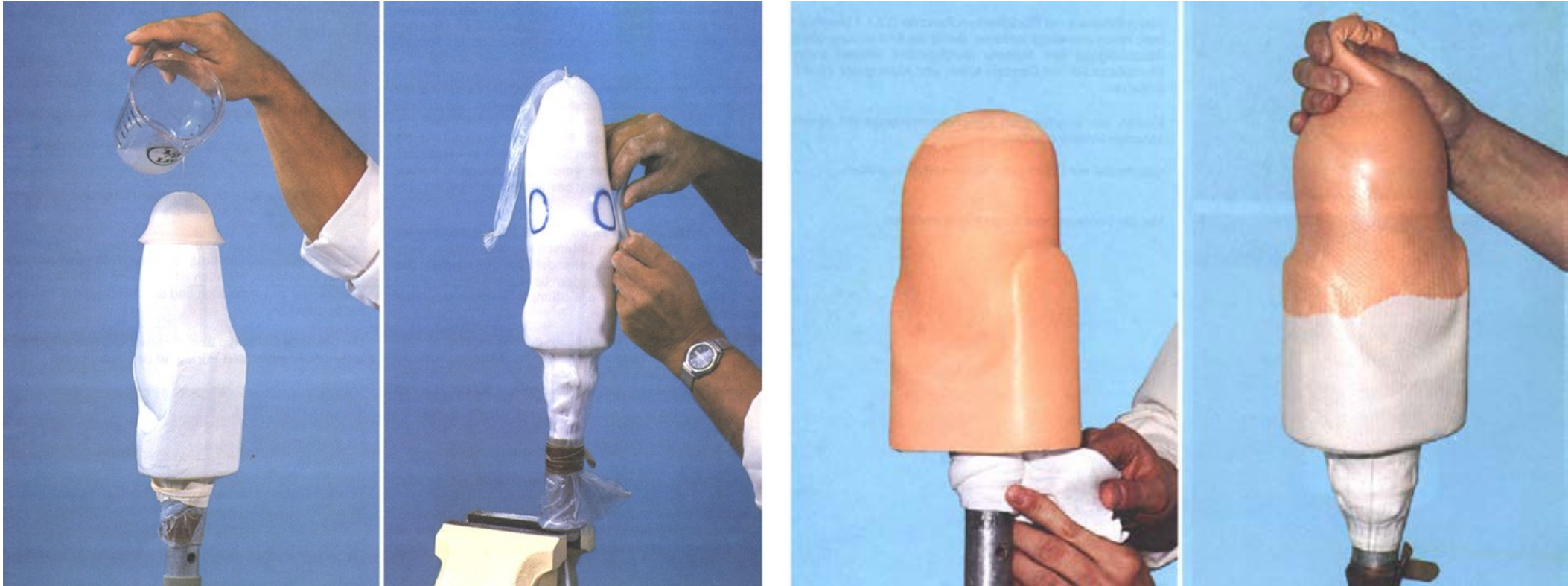
Protetika

Production – stump bed – negative positives



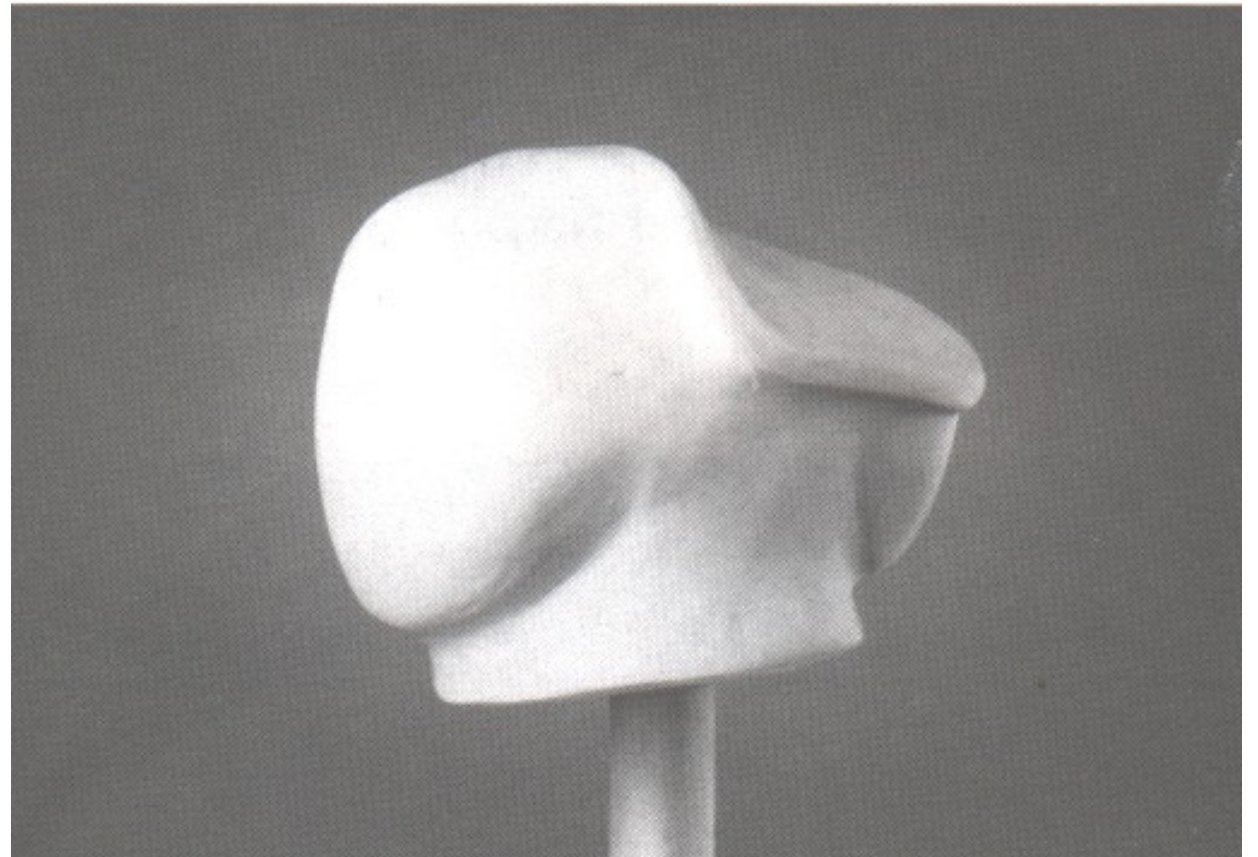
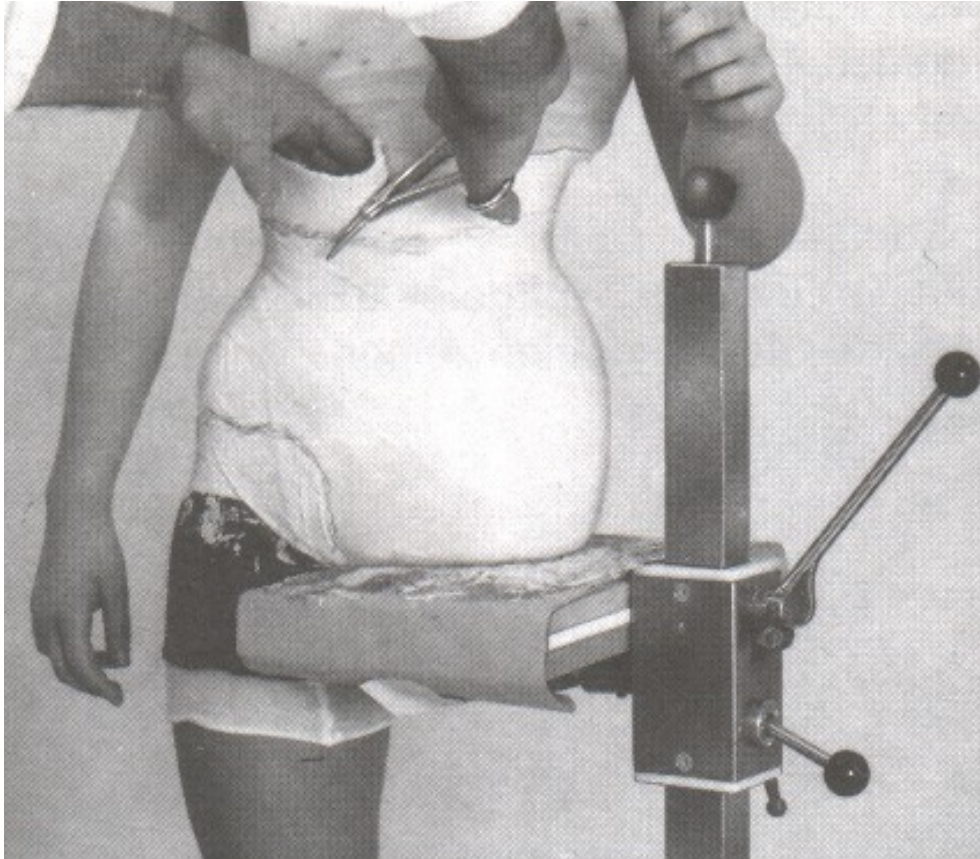
Protetika

Production – stump bed – silicone/rubber, thermoplastic



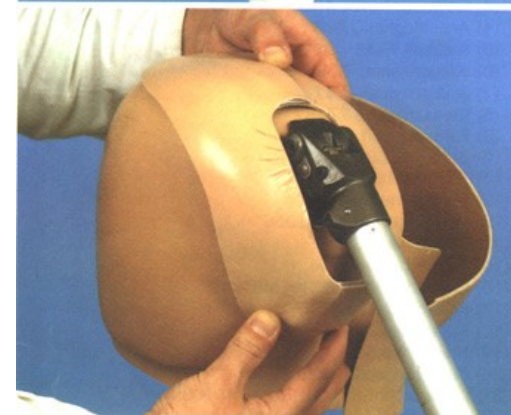
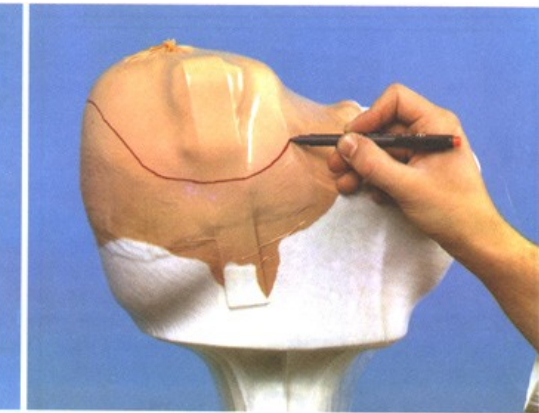
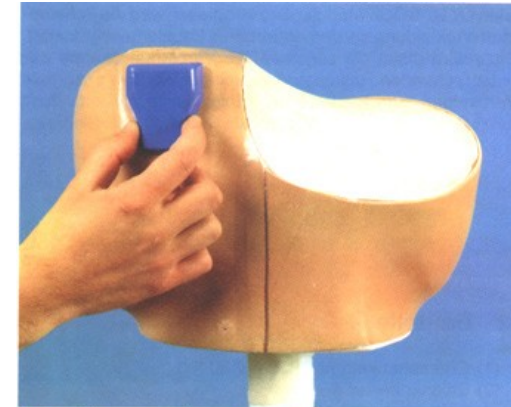
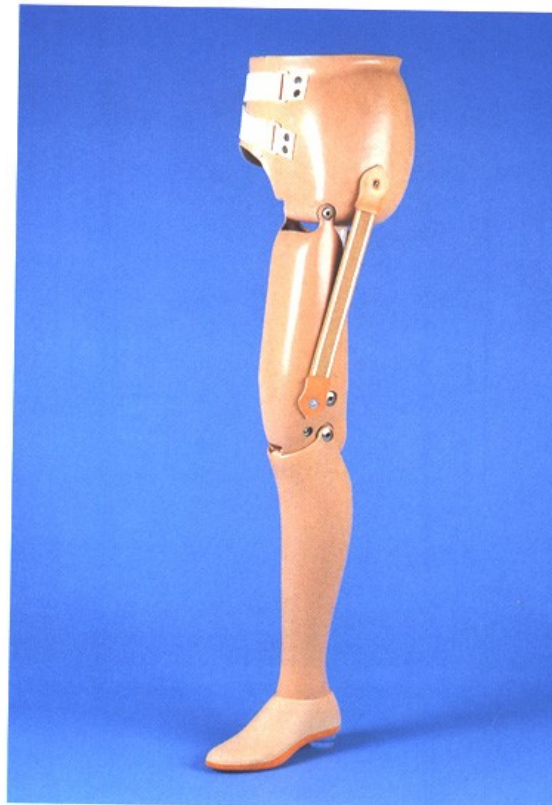
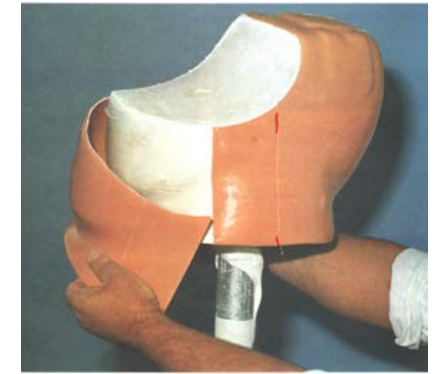
Prosthetics

Production – stump bed – exarticulation in the hip



Prothetics

Production – stump bed – exarticulation in the hip



Prosthetics

Production – stump bed – exarticulation in the hip



(1) Mittellanger Oberschenkelstumpf



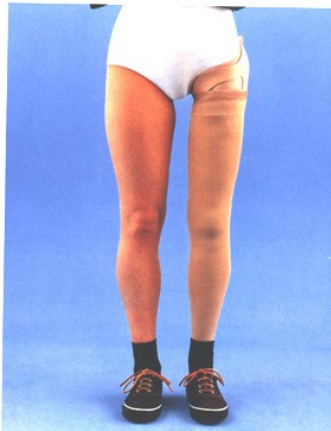
(2) Zum Ansetzen der Prothese wird der Stumpf mit Hilfe eines Trikotstrümpfchens in die Stumpfbettung eingezogen



Klauen- Oberschenkelstumpf



(3) Zum Ansetzen der Prothese wird der Stumpf mit Hilfe eines Trikotstrümpfchens in die Stumpfbettung eingezogen



Prosthetics

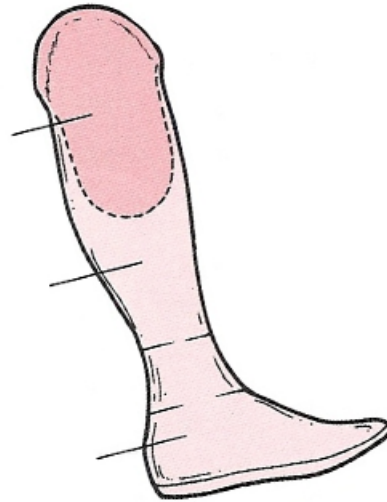
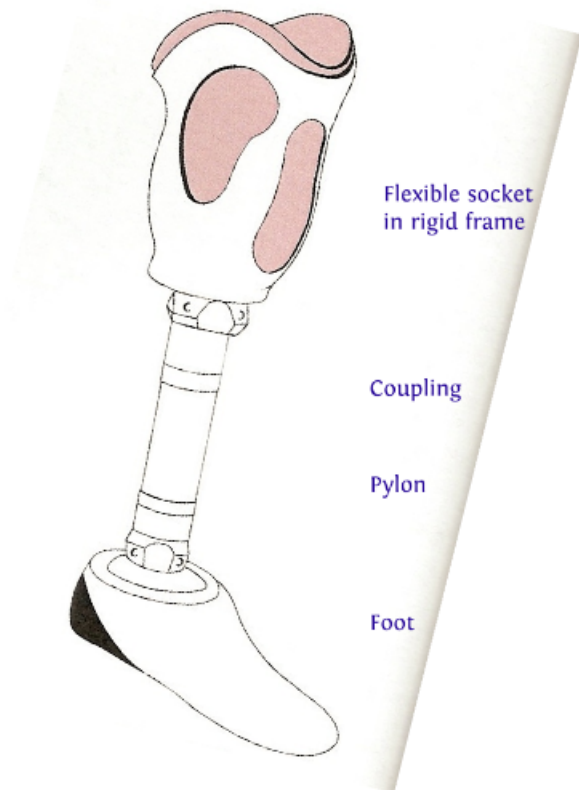
Construction – module



Prosthetics

Construction Module

Endoskeleton



Exoskeleton

Prosthetics

Rehabilitation

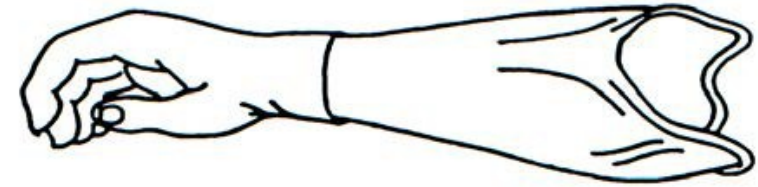
- Training the seat
- Proprioception
- Work out
- Coordination of movement
- Walk
- Stay in the inpatient department
-



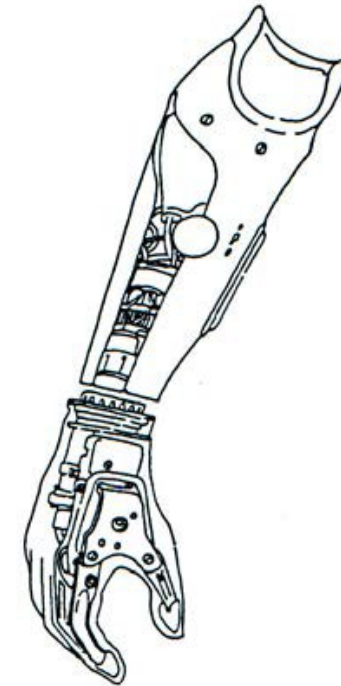
Prosthetics

Prosthesis of the upper limb

- Cosmetic
- Cosmetic with mechanical hand
- Bioelectric prosthesis



Obr. 24-5: Předloketní kosmetická protéza

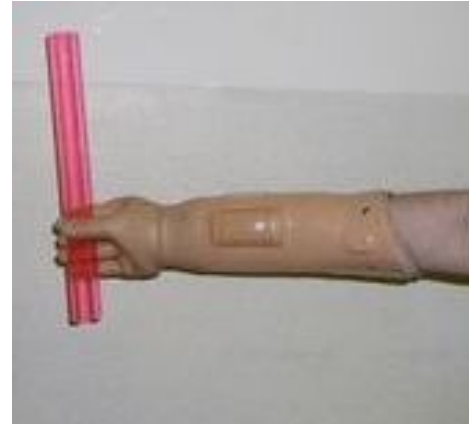


Obr. 24-6: Moderní předloketní myoelektrická protéza

Prosthetics

Prostheses of the upper limb

- Cosmetic
- Cosmetic with mechanical hand
- Bioelectric prosthesis



Orthosis

doctrine on the replacement of lost body functions

- Weakened or lost function

- Brace:

