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Prosthetics

Field, its essentials and use in practice

Department of Orthopedic Surgery – Faculty of Medicine – Masaryk University
Assistant professor Jan Kocanda

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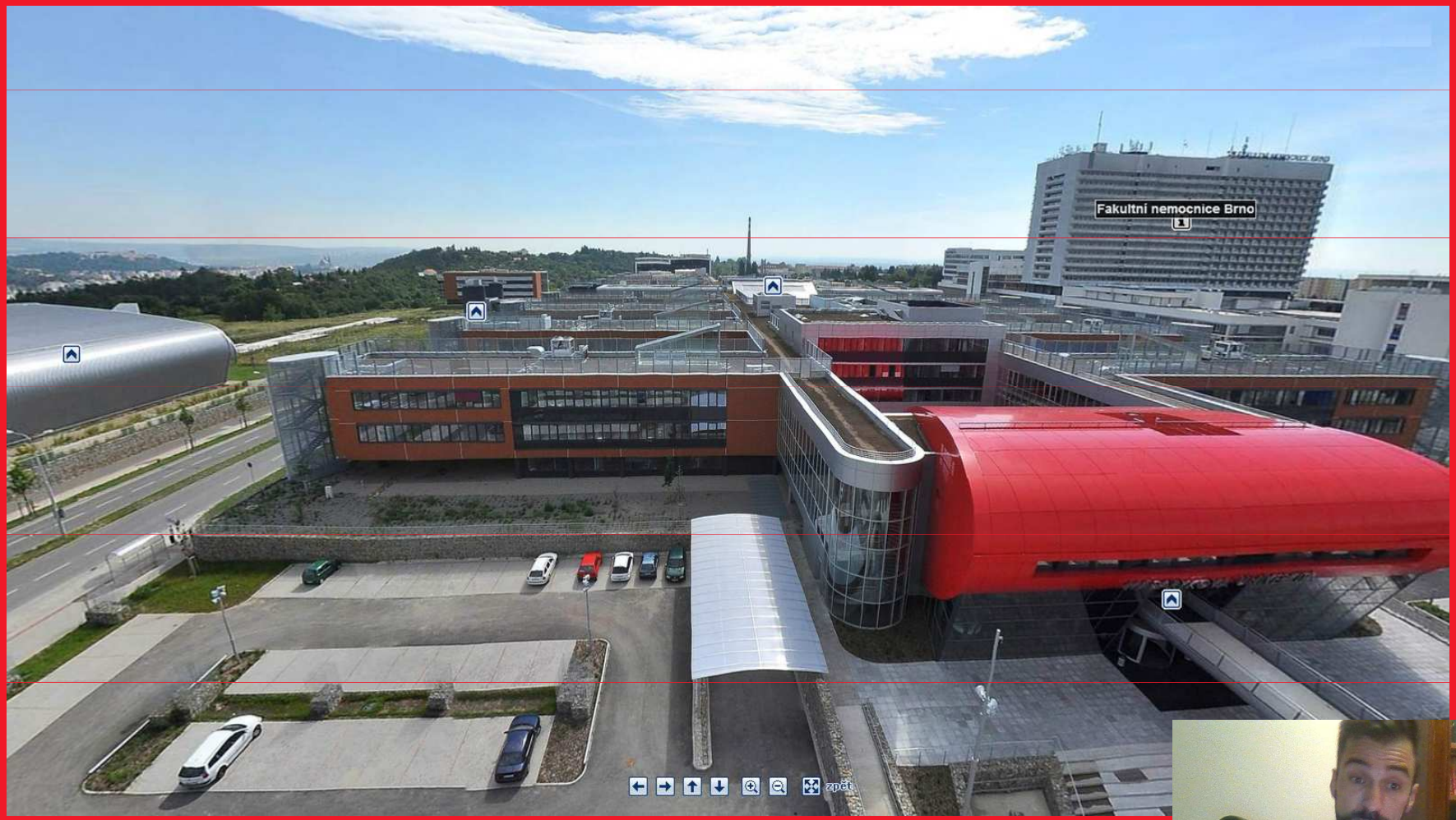

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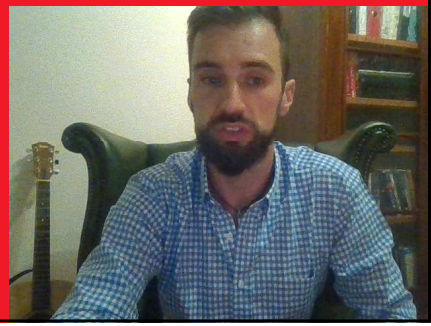


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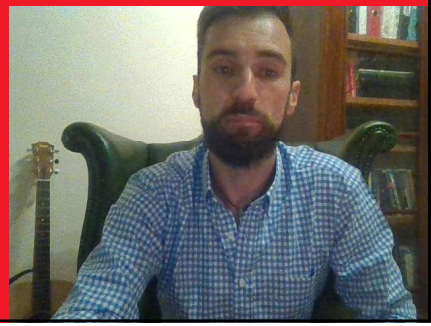
Acknowledgements to assoc prof Zdenek Rozkydal & assoc prof Ivan Muller for database



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?