 - serial or individual

 - torso or limbs

Orthosis

doctrine on the replacement of lost body functions

Static:

- Solid without movement, relieve pain, stabilize the limb

Dynamic:

- Controlled movement, replace lost or weakened functions of muscles and joints

Orthosis

And parts of them

- Splints
- Joints
- Calipers
- Strokes
- Pelotons
- Auxiliary parts (sleeves)
-

Orthosis

doctrine on replacing lost body functions

- Brace:**

- serial or individual
- torso or limb
- fixation (restrict movement)
- corrective (adjusting position)
- extension (straighten ing the limb)
- leveling (mechanicallength)
- support (reliever from load)
- for work

- Dynamic**

- Static**

Orthosis

Upper limbs

Finger brace

- Dynamic: Flexible strokes
- Static

Wrist/forearm:

- Rigid
- Semirigid

Forearm:

- epicondylitis
- elbow



Orthosis

Upper limbs

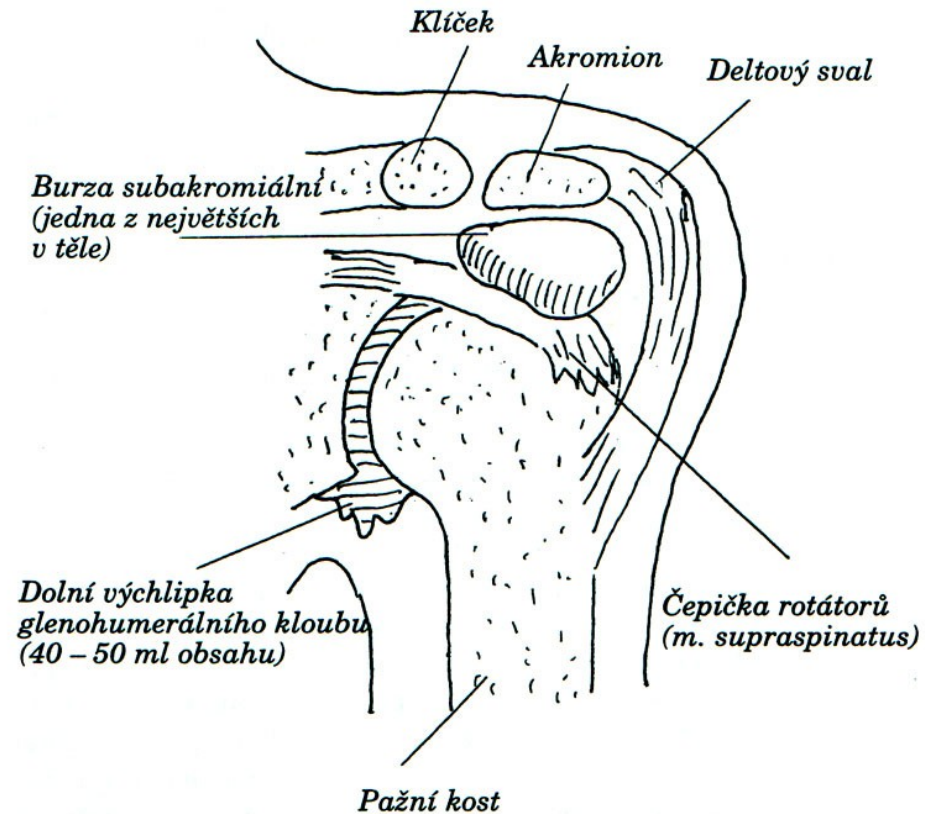


Orthosis

Pain shoulder syndrome

- Tendosynovitis capitis longi m. bicipitis brachii
- Rupture of the tendon long head of the biceps
- Bursitis subacromialis
- Tendinitis m. supraspinati
- Rupture of the rotator cuff
- Impingement shoulder syndrome
- Frozen shoulder syndrome
- Arthrosis art. glenohumeralis
- Affective acromioclavicular joint
- Inflammation
- Tumors
- Trauma
- Pain transferred from another place
- Postoperative treatment

Obr. 17 – Schéma měkkého ramene.



Orthosis

Shoulder joint

□ Orthopedic surgery:

- Arthroscopy:
 - SLAP lesions
 - Rotator cuff repair
 - SA decompression
- Endoprosthesis:
 - hemiarthroplasty
 - Rev TSR
 - TSR
- Traumatology:
 - ORIF
 - IM nail

□ Brace:

- Arthroscopy
 - Desault 4 – 6 weeks
 - Abduction orthosis
 - Scarf hinge
- Endoprosthesis:
 - No fixation/DO
 - No fixation/DO
 - No fixation /DO
- Traumatology:
 - No fixation 90% ORIF performance
 - Conservative Therapy: DO/AD
 - Individual orthosis and splints
 - Scarf hinge

Orthosis

Shoulder joint

Desault Orthosis

- fixation for 4 – 6 weeks
- a) active exercises of fingers, wrists
- b) passive and later active elbow movement
- b1) (arm in internal rotation!)
- c) isometry of arm muscles in the orthosis
- d) adjustment of the posture

Abduction splint/orthosis

- fixation 4 – 6 weeks
- a) active exercise of fingers, wrists
- b) passive and later active elbow movement
- c) modification of the posture

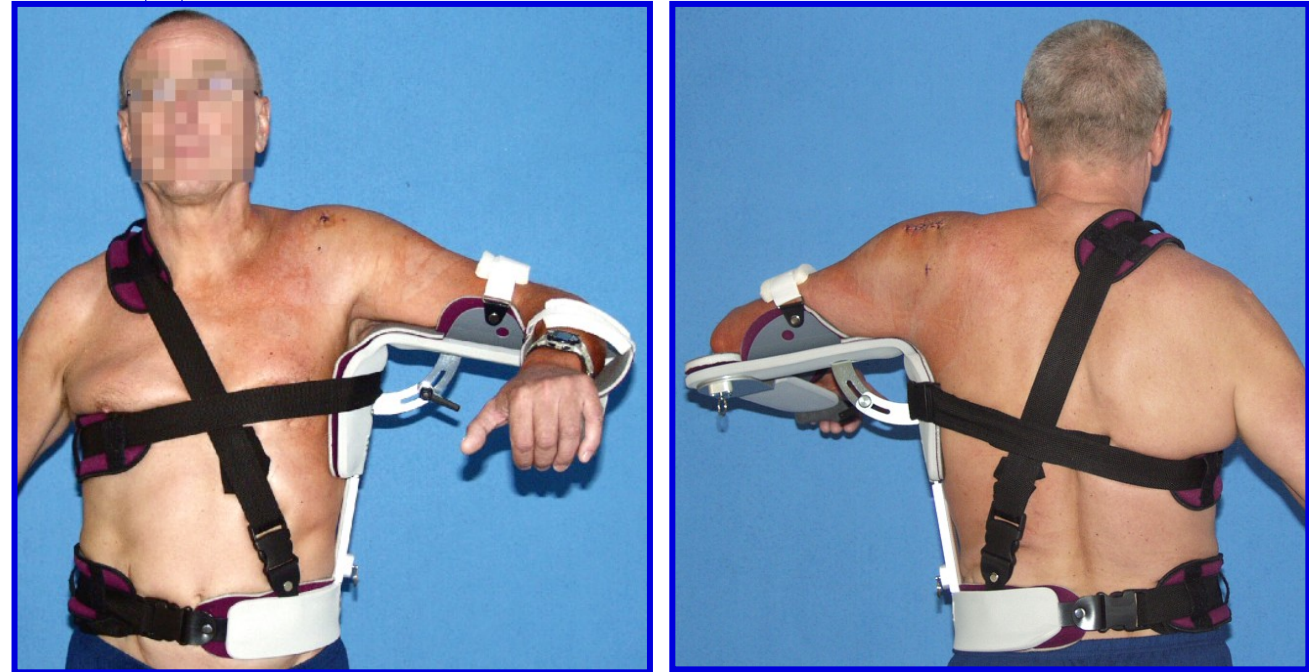
Orthosis

Shoulder joint

Desault Orthosis



Abduction splint/orthosis



Orthosis

Shoulder joint

Desault Orthosis



Abduction splint/orthosis



Orthosis

Pierre-Joseph Desault

□ Pierre-Joseph Desault

- 6 Feb 1738 – 1 June 1795
- France
- Anatomy/surgeon

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EMINENT PRE-LISTERIANS



FIG. 81. Desault's bandage for fractured clavicle. From: *Oeuvres chirurgicales de P. J. Desault*

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EMINENT PRE-LISTERIANS



P. J. DESAULT,
1738-1795

FIG. 80

Orthotics

Lower limb



TLSO brace

Types and clinical use



Prosthetics

- Prosthetics - doctrine on the replacement of lost parts of the body
- Orthotics - doctrine on the replacement of lost body functions
- Epithetics - doctrine on cosmetic cover of the body part
- Kalceotika - doctrine of orthopedic shoes
- Adjuvatics - doctrine of aids
-

Korzetoterapie

- Stop/mitigate the progression of spinal deformity
- Maintain steady position of the fuselage
- NMS sometimes questionable and problematic

Differential diagnosis of pathologies

etiology: physical, chemical, biological and in particular genetic and multifactorial

Trauma
Radiotherapy
Postural
Laminectomy

Osteoporosis
Osteomalacia

Achondroplasia,
Mucopolysaccharides
Oncology
Infectious causes
M Bechterev
M Scheuermann

PHYSICAL INFLUENCES

Injuries
Iatrogenic causes
Faulty posture
Muscle dysbalance

CHEMICAL INFLUENCES

Hormone/Corticoid Therapy
Menopausa

BIOLOGICAL INFLUENCES

Genetics
Combination of influences
Congenital kyphosis – disorders of
segmentation and formation
Neuromuscular kyphosis
Degenerative changes

Conservative treatment of trauma

A) Rest

B) Collars:

- soft/molitan
- Philadelphia



Conservative treatment of trauma

- rest
- C: Halo traction



Conservative treatment of trauma

- Rest
- Th fracture: Jewet's brace/TLSO
- Th-L fracture: Jewet's brace, lumbar belt



Conservative treatment of trauma

Plaster TLSO: not adequate in traumatology these days



Conservative treatment of trauma



Corsetotherapy

Indications:

- Scoliosis: Congenital, Idiopathic, Neuromuscular, Degenerative
- Traumas: primarily, event. postoperative treatment
- Oncology: primarily, event. postoperative treatment

Degeneration: postoperative treatment

Objective: stabilization, correction

Principle of three-point fixation

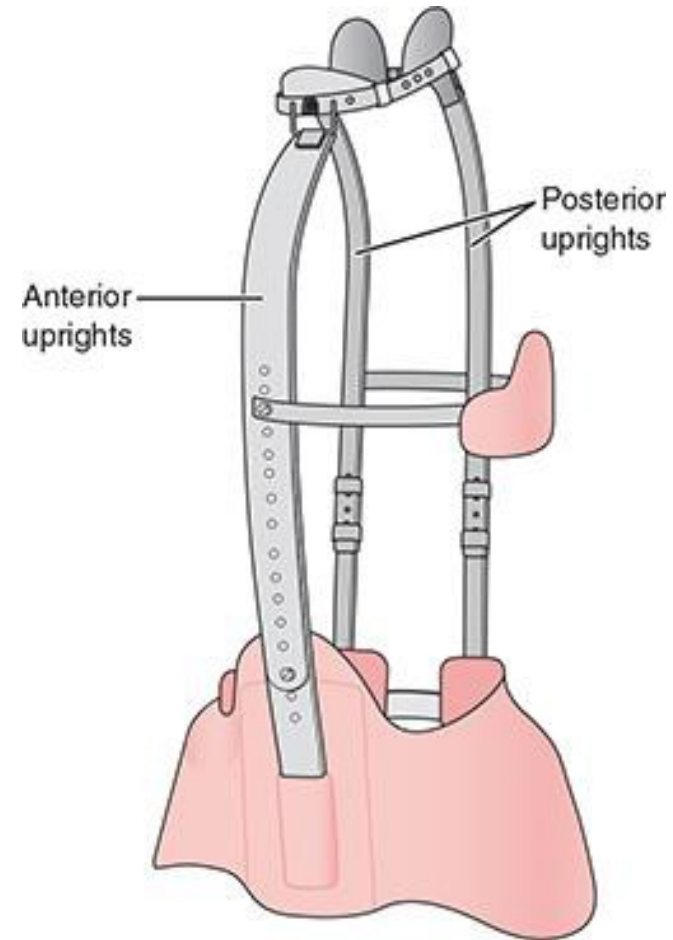
Pelvic belt – neck circle – side pressure pellets

- Primary forces:
 - acts indirectly on the spine through surrounding structures
 - axis: tensile – for deformity in the sense of stretching: pelvis – cervical pelotes
 - sides: pressure – through the rib cage by pressure on the vertebra

- Milwaukee Brace
- Thorakolumbosacral orthosis (TLSO)
- Two-part cervikothoracolumbusal orthosis (CTLISO).
- Carlson and Payette (2017) braces supporting sed
-

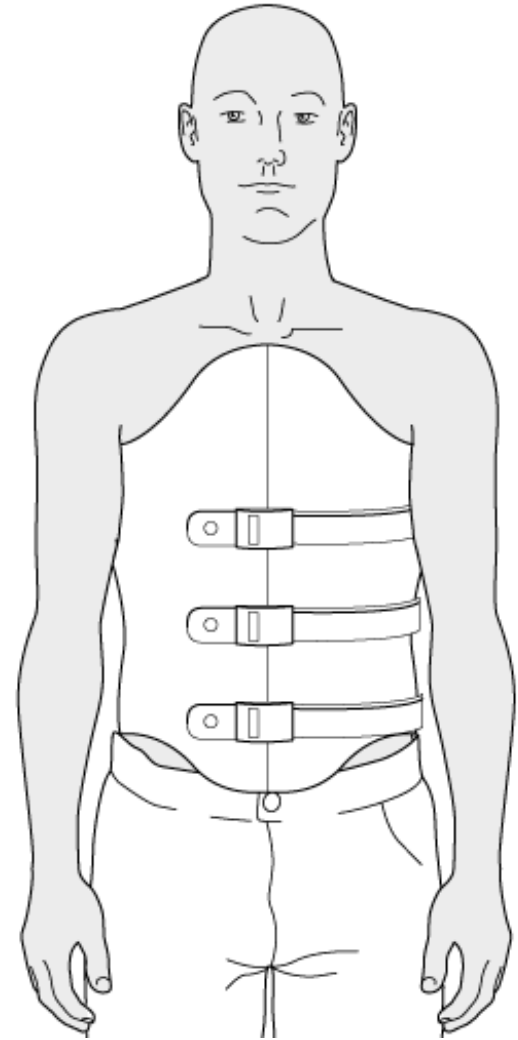
Principle of three-point fixation

Milwaukee Brace (May & Lockard, 2011)



Principle of three-point fixation

Thorakolumbossacral orthosis (author unknown, 2018)



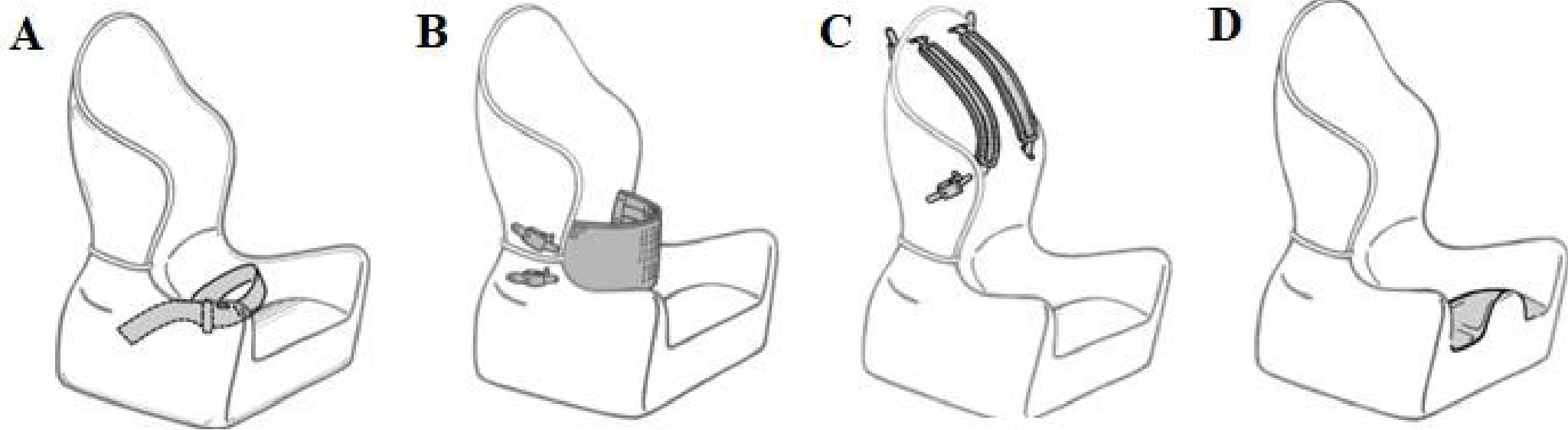
Principle of three-point fixation

Thoracosocal corset of synthetic material



Principle of three-point fixation

Sample sit-supporting orthosis supplemented with additional compensatory aids (Carlson & Payette)



Morbus Scheuermann

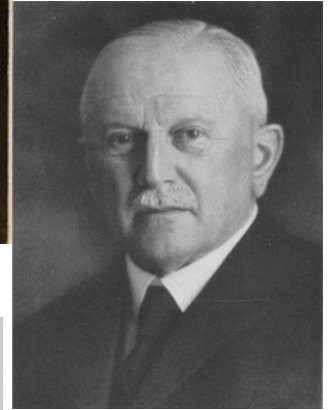
Holger Werfel Scheuermann (1877-1960) - Dánsko - 1920 osteochondritis deformans juvenilis dorsi

- Abnormal increase in lower thoracic kyphosis in puberty with rigidity and typical X-ray changes (ASCANI and co. 1985)
- Disparity between growth hormone production and sex hormones with vertebral fragility (Bradford 1985)
- The cause is not yet fully known
- Genetics/Multifactorial

Epidemiology and Etiology

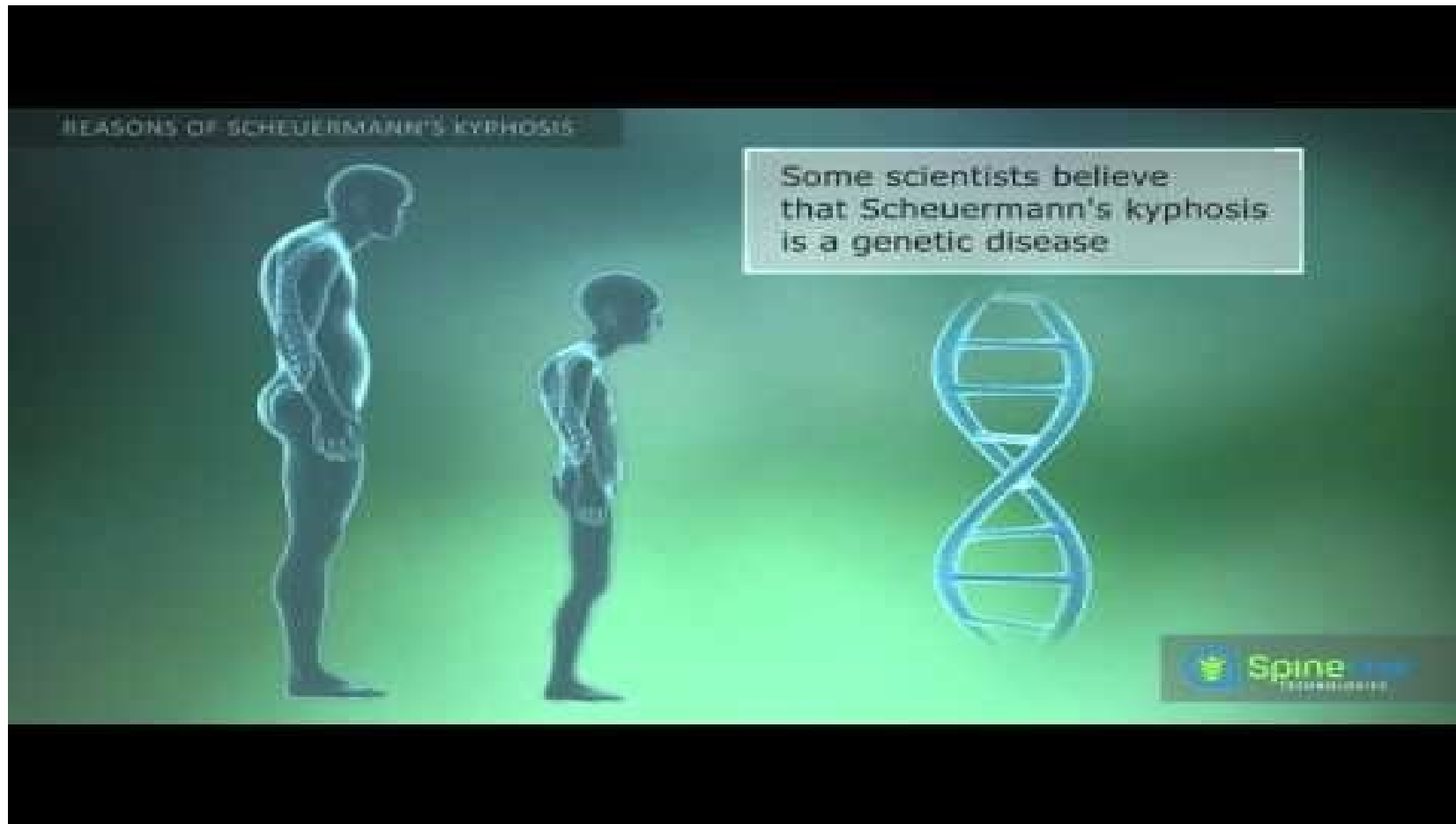
Morbus Scheuermann

- Aseptic necrosis of the vertebrae (Scheuermann 1920)
- Herniation of discs into vertebrae (C.G. Schmorl 2 May 1861 – 14 August 1932)
- Mechanical overload ("apprentice's back," Mau 1927, Keim 1975)
- Hereditary talents (Sörensen 1964, prof. Vlach a spol. 1990 – 36%)
- Hormonal influences (Ipolito 1981)
- 0.5 - 8 % of the population
- More often boys (but 612, Ž:M 1,2:1; ORTK FN, odb.as.Filipovič 2001)
- Age 12-18 years
- Enchondral ossification disorder
- More often lower thoracic spine
-



Epidemiologie a etiologie

Morbus Scheuermann youtube



Epidemiologie a etiologie

Morbus Scheuermann youtube



Epidemiology and Etiology

Morbus Scheuermann in literature

„...autosomal genetic component of high penetrance and variable expressivity, with 74% heredity...“

Damborg F, Engell V, Andersen M, Kyvik KO, Thomsen K. Prevalence, concordance, and heritability of Scheuermann kyphosis based on a study of twins. J Bone Joint Surg Am. 2006;88(10):2133–2136

„...Its origin has been associated with avascular necrosis of the epiphyseal rings...“

Scheuermann HW. Kyphosis dorsalis juvenilis. Orthop Chir. 1921;41:305–317

„...juvenile osteoporosis...“

Gilsanz V, Gibbens DT, Carlson M, King J. Vertebral bone density in Scheuermann disease. J Bone Joint Surg Am. 1989;71(6):894–897

Lopez RA, Burke SW, Levine DB, Schneider R. Osteoporosis in Scheuermann's disease. Spine. 1988;13(10):1099–1103

„...shortening of the ischiotibial musculature...“

Lopez RA, Burke SW, Levine DB, Schneider R. Osteoporosis in Scheuermann's disease. Spine. 1988;13(10):1099–1103

„...mechanical factors that would trigger secondary remodelling responses, such as reduction of sternal size...“

Sorensen KH. Scheuermann's Juvenile Kyphosis: clinical appearances, radiography, aetiology and prognosis. Munksgaard; Copenhagen: 1964.

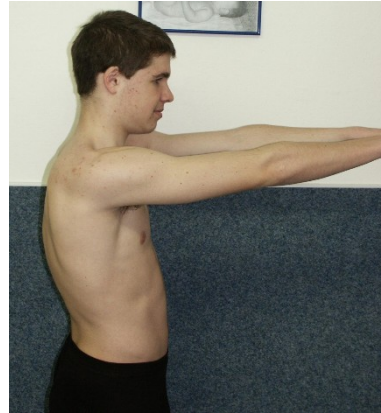
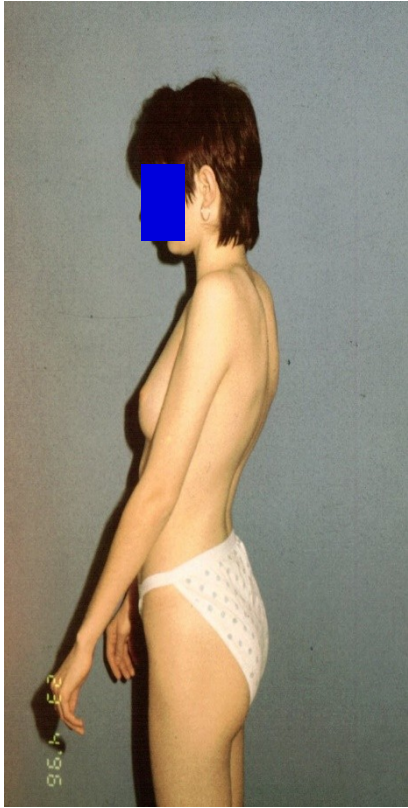
Ferguson AB., Jr The etiology of preadolescent kyphosis. J Bone Joint Surg Am. 1956;38(1):149–157

Clinical examination

- Round back at the bottom t8-9 (48%)
- Thoracic or lumbar spine pain (28%)
- Rigidity of deformity
- Scoliosis in 49%
- Muscle dysbalance "texas attitude"
- Reflective changes in soft tissues
- Positive tests (Matthias, Frank, hyperextion)



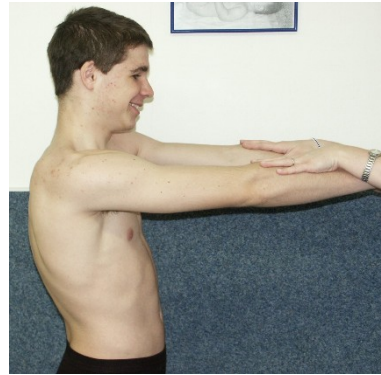
Clinical examination



Matthias



hyperextension



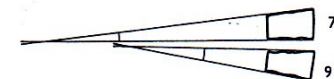
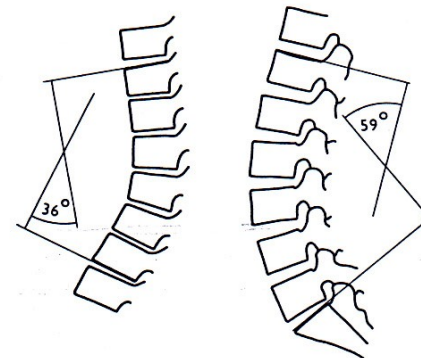
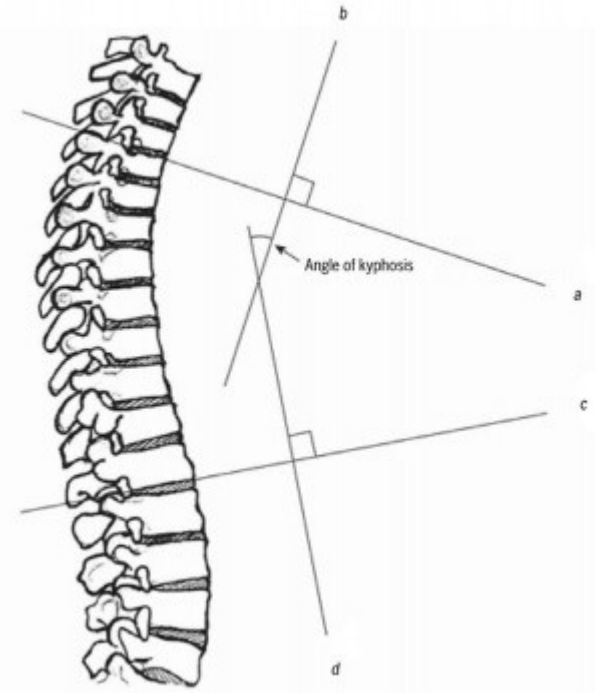
Franke

Clinical examination

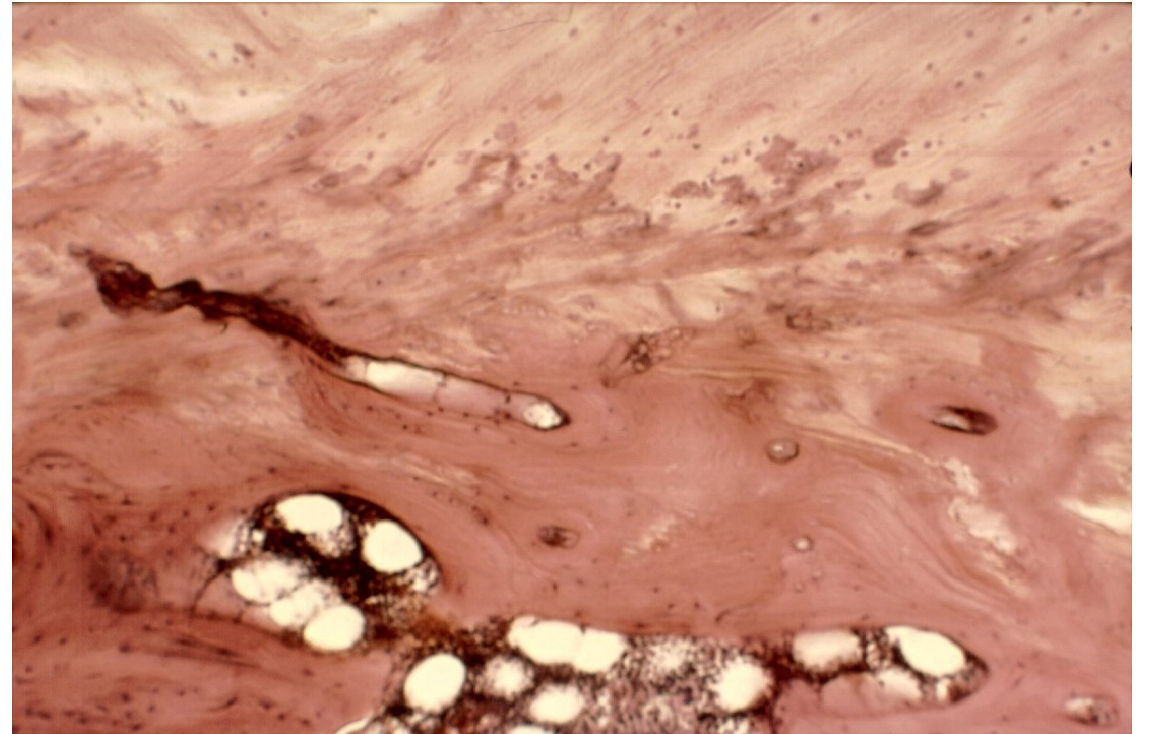
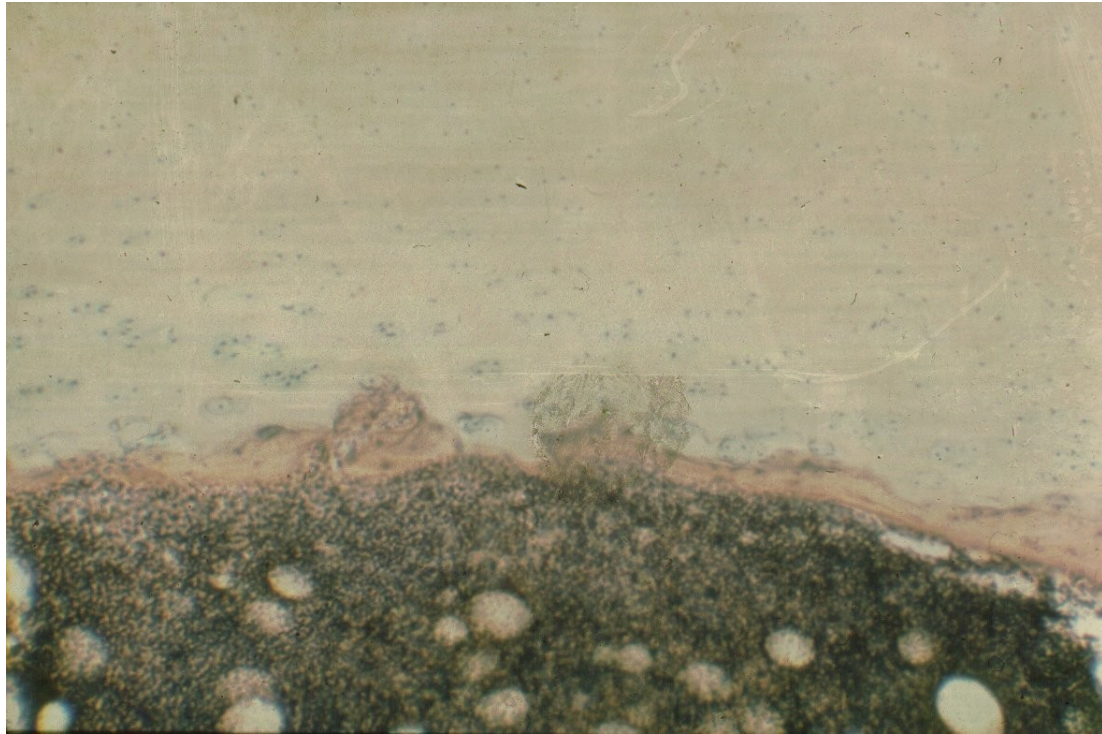


Morphology

- Histology, X-ray, CT, MRI
- C lordosis, Th kyphosis, L lordosis
- Th kyphosis: 20° - 40° ($< 20^{\circ}$ hypo; $> 45^{\circ}$ hyper)
- Radiological criteria according to Bradford 1985:
- Chest kyphosis above 40° according to Cobb
- Vertebral wedges above 5° (43% in 3 vertebrae)
- Unevenness of covering surfaces and disc narrowing
- Stretching of vertebral bodies
- Schmorl nodes (up to 42%)

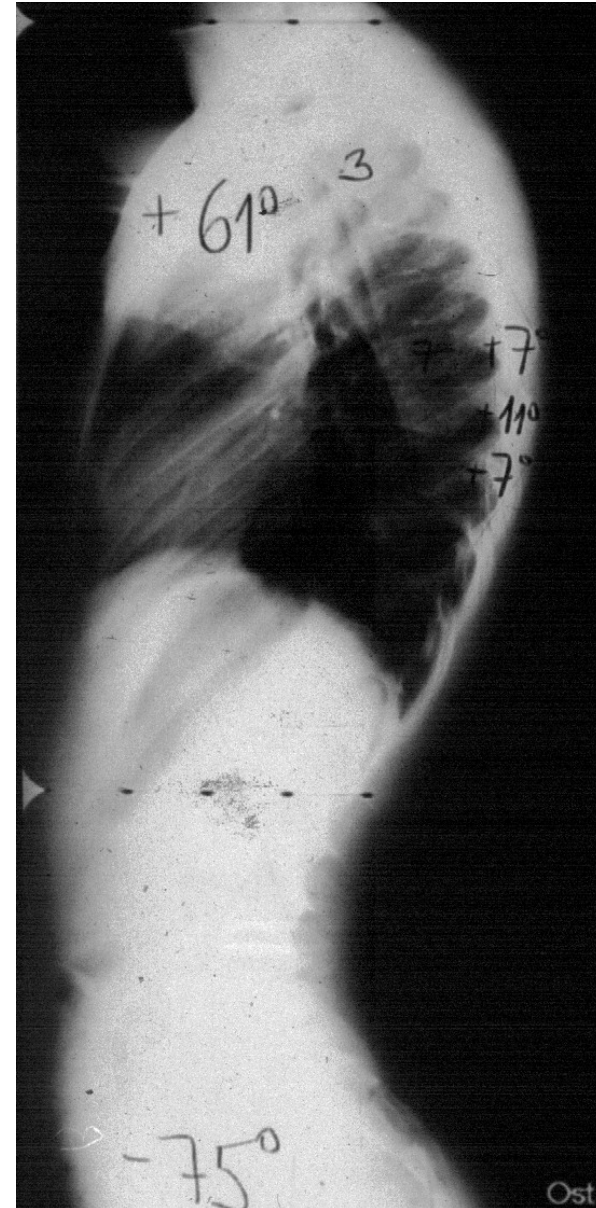


Histology



Xrays

- AP + side long formats
- re-evaluation
- We measure:
 - Cobb angle T3/4 – T12
 - reclinacion
 - SVA
 - PT, PI, SS



CT

- CT - bone window
- fresh Schmorl knot:
 - character of osteolysis
 - around the edge break
 - In addition, STIR MRI
- Differential diagnosis!