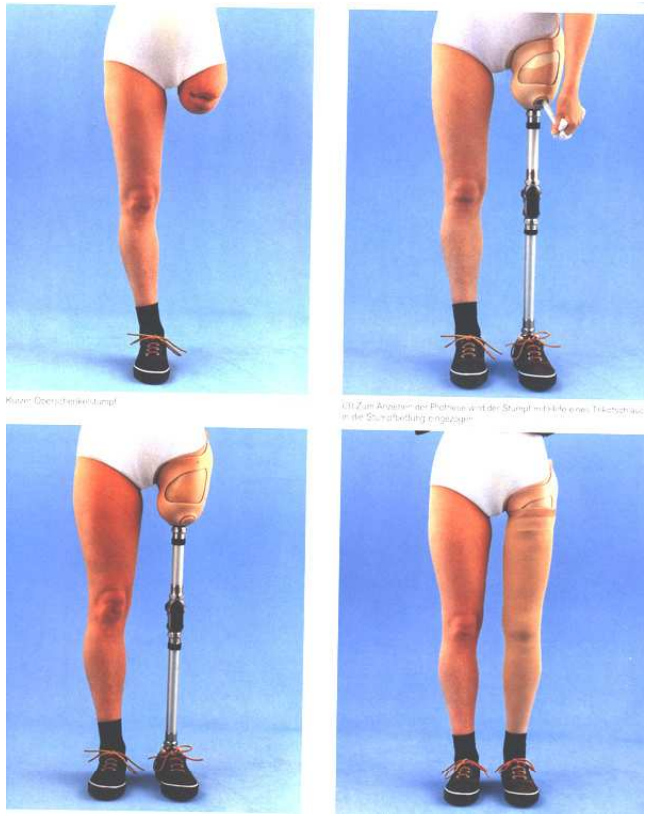
Proteometry

- 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)

Prosthetics

doctrine on the replacement of lost body parts

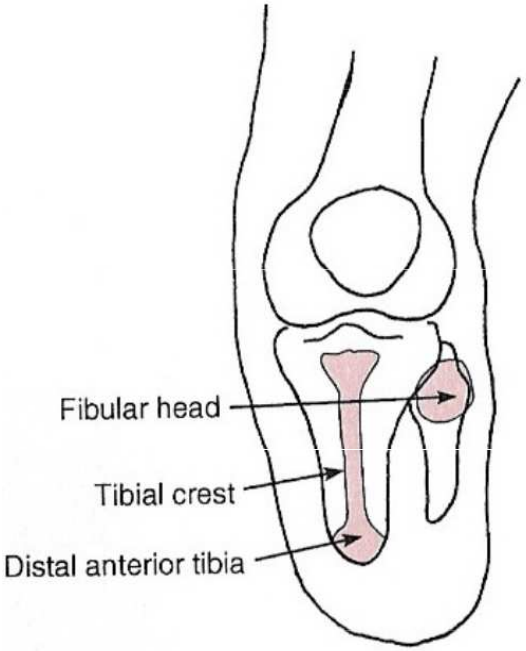
- Prothesis:
  - Replacement: body parts and functions
  - Requirements:
    - statics, dynamics, controllability
    - durability, aesthetics
  - Construction:
    - Stump bed
    - Module (thigh, leg, leg, joint)
    - Auxiliary parts: bandages, stools