MRI

- old Schmorl's knot:

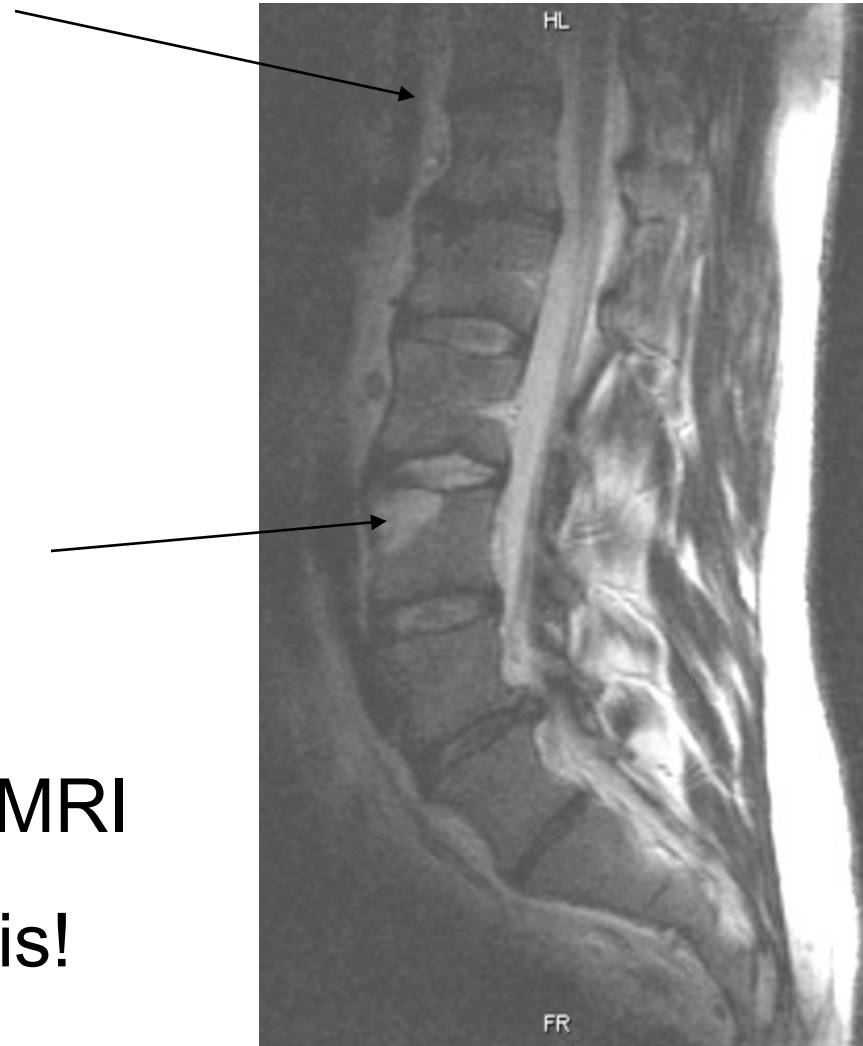
- Consolidated
- Inactive

- fresh Schmorl knot:

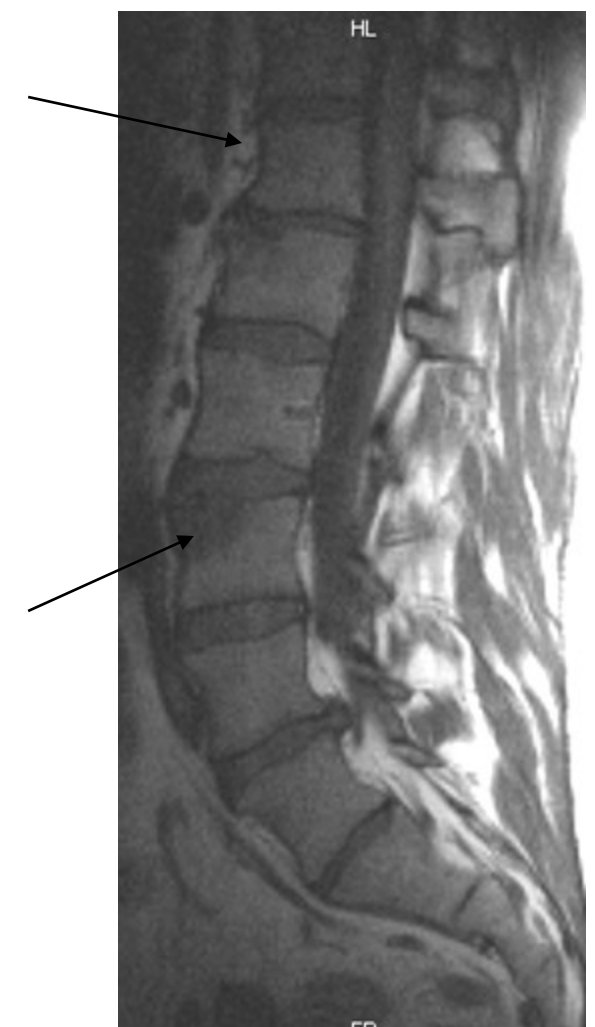
- Character of osteolysis
- around the edge break

- on T2, better STIR MRI

- Differential diagnosis!



T2



T1

Forms Morbus Scheuermann

Typical and atypical

Typical:

- Type I: Th spine only: upper type
- Type II: Th – L Gradient: Lower Type
- Affects the transition of Th and L of the spine
- "Lumbar type" Morbus Scheuermann
- fresh Schmorl's knot

Atypical:

- I. form (vertebrae changes without hyperkyphosis)
- II. form (typical clinic, no significant serious X-ray changes)
- III. form (lumbar localization)

Stages Morbus Scheuermann

early – deformities - consequences

Stage I early on set

- 9-12 years, round loose back with pain, muscle changes

Stage II deformities

- 13-16 years, stiffness, x-ray changes

Stage III of the consequences

- chronic back pain

Degrees Morbus Scheuermann

Montgomery 1981

- Grade I – up to 45° kyphosis
- Grade II - up to 55° kyphosis
- Grade III - up to 65° kyphosis
- Grade IV - 75° and up
-

Therapy

Conservative

- Exercising
- orthosis and exercises
- antigravity plaster corset
followed by orthosis and LTV
- "Lyon method" De Mauroy and Stagnar's 1978

Surgical

- Indications:
 - Absolute:
neurological deficiency (extremely rare)
 - Relative:
Rigid deformity above 70°
Pain
Cosmetics
Posterior spondylodesis
SPO/PSO

Conservative practices



Conservative practices

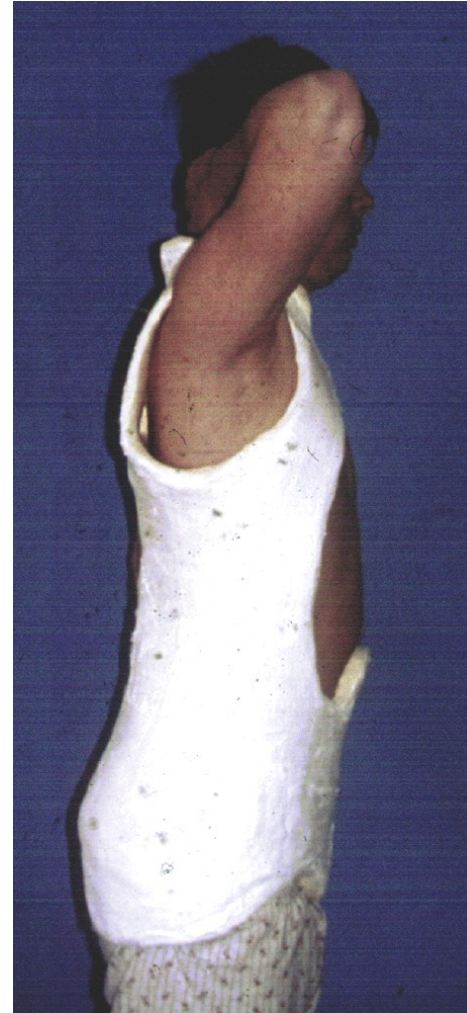
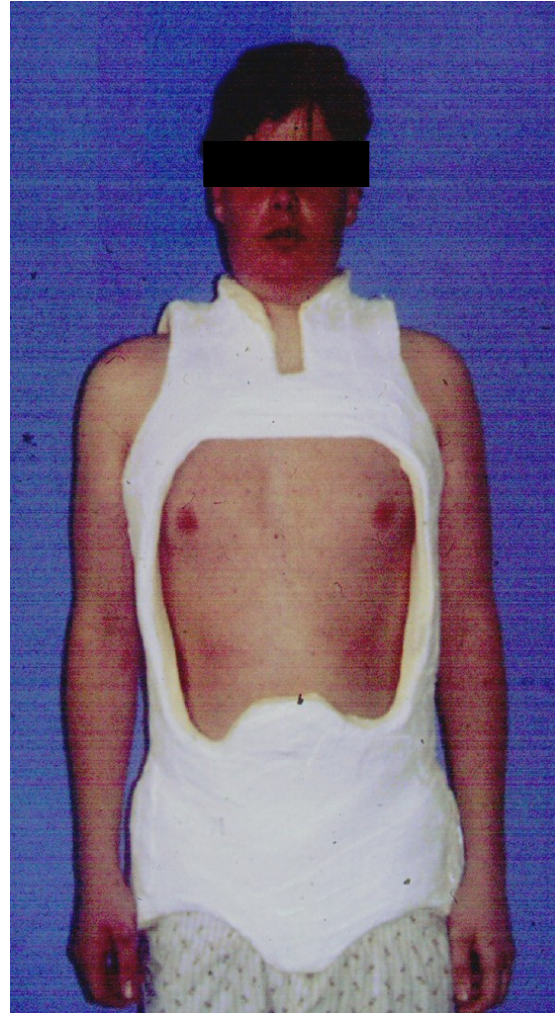
- Exercise + corztotherapy
- Physical treatment
- Stop: competitive sport
- Stop: heavy loads
- NSAIDs, analgesics?
- Myorelaxantia?
-



Modified Milwaukee Orthosis (Hudeček- Wernio – Nobility 2004)



Antigravity – plaster - corset



Rehabilitation and prosthetics

23h/16h night mode, „NO“ night mode, intense, daily exercise

- Exercising
- Physical treatment
- Prohibition of competitive sport
- Prohibition of heavy loads
- NSAIDs, analgesics
- Muscle relaxants
- Anti-gravity brace
-

Rehabilitation and prosthetics

23h/16h night mode, „NO“ night mode, intense, daily exercise

- Individual LTV + instruction
- Individual + special techniques (Brunkow, Brügger, Klapp and others)
- Group and Motivational (swimming, hippotherapy, dancing)
-

Rehabilitation and prosthetics

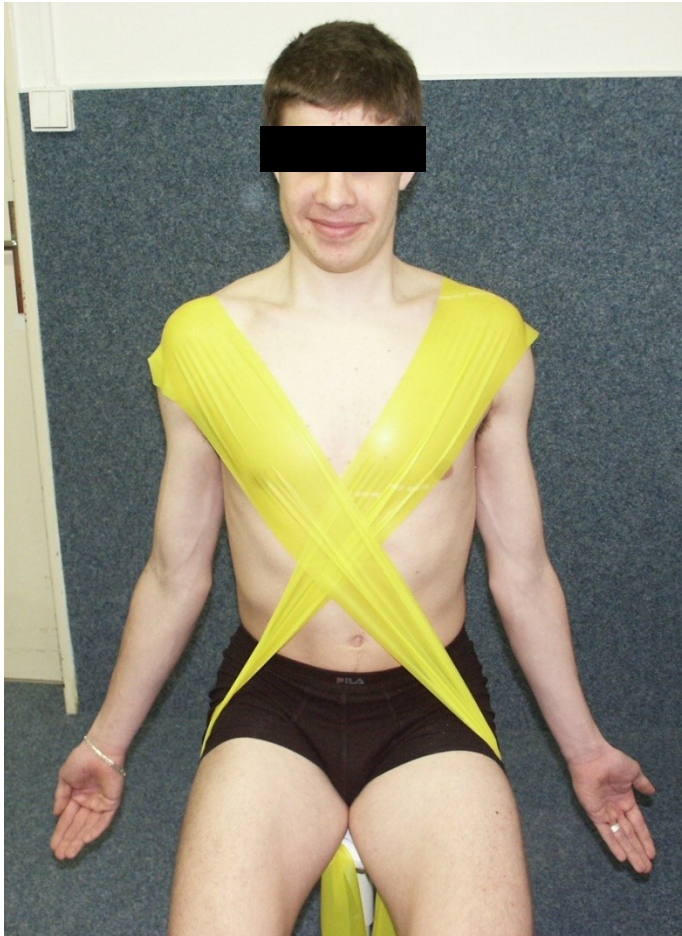
Brunkow



Prosthetics - Faculty of Medicine Masaryk University

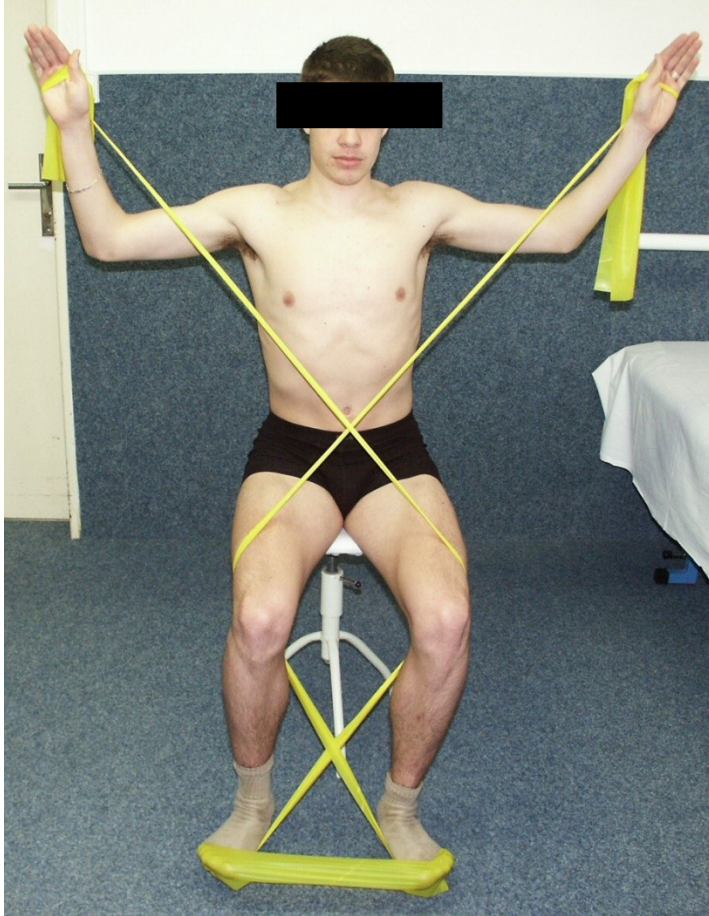
Rehabilitation and prosthetics

Brügger



Rehabilitation and prosthetics

Brügger



Rehabilitation and prosthetics

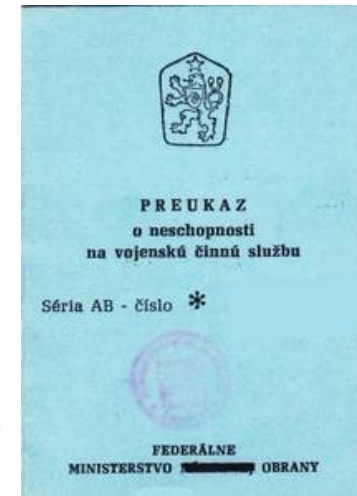
Klapp



Complications of conservative therapy

Patient and parents

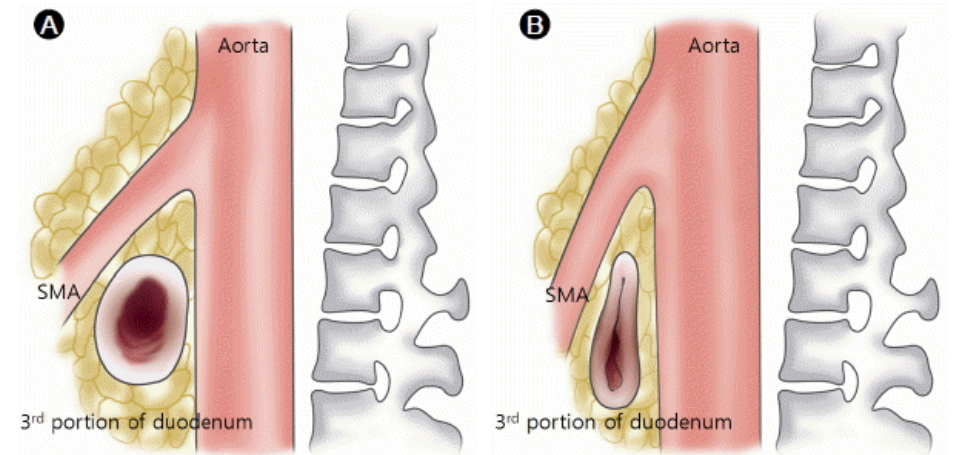
- CAST SYNDROME!!!**
- Care for antigravity corset (exanthema, decubitus)
- Long-term treatment
- Small cooperation in puberty
- Little motivation
- Lifestyle
- Assessment problems:
 - improved with the abolition of compulsory military service
 - the most common cause of the "blue book"



Complications

CAST SYNDROME = ACUTE CONDITION = THERAPY IMMEDIATELY

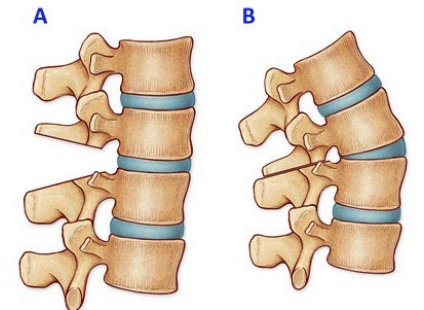
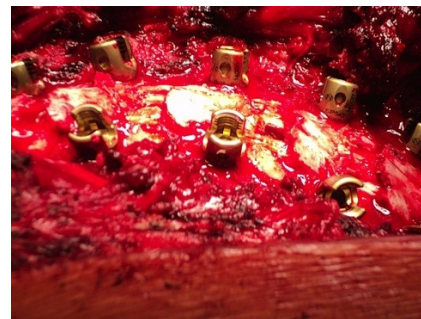
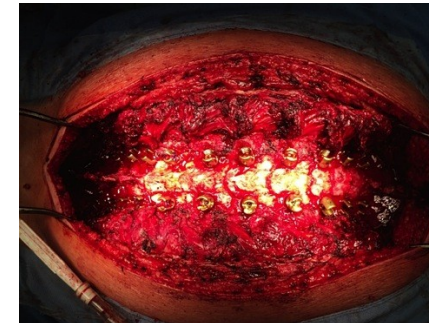
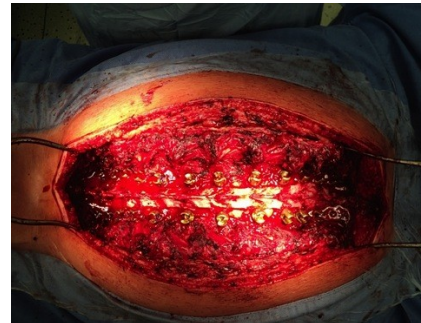
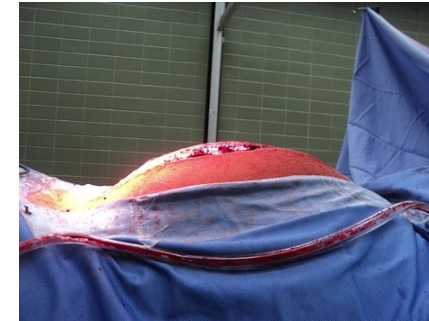
- SMAS= superior mesenteric artery syndrome (mesenteric artery syndrome)
- dilation of the stomach with partial or complete obstruction of the duodenum
- Conservative therapy: castings, plaster corsets, corsets:
- in all patients with mesenteric artery syndrome
- NSG (nasogastric decompression), pharmacological treatment: Metoclopramid i.v.
- Positioning: left, knee-to-chest position or Goldthwaite maneuver
- Enteral nutrition using a double lumen tube, soyurally guided distal to obstruction under fluoroscopic assistance
- Surgical therapy:
- Failure of conservative treatment = surgical intervention:
- duodenojejunostomy or gastrojejunostomy to bypass obstruction or duodenal derotation altimeter
- mobilization of duodenum by laparotomy or laparoscopy
- duodenojejunostomiestomy rarely
- Pathophysiology:
- compression of the duodenum between the upper mesenteric artery forward and the aortic and spine at the back.
- obstruction may occur within a few hours to days after surgery or casting or plaster corset or may not develop for several weeks.



Surgical treatment

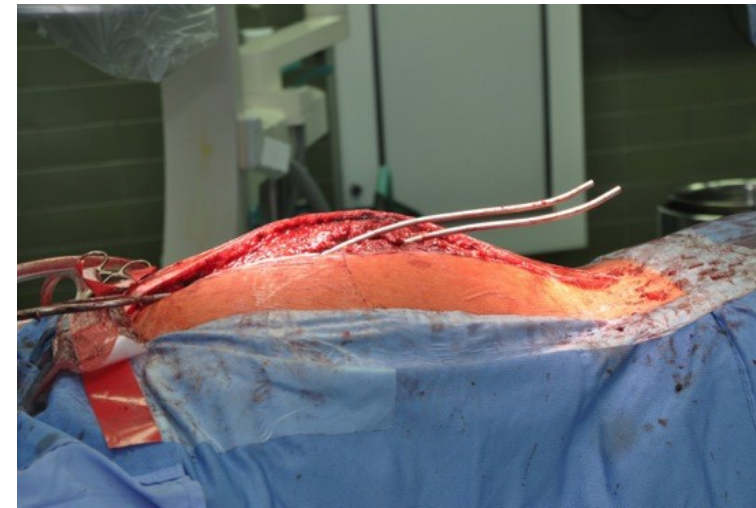
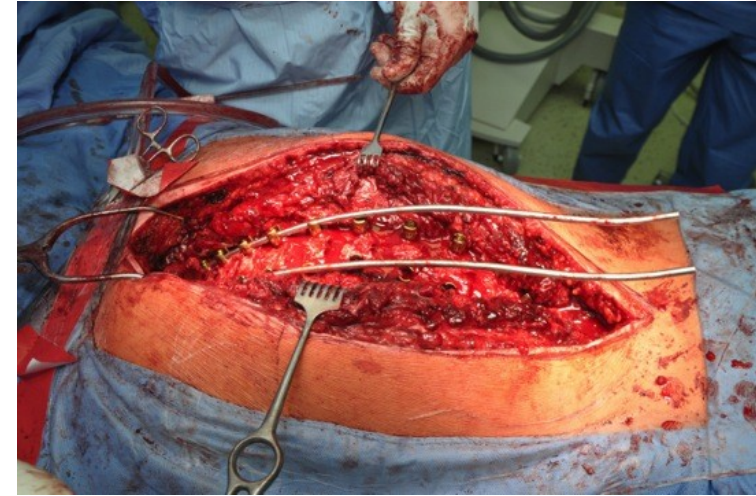
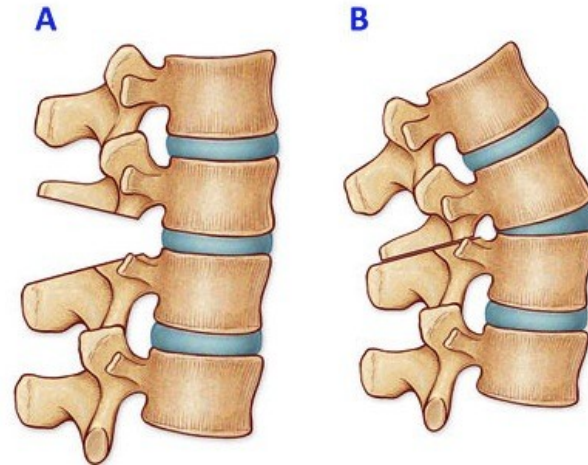
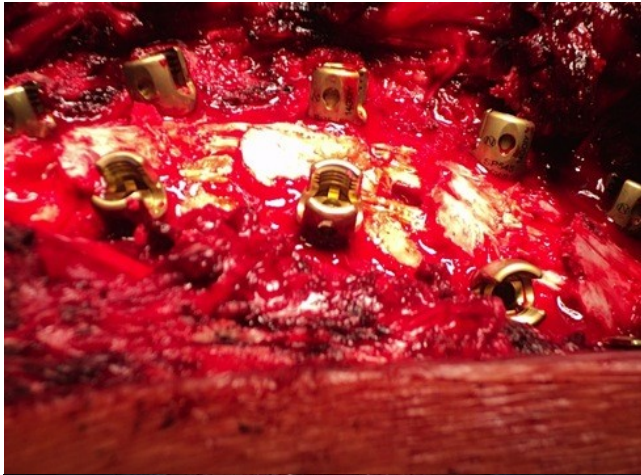
Late, severe diagnosis

- Posterior spondylodesis
- Osteotomy: SPO/PSO
- + treatment in TLSO
-



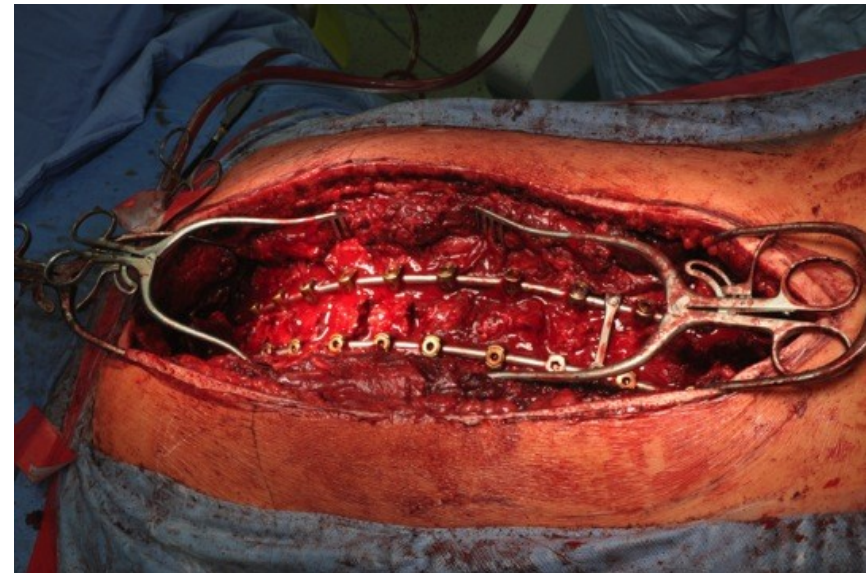
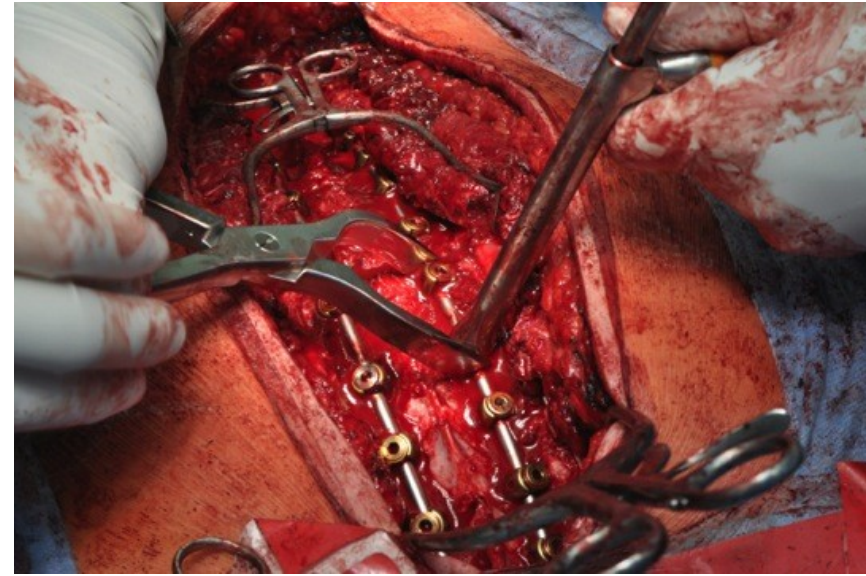
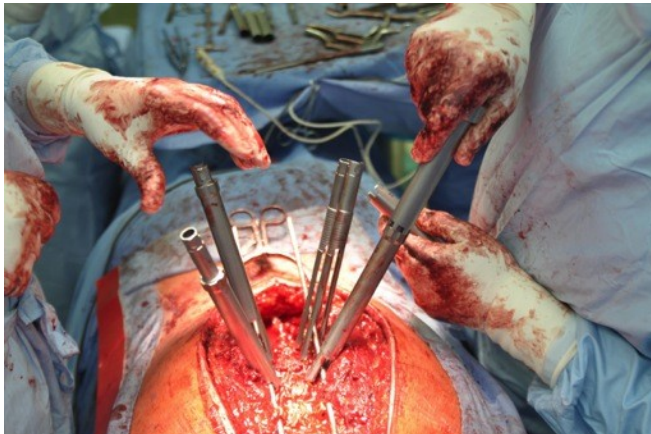
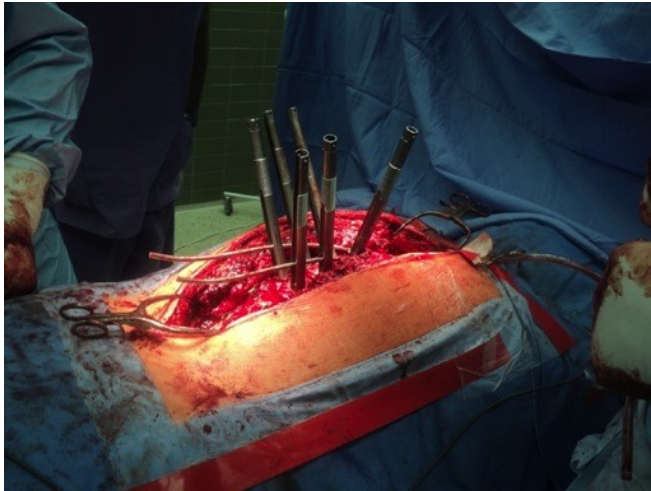
Surgical therapy

Smith-Petersen osteotomies



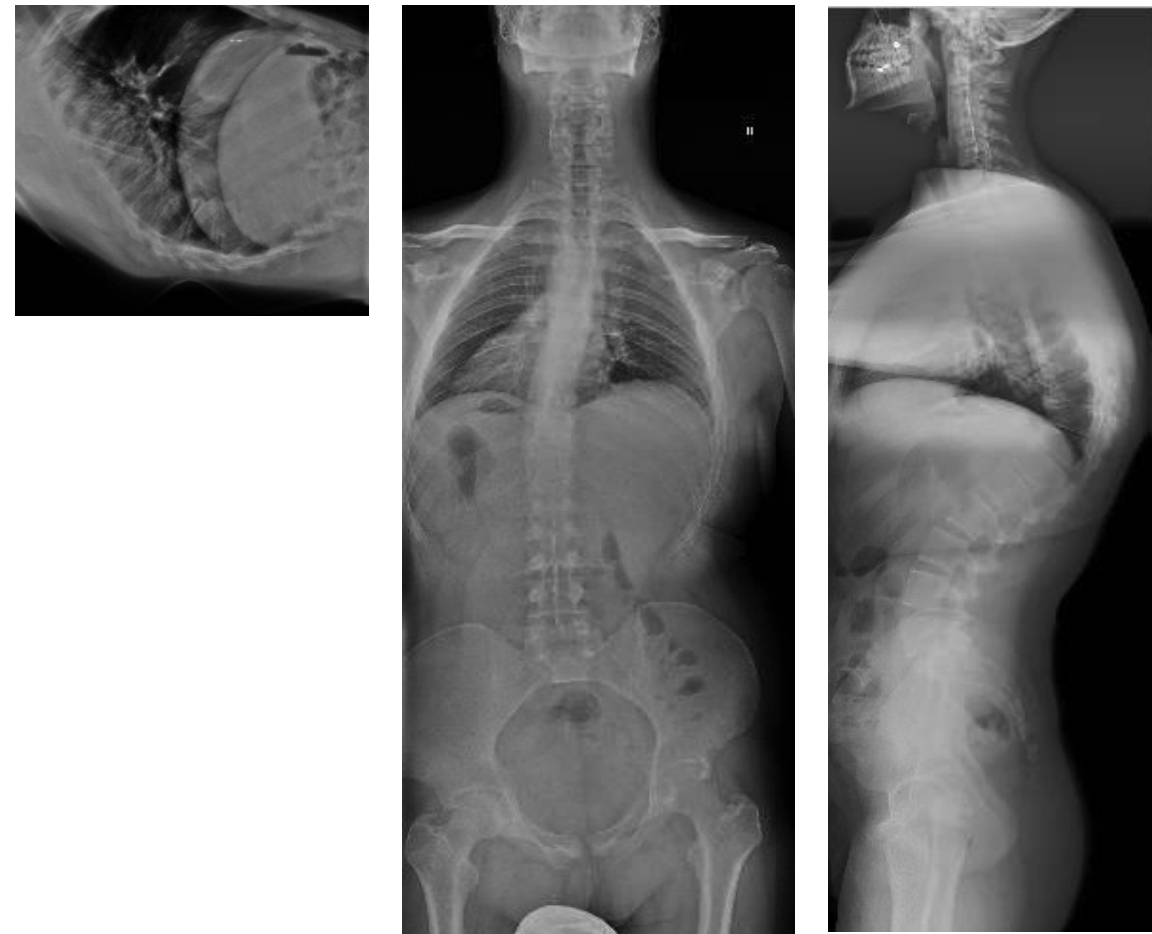
Surgical therapy

Cantilever maneuver



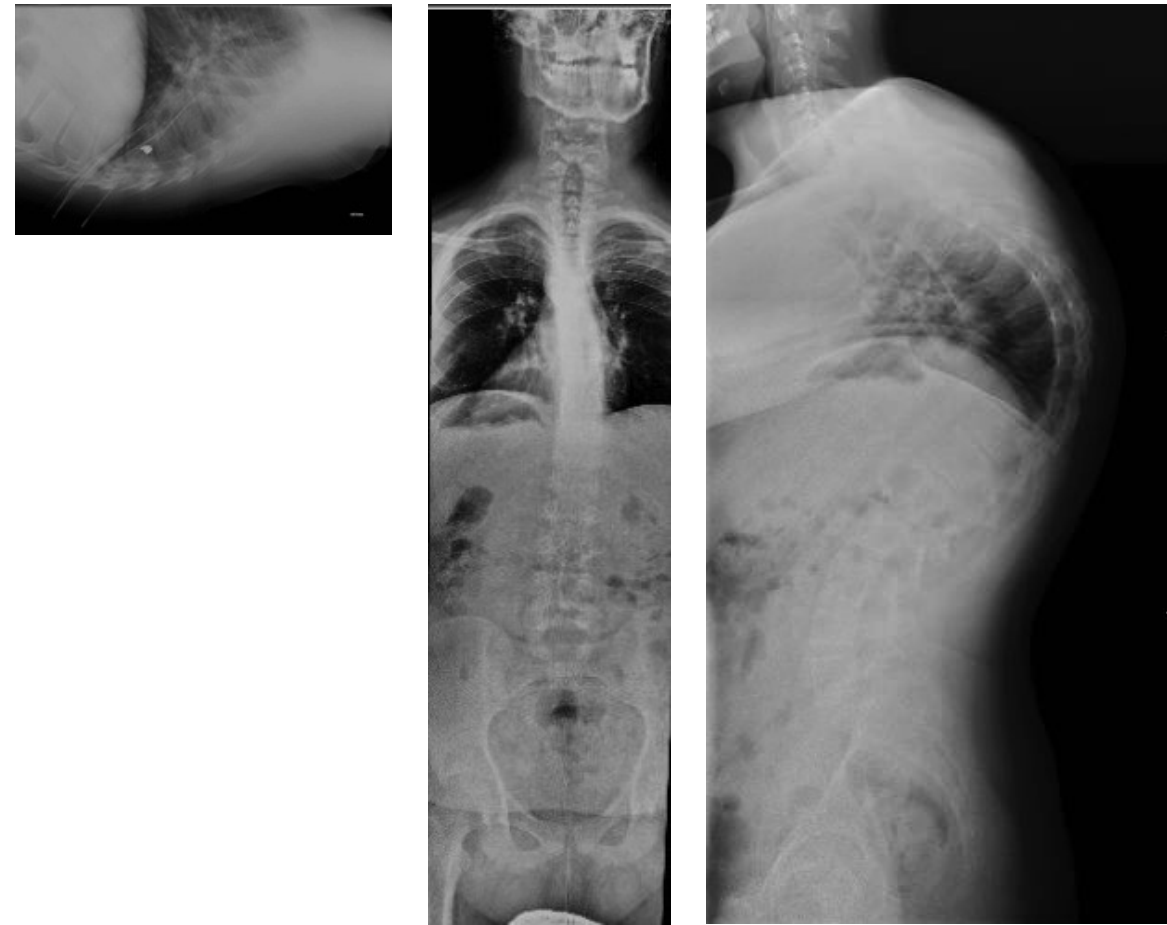
Surgical therapy

Xrays Follow ups (16y + 2m)



Surgical therapy

XR FU (17y + 3m)