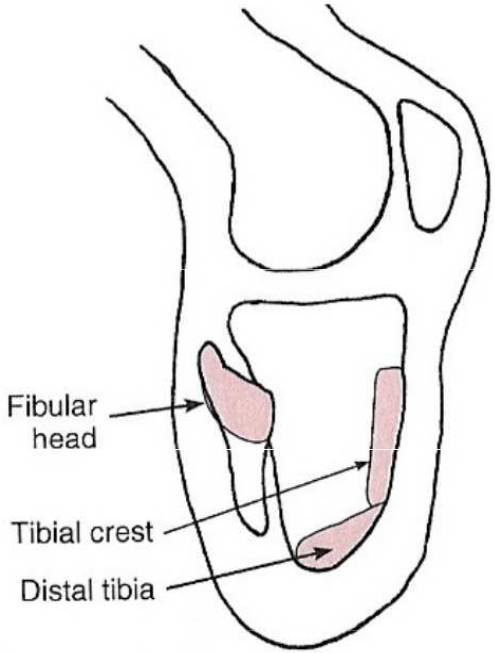


Prosthetics

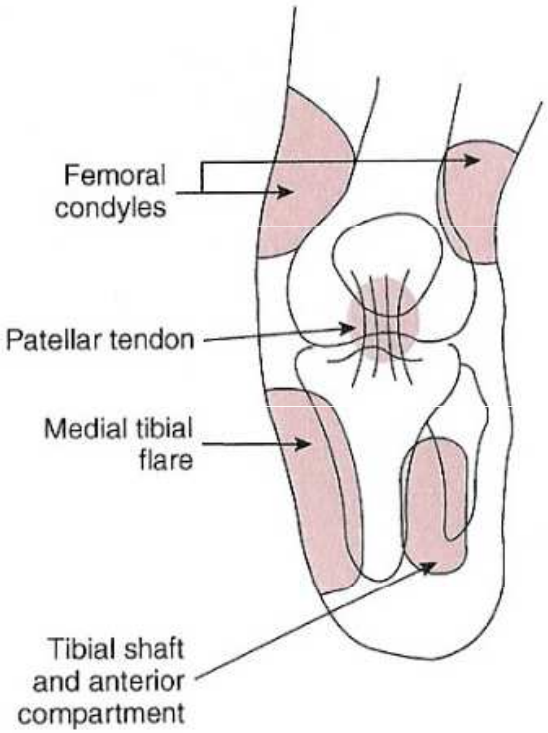
Construction – stump bed

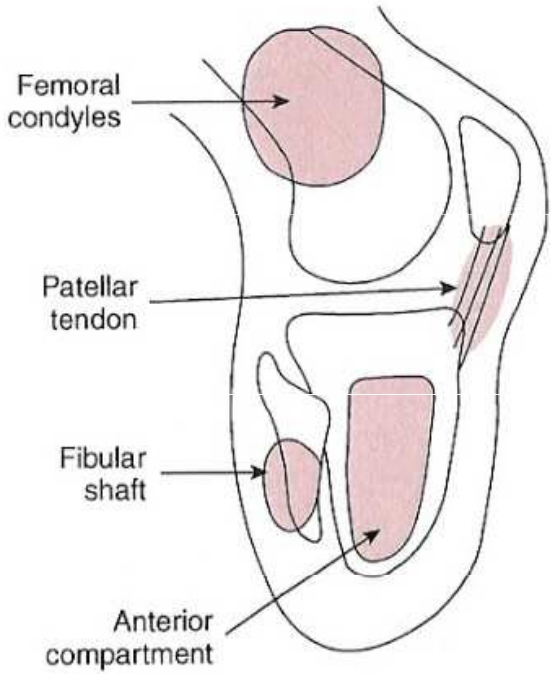
Intolerant

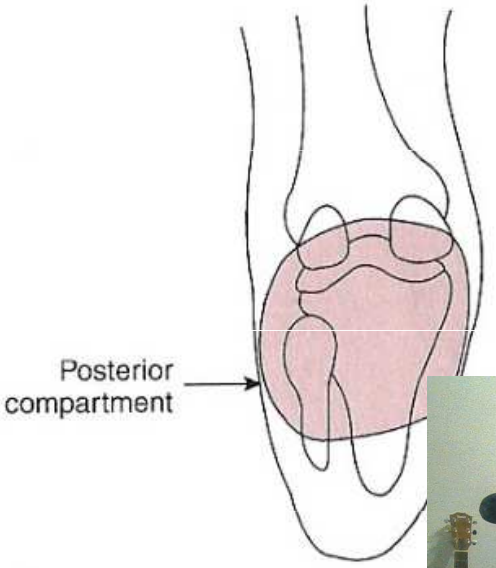