Faulty posture

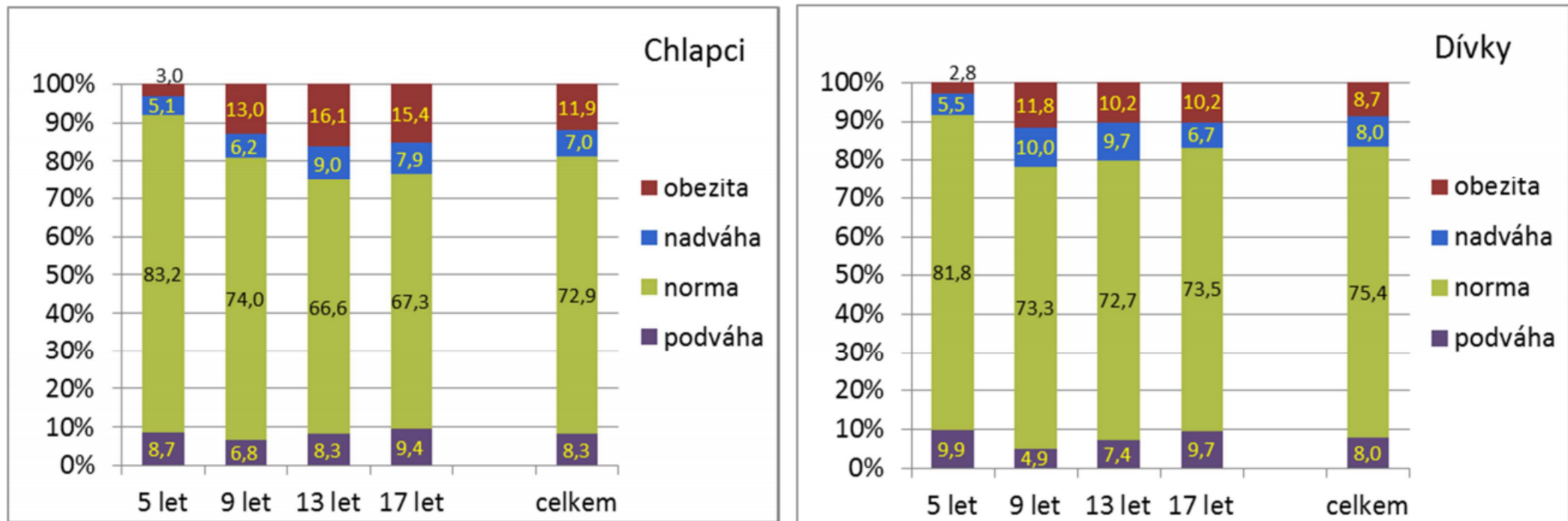
Most common

- It arises with muscle imbalance, lack of exercise and „sitting“ lifestyle.
- Poor musculature of the back and abdominal.
- Increased lumbar lordosis and thoracic kyphosis
- Treatment:
 - "Good lifestyle"
 - Regular exercises of back and abdominal muscles
 - Endurance
 - Physiotherapist

Faulty posture

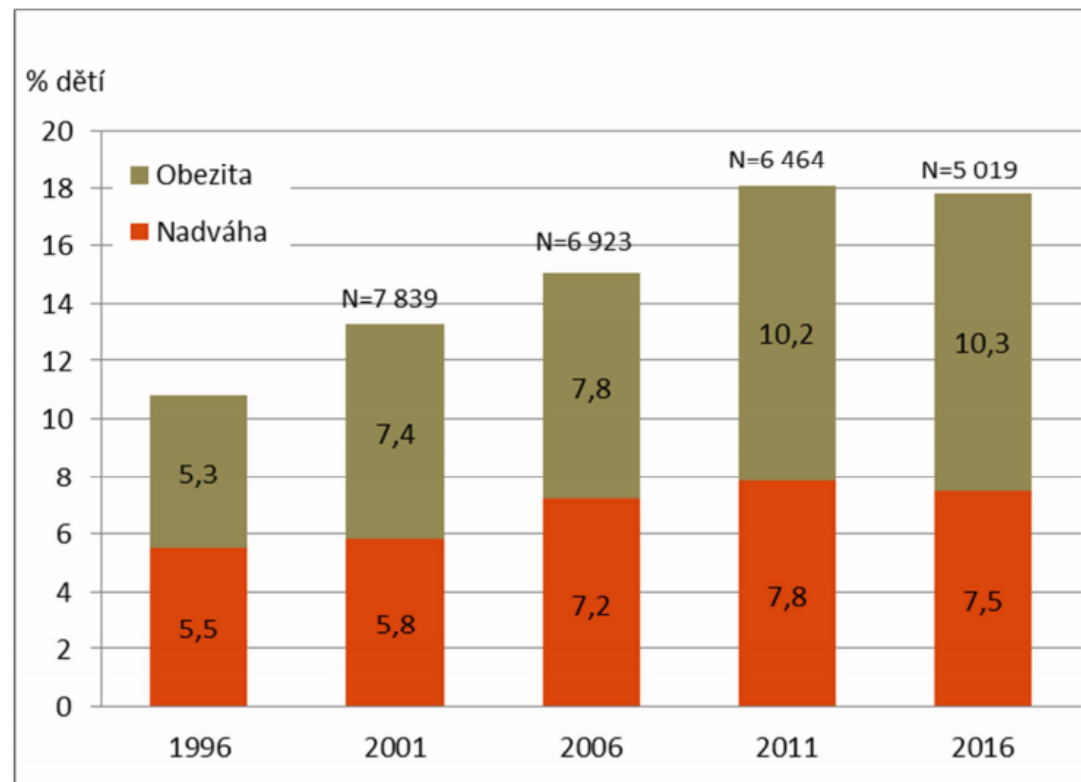
BMI a „bad posture“?

Graf č. 14 a 15. Hodnoty BMI u chlapců a dívek podle věku



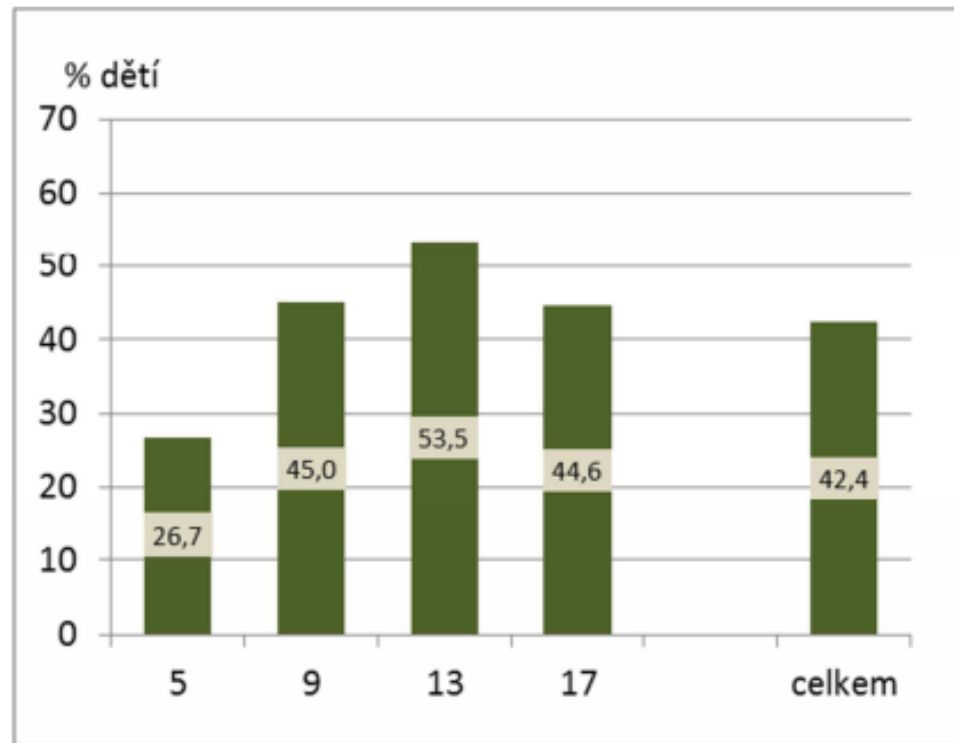
Faulty posture

Graf č. 16. Vývoj prevalence nadváhy a obezity u dětí (věkové skupiny 5, 9, 13 a 17 let) mezi lety 1996 až 2016

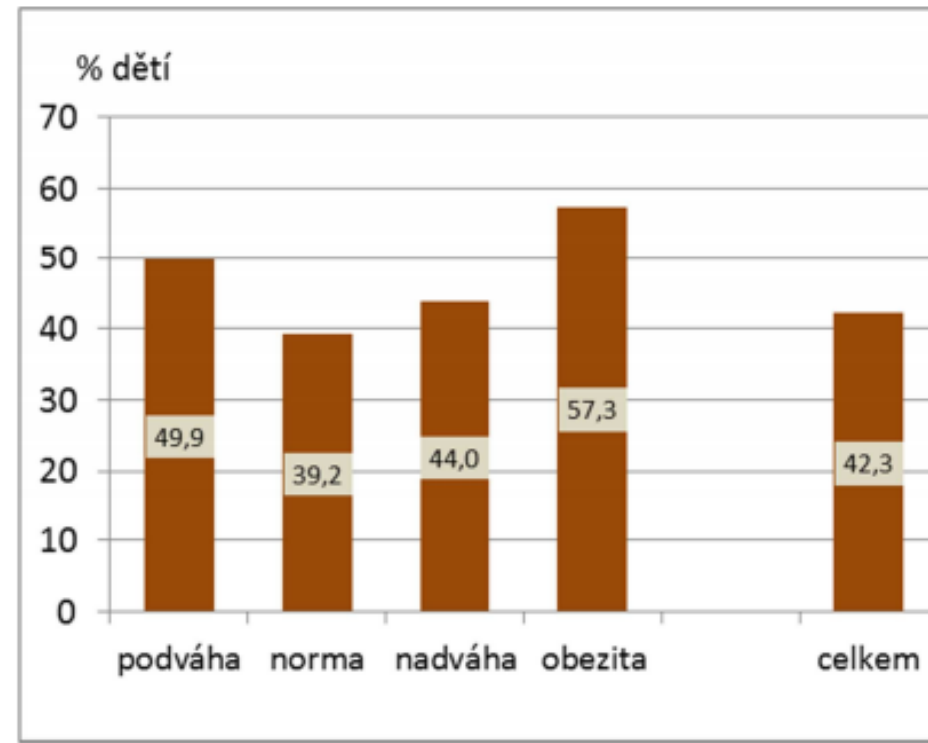


Faulty posture

Graf č 17. Prevalence VDT dle věku



Graf č. 18. Prevalence VDT dle BMI



Nejčastější zjištěnou vadou v držení těla byl předsun hlavy (25,5% dětí), kulatá záda / zvýšená hrudní kyfóza (14 %) a skoliotické držení (13 %). Předsun hlavy a kulatá záda byly častější u chlapců, ve výskytu skoliotického držení se chlapci a dívky nelišili. Všechny tyto tři vady byly nejčastější u třináctiletých dětí.

Nejzávažnější z posuzovaných vad je skolióza. Jedná se o již fixovanou poruchu zakřivení páteře, kterou není možné zvýšeným svalovým napětím vyrovnat a která ovlivňuje celou funkci páteře a ve svých důsledcích může vést k snížení funkce plic. Skoliózu mělo celkem 79 dětí (1,5 % souboru), nejčastěji byla diagnostikována u 17letých (45 dětí, 4 % všech 17letých).

Součástí rodičovského dotazníku byly otázky zjišťující, jestli děti trpí bolestmi hlavy a páteře.

Bolestmi hlavy trpělo 21,2 % dětí, významně častěji dívky (23,1 % dívek, 19,4 % chlapců; $p=0,001$). Podíl dětí s bolestí hlavy narůstal s věkem (graf č. 19), nejčastěji ji trpěli sedmnáctiletí (34,8 %; více jak pětina z nich pociťovala bolest hlavy nejméně jedenkrát za týden). Častěji bolestmi hlavy trpěli děti s vadným držením těla (24,7 %) v porovnání s držením fyziologickým (18,0 %). Bolesti krční i bederní páteře uváděli rodiče shodně u 7 %

Evaluation morbus scheuermann

- adolescent damage to the spine with lifelong consequences
- requires 100% cooperation between patients and families
- Conservative therapy: in combination treatment with orthosis and rehabilitation
- Surgical therapy: Dpt of Orthopaedic Surgery UniHospital Brno

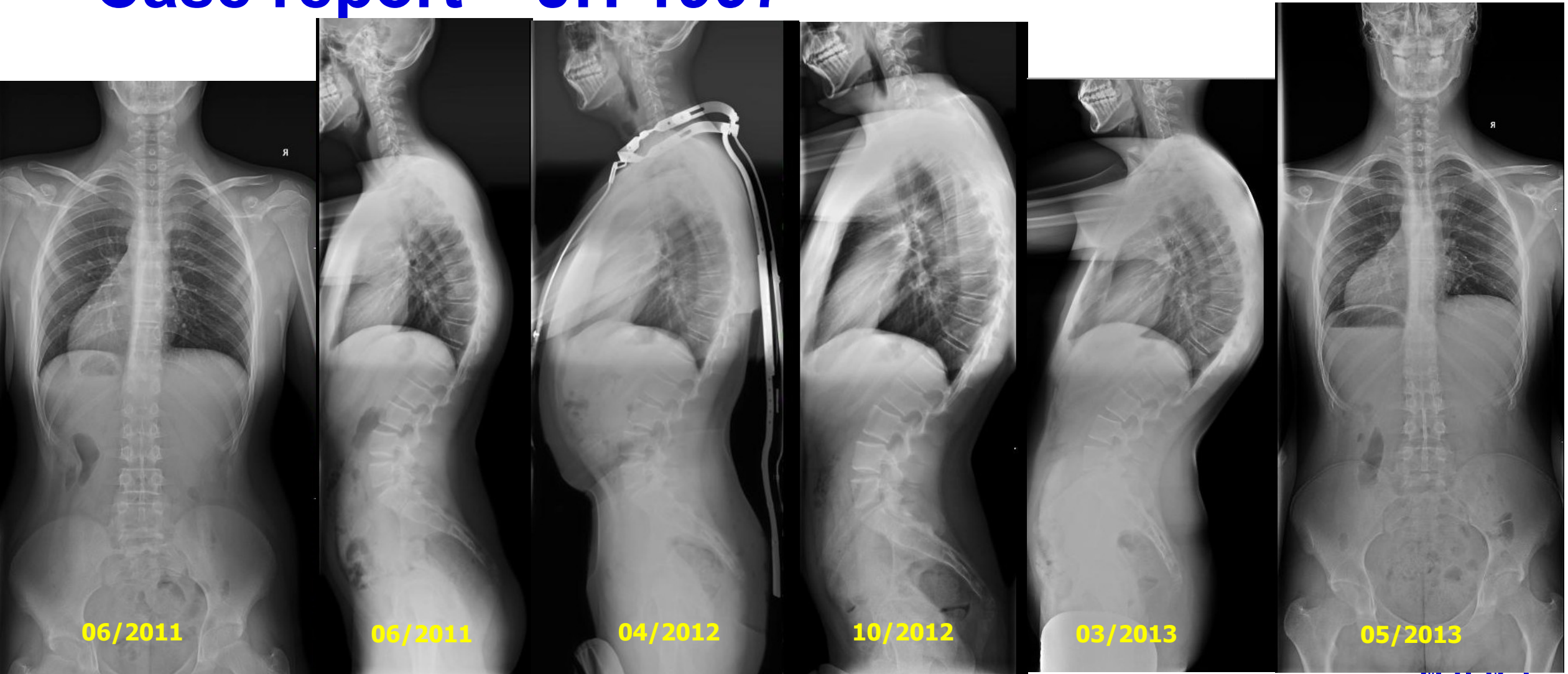
Evaluation morbus scheuermann

- Exercise: affecting up to 5%
- TLSO braces: up to 30% influence
- Operation: today over 70%
-