Transtibial: PTB Weightbearing

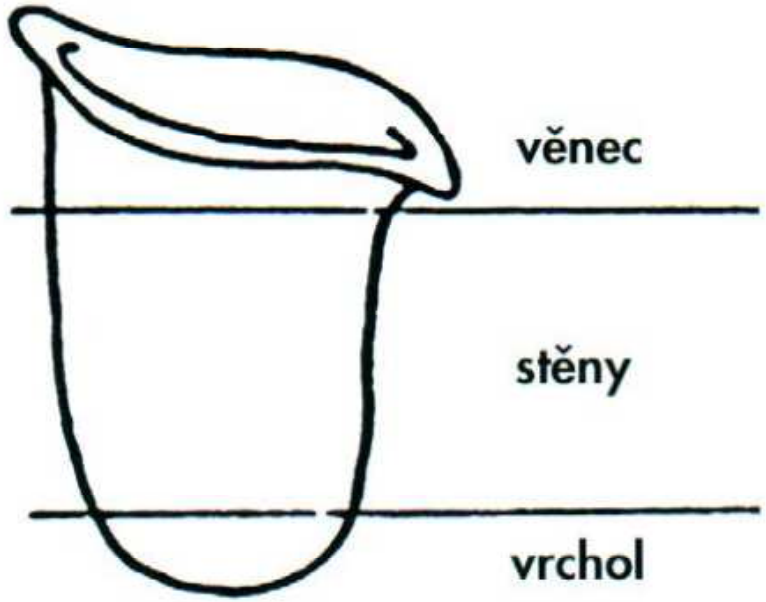


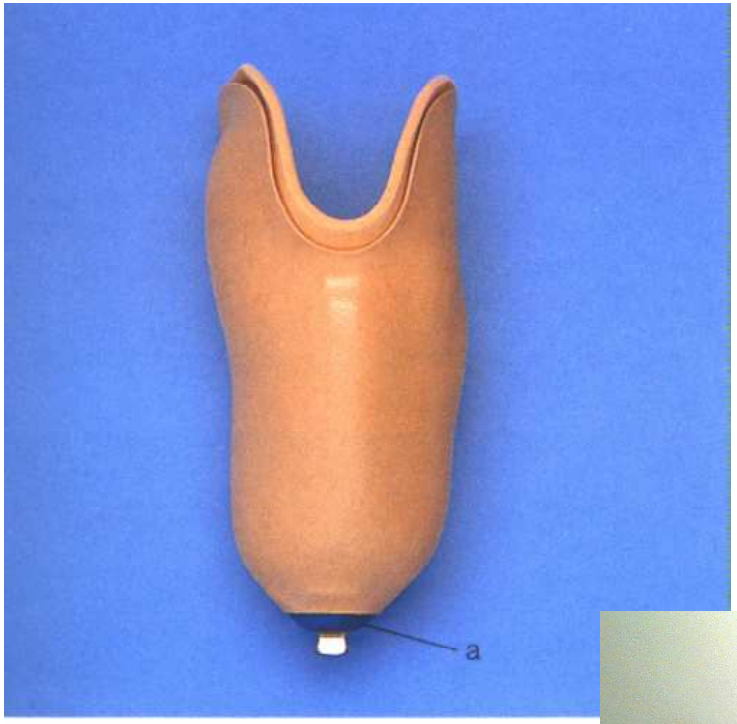




Prosthetics

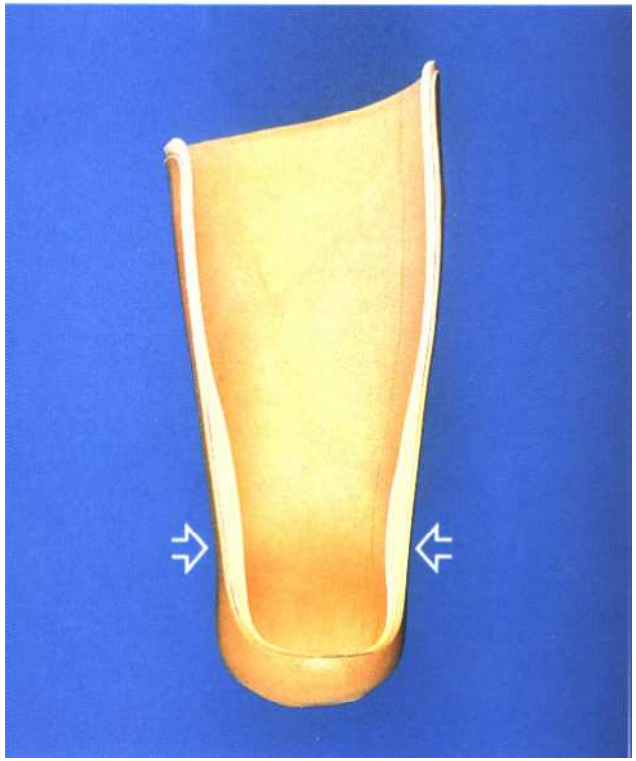
Construction – stump bed

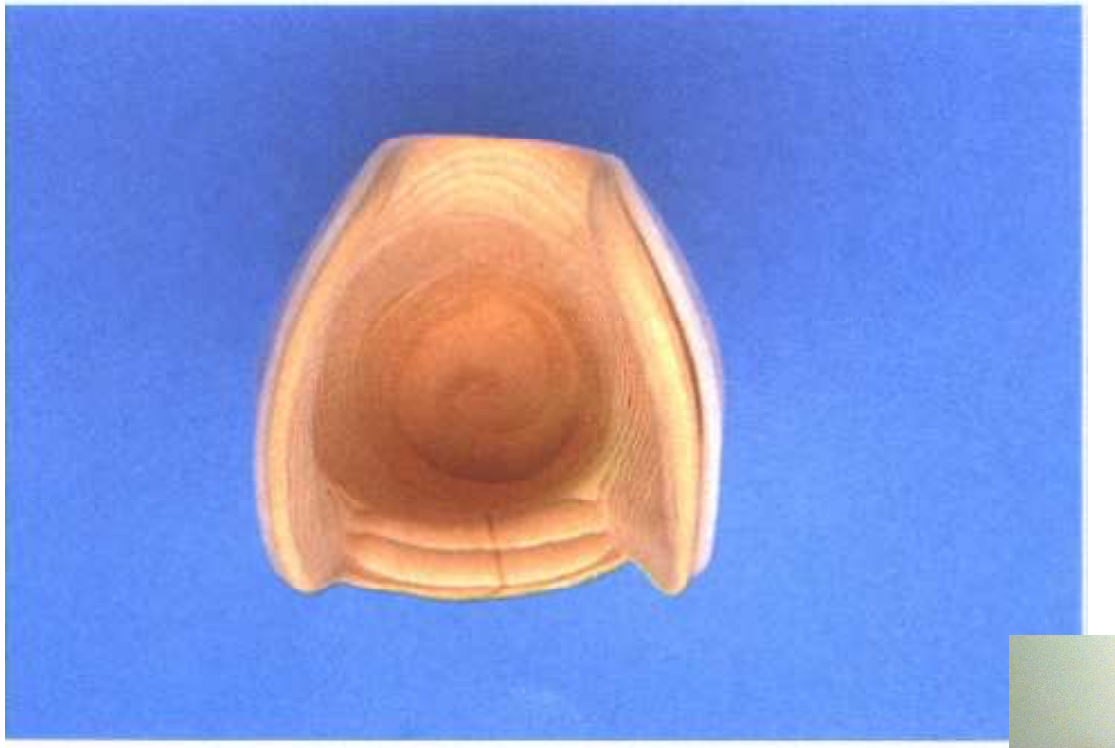




Prosthetics

Construction – stump bed





Prosthetics

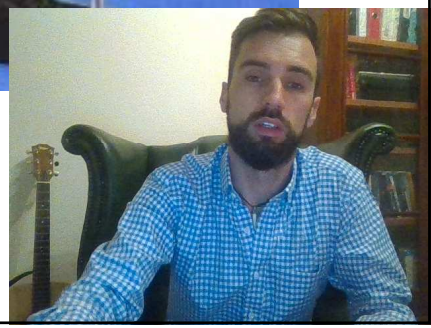
Construction – stump bed

Interface material

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

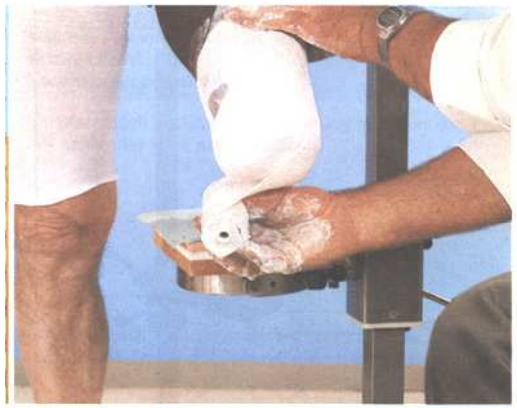
Prosthetics

Stump moulding – stump bed



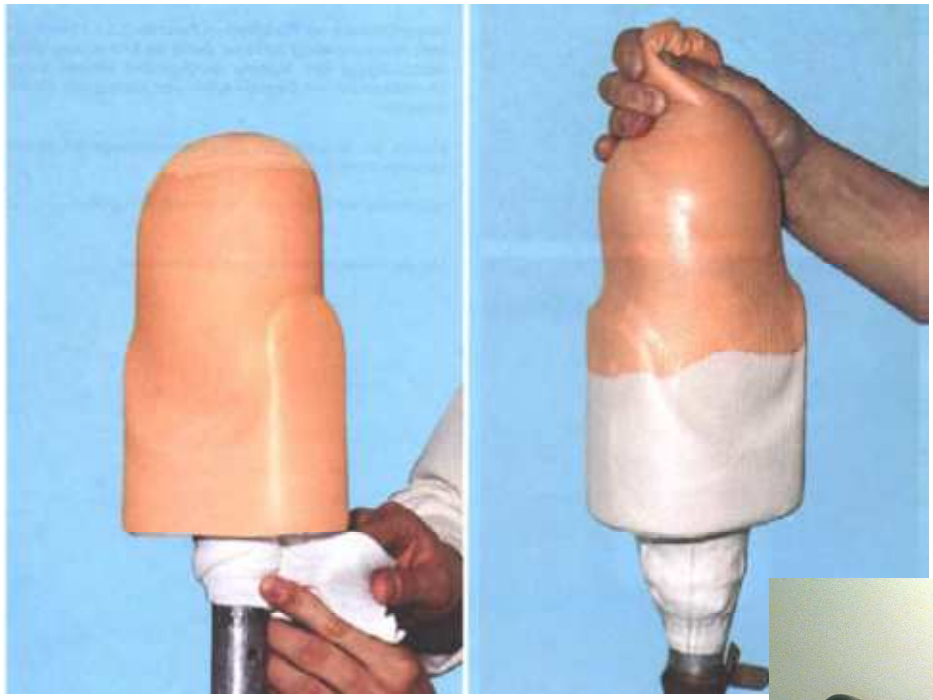
Prosthetics

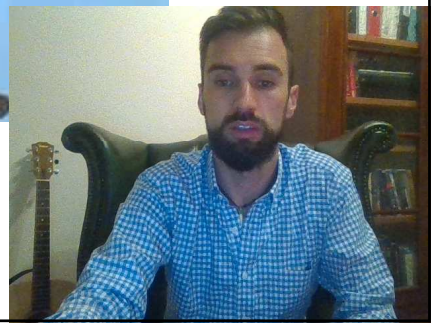
Production – stump bed – negative positives