Case report – JH 1997



Case report – JH 1997



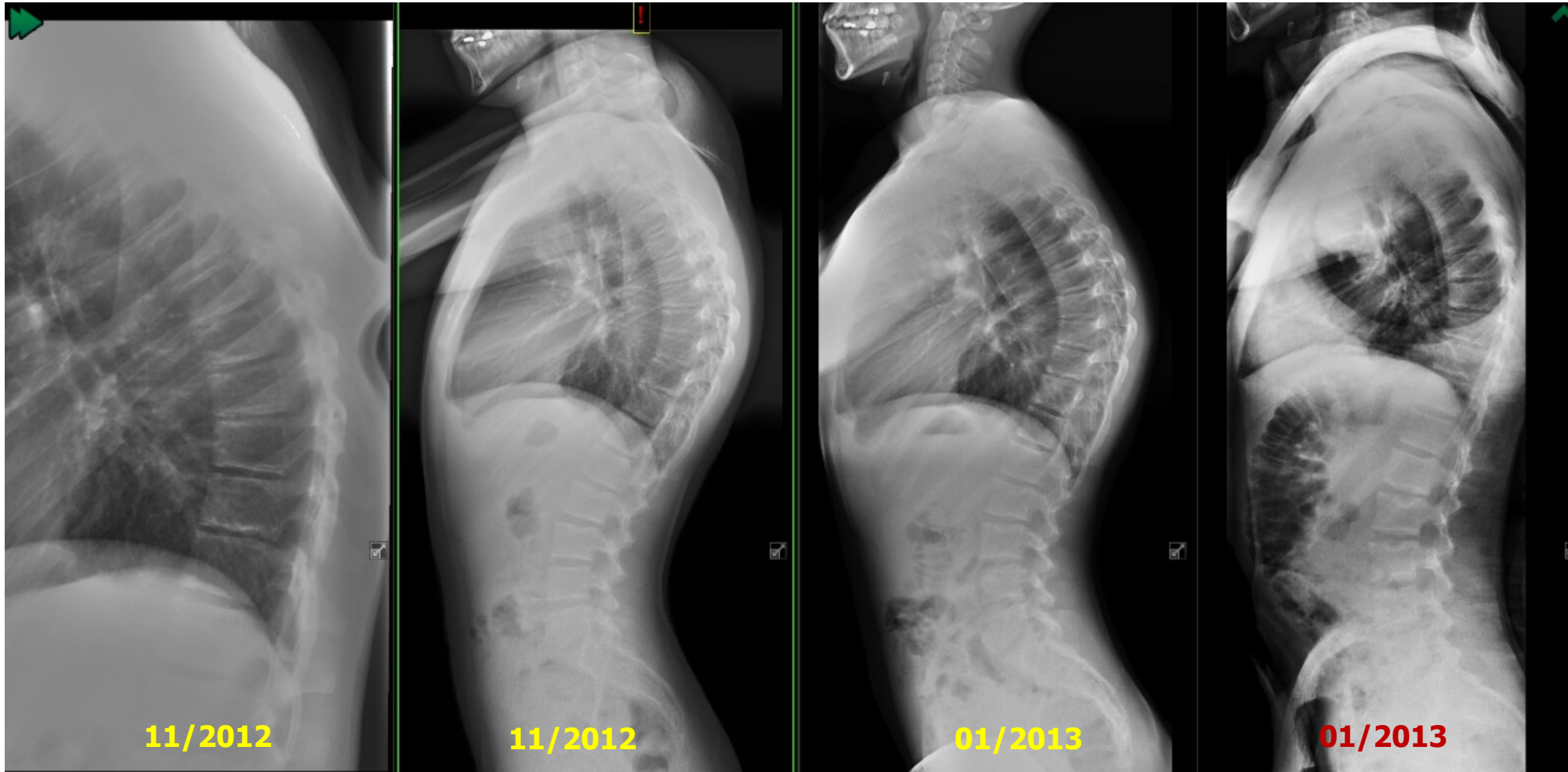
Case report – JH 1997



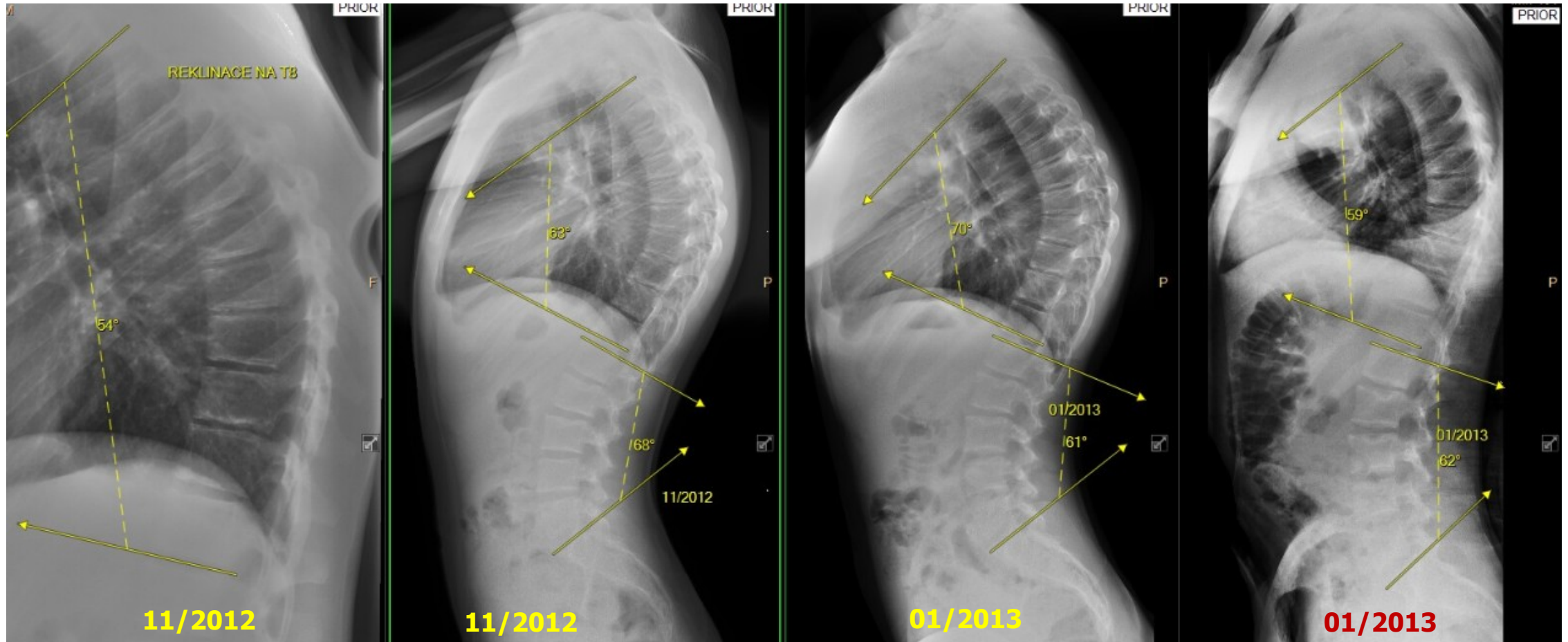
Case report – AF 1999



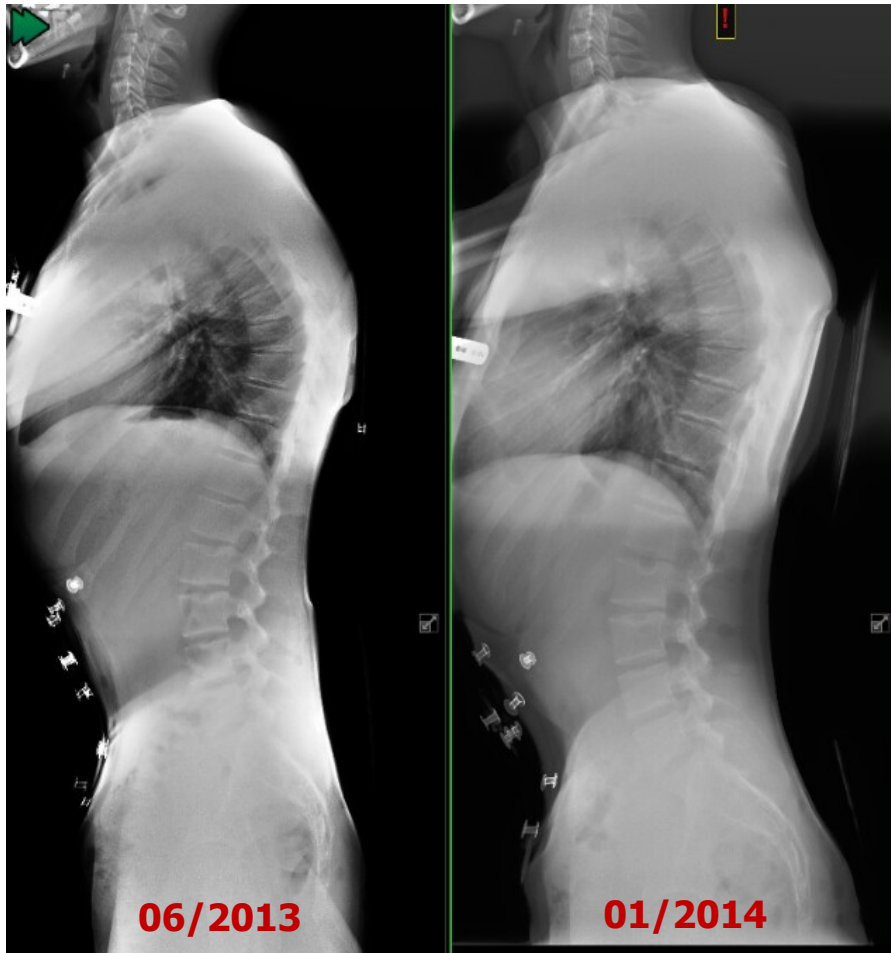
Case report– AF 1999



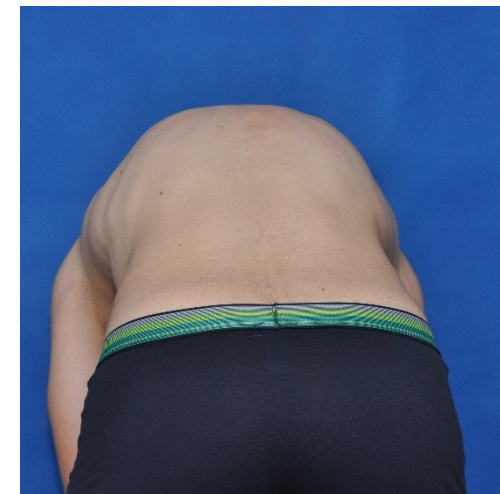
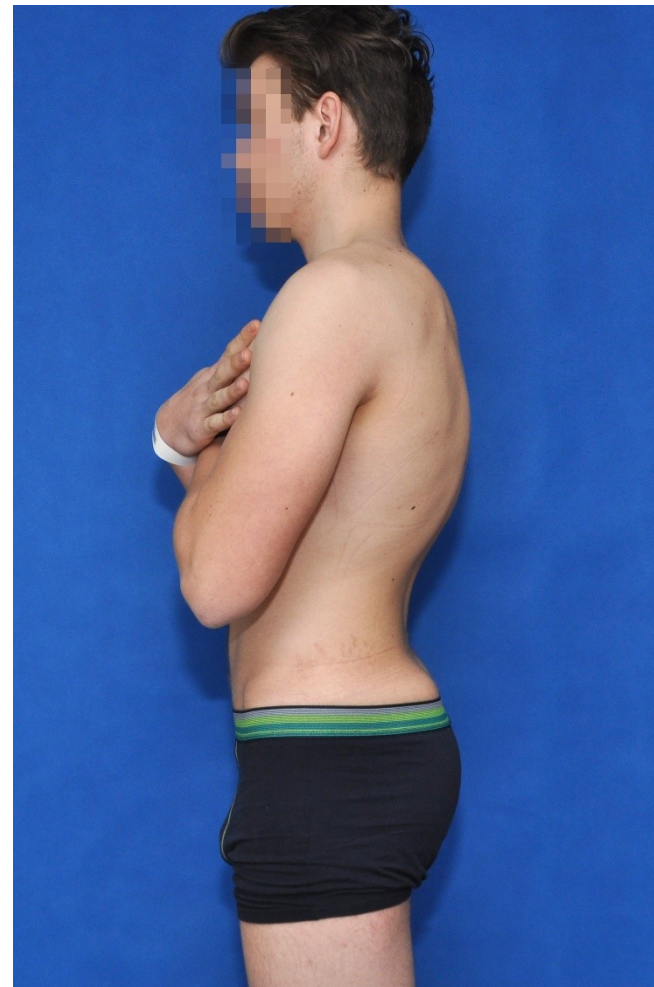
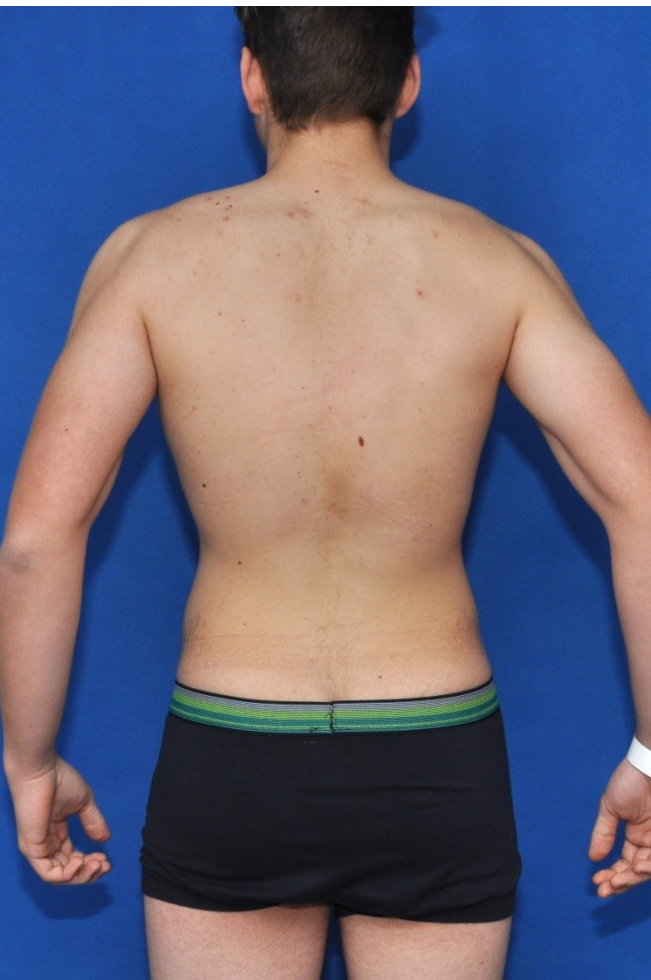
Case report – AF 1999



CR – AF 1999



CR – RS 1999



CR – RS 1999



CR – RS 1999



CR – RS 1999



Epithetics

doctrine on cosmetic cover of the body part

Replacement of lost, undeveloped or atrophied body parts



Epithetics

3D

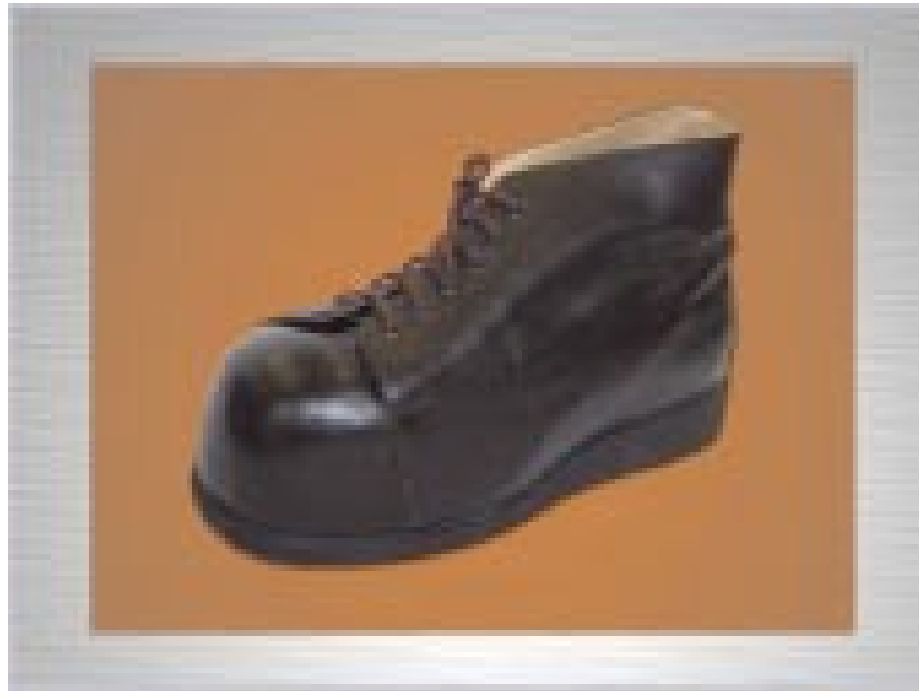
- In the abode of paired organs, parts (ears, fingers, amputation of the foot)
- Skenner: sensing – CAD - positives
- Maxillacafacial epithesis (Bibb et al.)
- Design Covers - SLS (Selective Laser Sintering)
-



Calceotics

orthopedic shoe doctrine

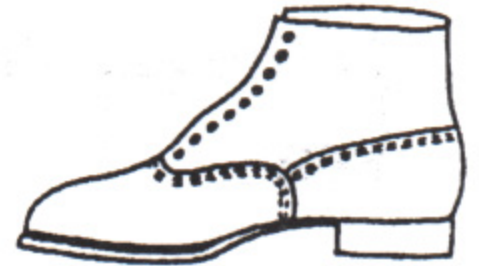
- Specially adapted shoes



Calceotics

orthopedic shoe doctrine

- Features of orthopedic shoes:
- 1. Relief
- 2. Correction of defective position
- 3. Immobilization
-



Calceotics

orthopedic shoe doctrine

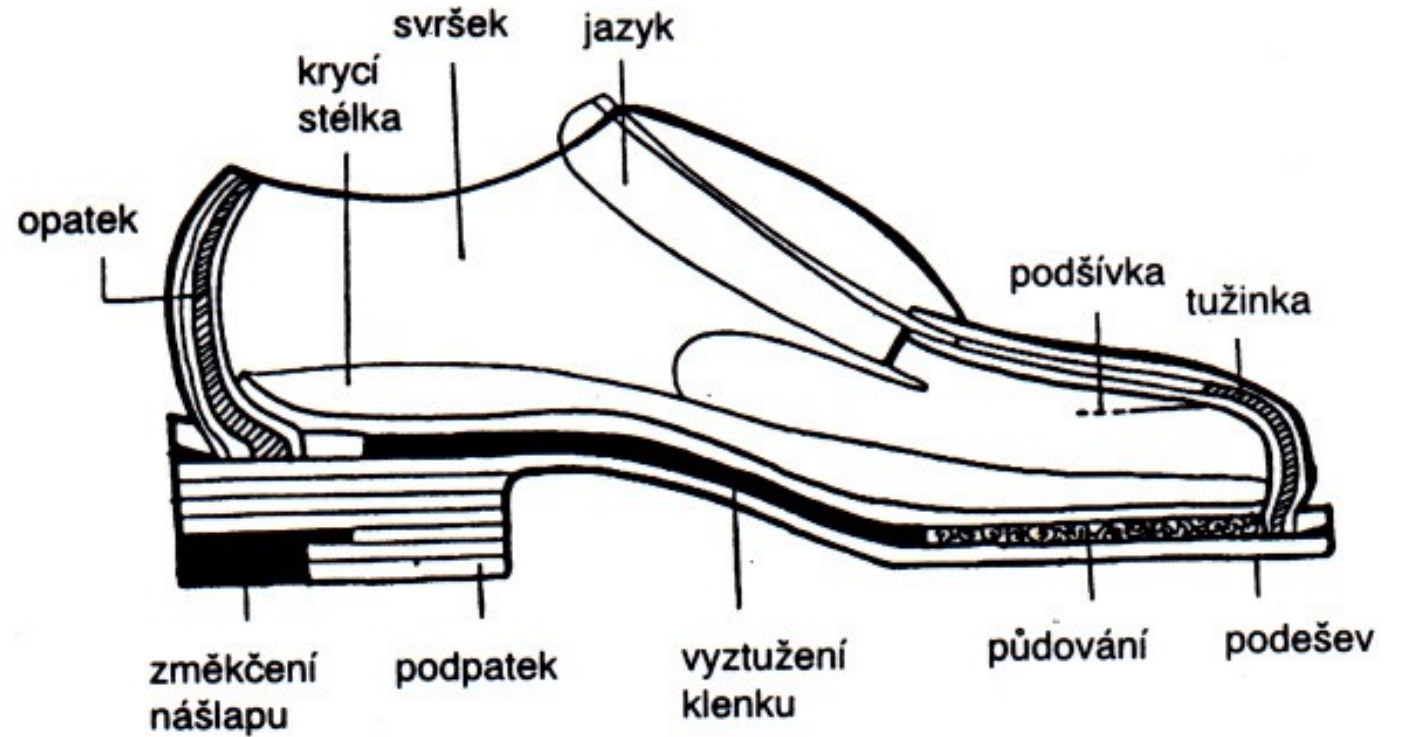
- Types of orthopedic footwear:
- Medical shoes
- Customized ready-made shoes
- Orthopedic shoes
- Diabetic shoes
-



Calceotics

orthopedic shoe doctrine

Part:

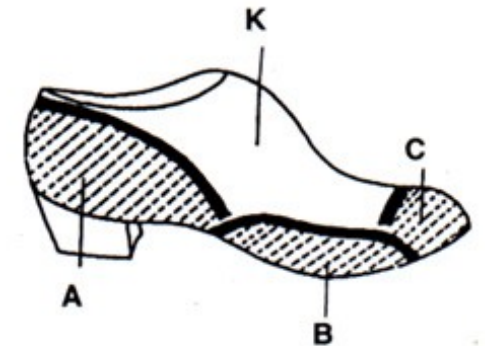
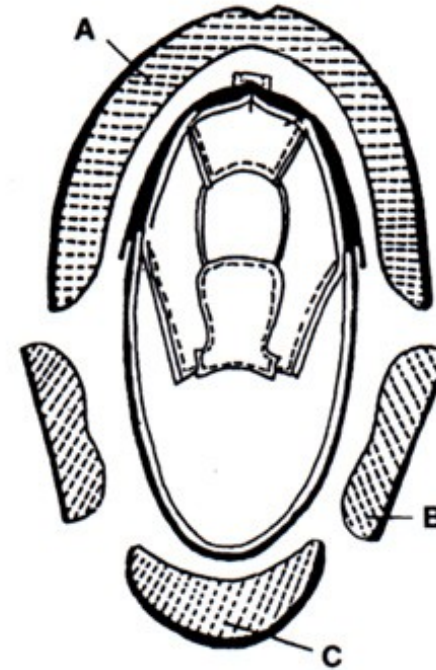


Obr. 10. Průřez botou.