Prosthetics

Production – stump bed – silicone/rubber, thermoplastic



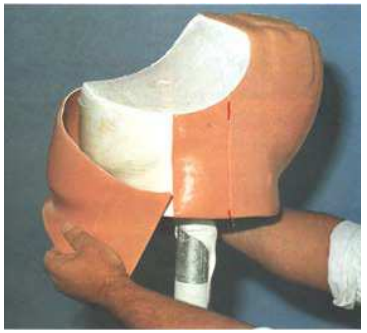


Prosthetics

Production – stump bed – exarticulation in the hip

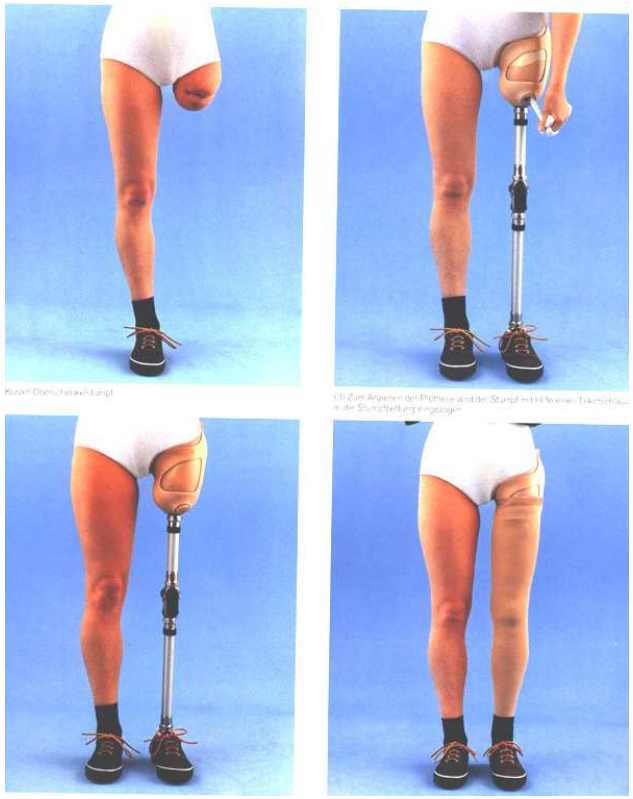
Prothetics

Production – stump bed – exartulation in the hip



Prosthetics

Production – stump bed – exarticulation in the hip



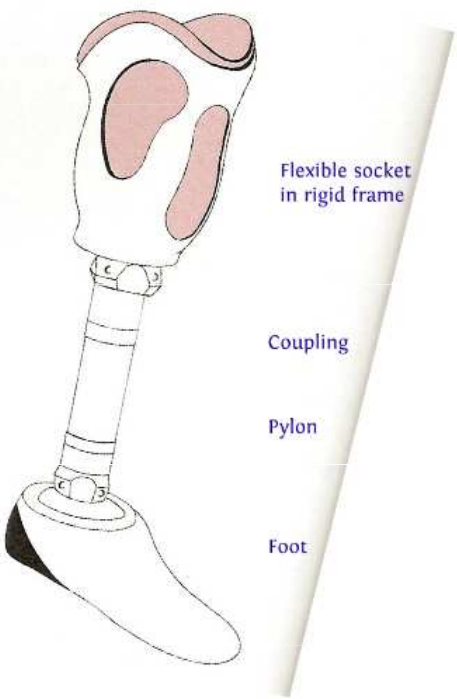
Prosthetics

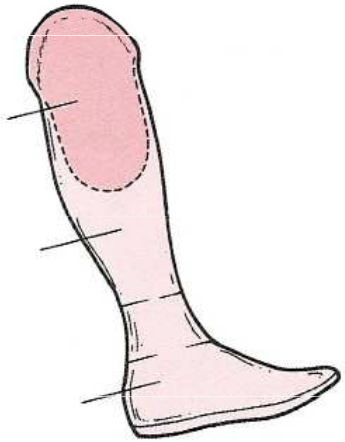
Construction – module

Prosthetics

Construction Module

Endoskeleton





Exoskeleton

Prosthetics

Rehabilitation

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

Prosthetics

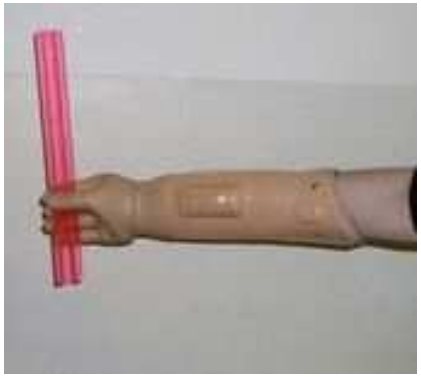
Prosthesis of the upper limb

- Cosmetic
- Cosmetic with mechanical hand
- Bioelectric prosthesis

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

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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
- Impimgement shoulder syndrome
- Frozen shoulder syndrome
- Arthrosis art. glenohumeralis
- Affective acromioclavicular joint
- Inflammation
- Tumors
- Trauma
- Pain transferred from another place
- Postoperative treatment