Calceotics

doctrine on orthopedic shoes

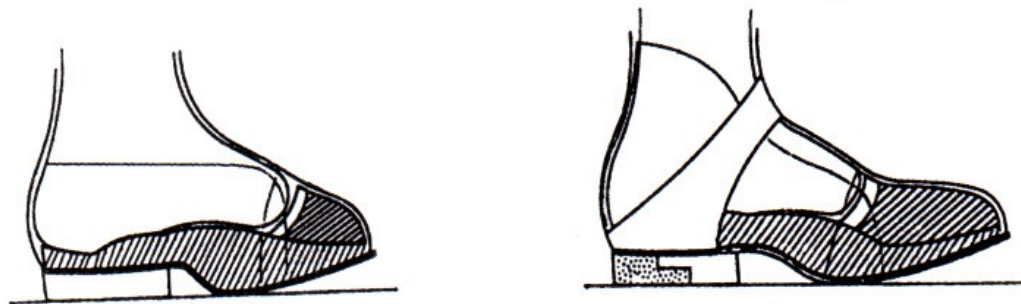
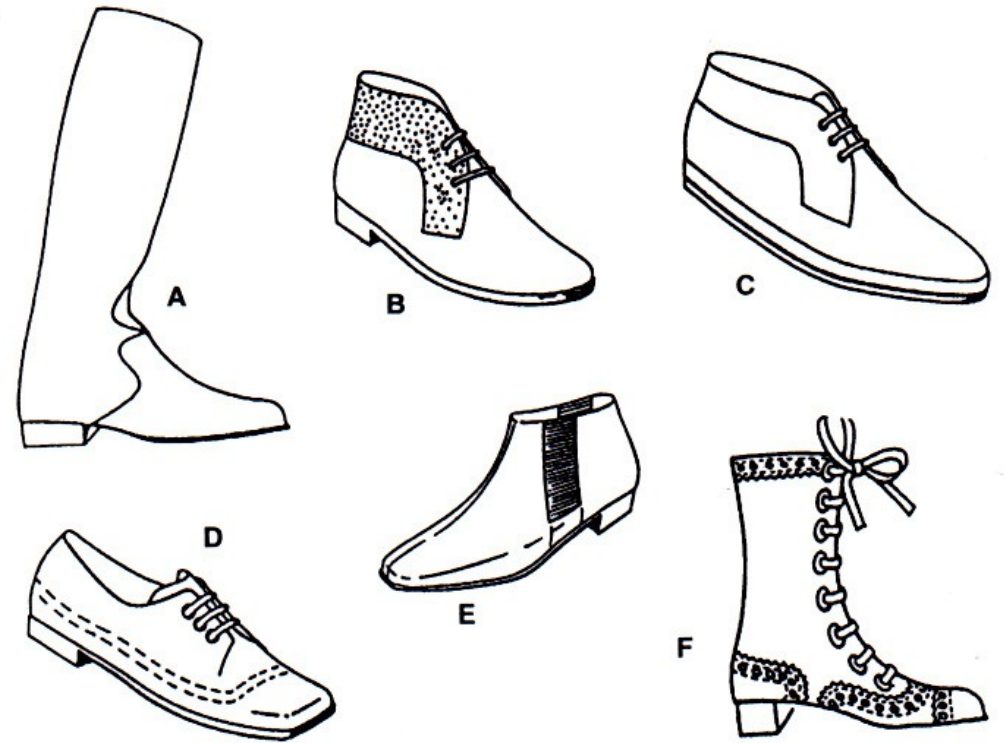
- To make a copy:
- 1. Sew the upper according to the hoof
- 2. Drawing of the tensioning insole
- 3. Tensioning the upper through the insole
- 4. Sticking the upper to the insole
- 5. Making a frame circling the entire insole
- 6. Knob workmanship – reinforcement
- 7. Soiling
- 8. Sticking soles and heel: A-measures, B-sides, C-tuna, K-hoof



Calceotics

Shoe shapes

- A- high boots
- B-shoe
- C- ankle shoe
- D-half-shoe
- E- „perka“
- F- boots
-



Obz. 59. Obraz prvá ambutace v oblasti metatarsů (podle Regenspurgera).

Calceotics

Principles of children's shoes

- 1. The correct size. Front of the tip of at least 1 cm of free space
- 2. Shoes with wider forefoot
- 3. Flexible in the centre of the foot
- 4. A solid abbot that holds the heel well
- 5, Barefoot....
-



Calceotics

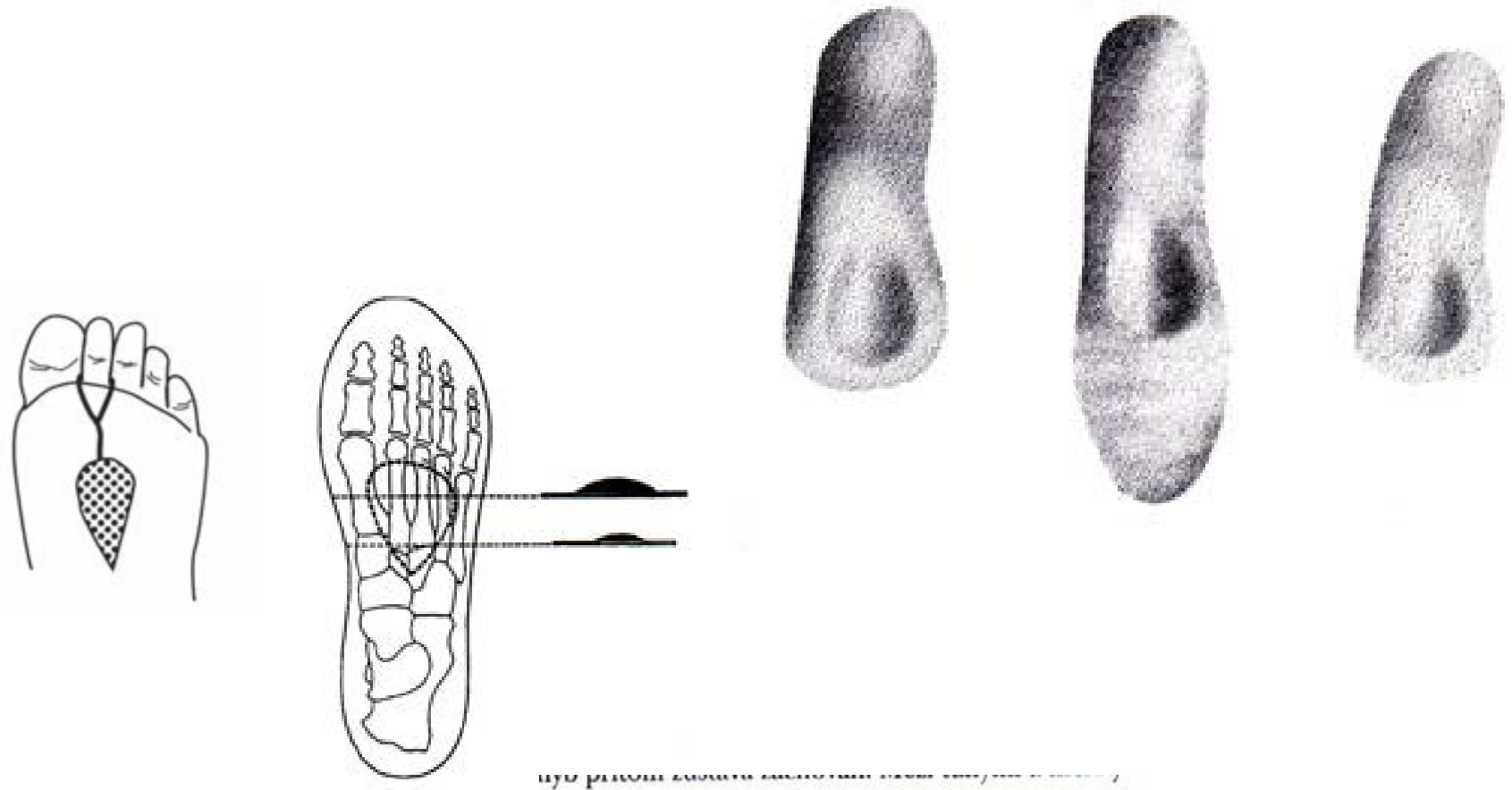
vložky

- 1. Insoles
- 2. Three-quarter
- 3. Heel heels
- 4. Hearts

- 1. Stiff
- 2. Soft

- 1. Active
- 2. Passive

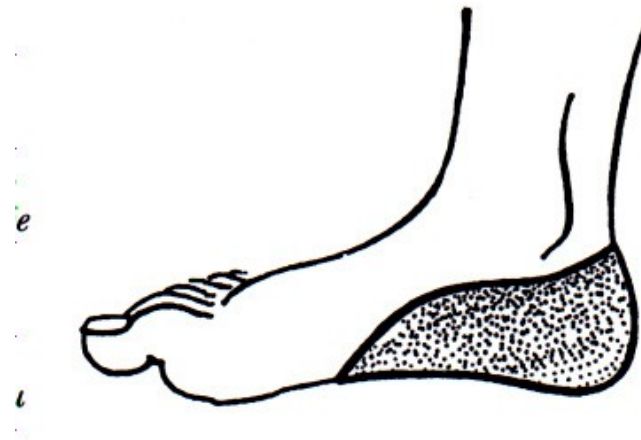
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Calceotics

Inserts

- Shell inserts
- Helfet heel insert
-



Calceotics

3D



Calceotics

Concealers, heel-heels

- heels
- concealers
-



Adjuvatics - aids

teaching on operator aids

- Disabled persons and daily tasks
- locomotive, hygiene and self-sufficiency, safety
- practical and graphomotor activities
- Sports
-

Adjuvatics

teaching of operator aids

- Immobile patients, wheelchair users, seniors
- Long-term bed treatment
- After demanding orthopedic – surgical procedures
-

Adjuvatics

teaching of operator aids

- positioning and fixing
- for locomotion, its training and compensation
- Hygiene
- facilitating the performance of practical activities
- for the implementation of leisure, work activities
-

Adjuvatics

positioning and fixing

- position optimisation, verticalization of persons with impaired momentum
- equipped with a controller to adjust the necessary height and slopes



Adjuvatics

positioning and fixing

Positioning wedges, tubes:

- Fixation lying on the back, side, abdomen
- Rotation of positions and 30min, prevention of dekubitus

Brace:

- Stabilization of posture, spine, chest and joints

Seats:

- Specially adapted, adjustable
- Safe seat, headrest



Adjuvatics

positioning and fixing

- Positioning, verticalizing stands:
- Fixation in the areas of the feet, calves, knees and thighs, pelvis, hips and hare
- + working stations
- Sliding plate:
- Makes it easy to move from trolley to bed or car
-



Adjuvatics

For focusing, practicing and compensating

- Medical strollers:
 - For children of early age
 - Combination with duct wedges, backrests, tables and trays
- Rehabilitation carts:
 - according to the drive - mechanical x electric
 - according to the environment - interior x exterior
 - by age - for children, young people and adults
 - according to construction - fixed x folding
 - according to the purpose - standard x special (sports, hygienic, transport).



Adjuvatics

Rehabilitation trucks – mechanical: activating, mechanical, multi-blow, for hemiparetics, amelia, dysmels



Adjuvatics

Special sports carts: basketball, rugby, tennis, bencykl



Adjuvatics

For sports: handbike, monocross, monoski



Adjuvatics

Limb movement trainers, e.g. after operations

- Motopeds:
- Motoding:
- Upper limbs
- Lower limbs:
- Knee and hip joint
- Ankle joint



Adjuvatics

Limb movement trainers, e.g. after operations

- Climbers: nana for children with cerebral palsy - diparetic form
- Walkers: walking practice:
 - Four-point immobile/mobile
 - Two-wheeled: mobile
 - Three-wheeled....
 -



Adjuvatics

Crutches: support function

- four-point, French, children's elbow crutches,
- armpit, walking sticks
- height adjustable, folding outing sticks
-



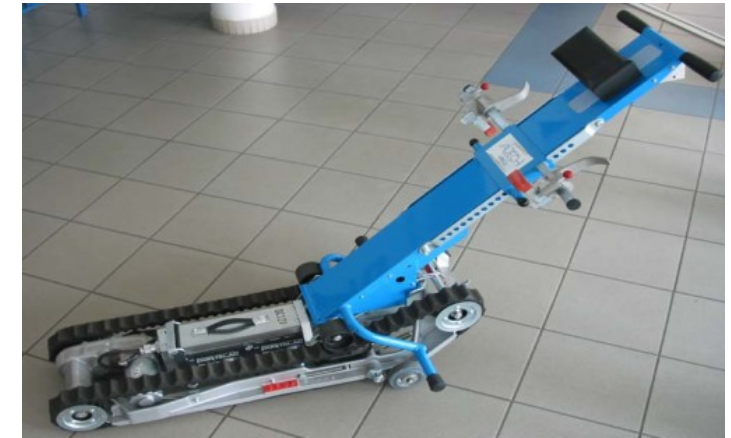
Adjuvatics

Overcoming barriers

Stair platforms: oblique, vertical

„stairclimbers“

ramps



Adjuvatics

For hygiene

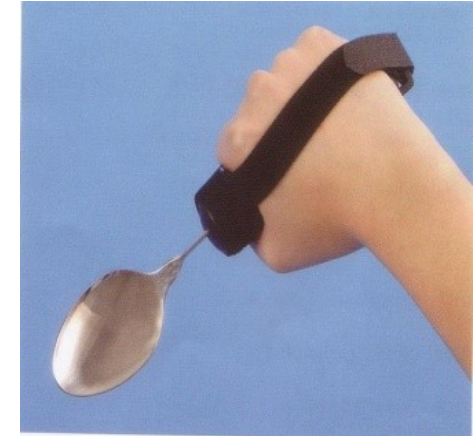
- increase the user's potential in self-service and independence from the assistance of the other person
- Jacks, bath/shower seats, toilet trolleys
- Attachments, backrests, toilet handles
-



Adjuvatics

Usnadňující výkon praktických činností

- fixing boards, plates
- Cutlery, handles
- Special knives
- Feeders
-



Adjuvatics

IT

Trackball, mouse

Keyboard



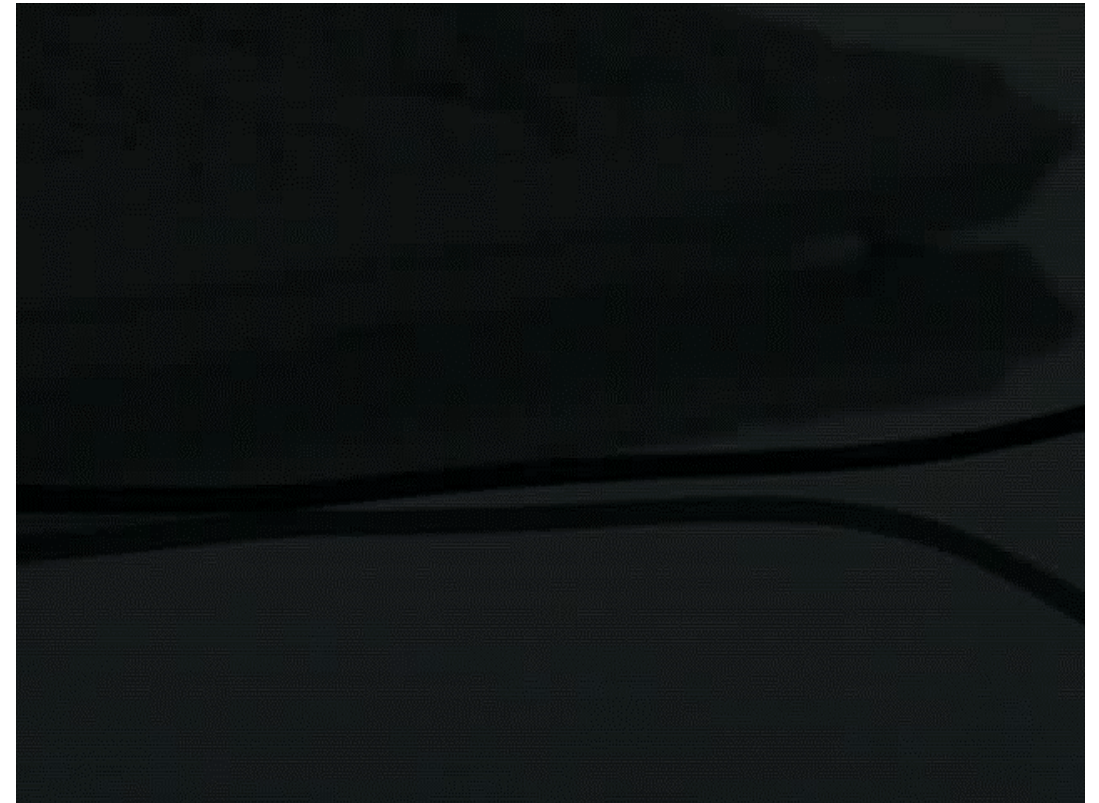
Adjuvatics

IT



Adjuvatics

Smart NAV a 14 Control



Adjuvatics

Strollers, trolleys

- Medical strollers:
 - For children of early age
 - Combination with abduction wedges, armrests, tables ap
- Rehabilitation carts:
 - according to drive - mechanical x electric
 - according to the environment - interior x exterior
 - by age - for children, young people and adults
 - according to the design - fixed x folding
 - according to purpose - standard x special (sports, hygienic, transport).

Conclusion



Conclusion





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Conclusion

21st century



Source

publikace LF MU, doc. Ivan Müller, CSc., doc. Z. Rozkydal, Internet

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- Fotografie z LAOS (soukromá databáze Jan Kocanda)

Source

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