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

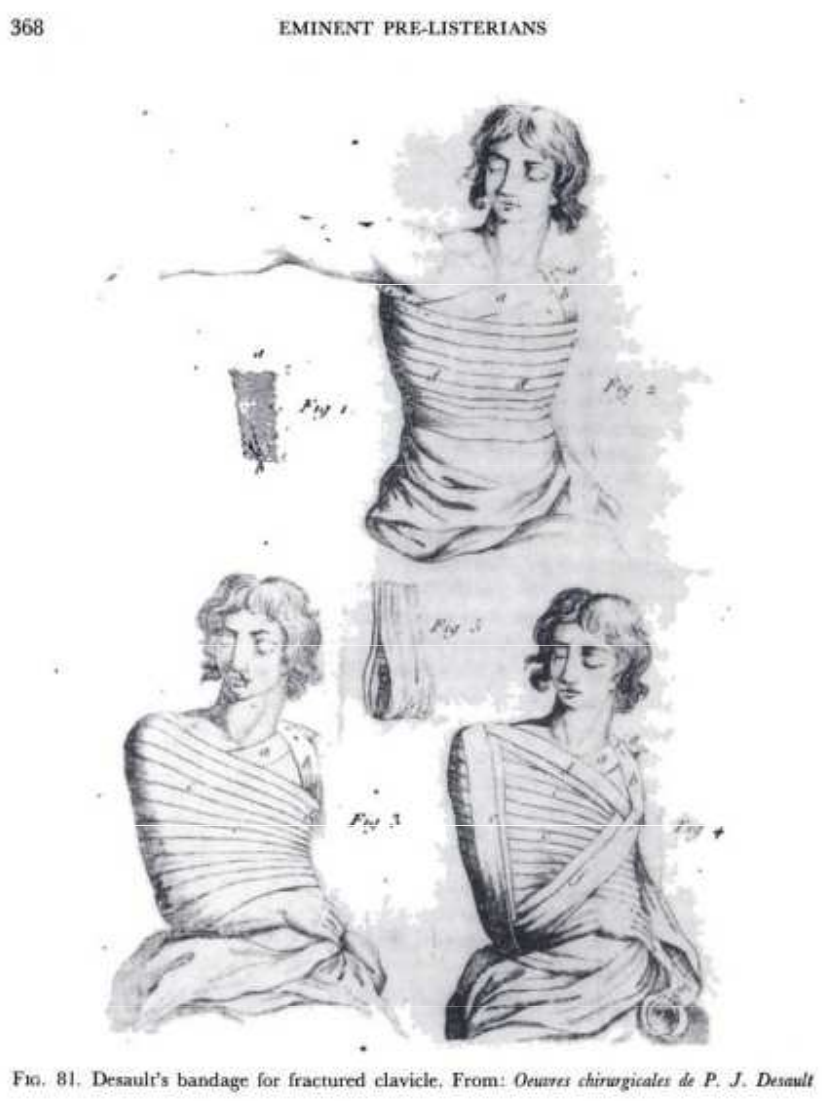
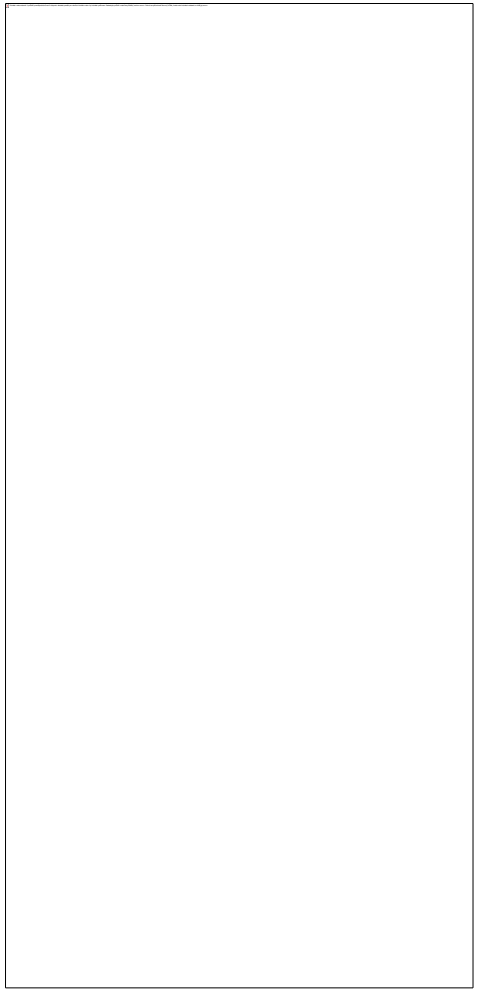


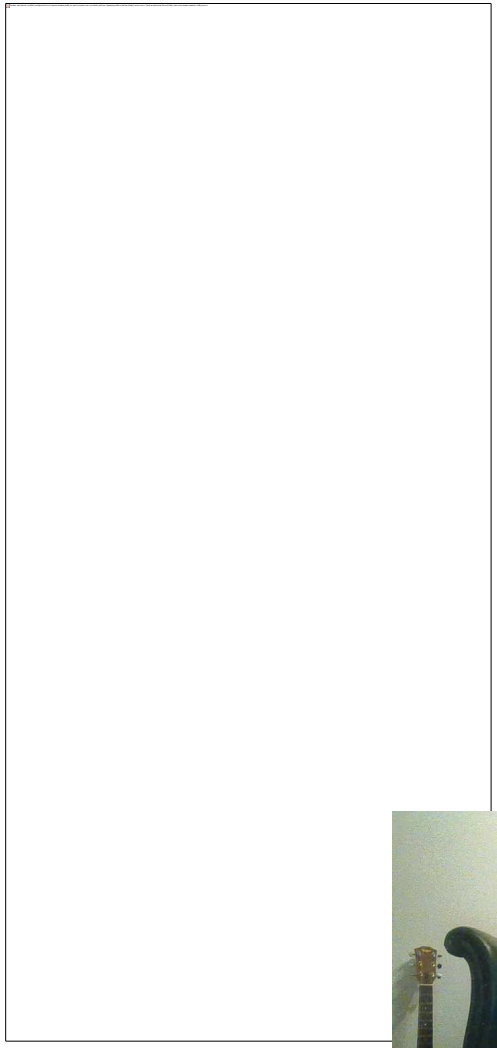
Fig. 81. Desault's bandage for fractured clavicle. From: *Oeuvres chirurgicales de P. J. Desault*

Fig. 80

Orthotics

Lower limb





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TLSO brace

Types and clinical use

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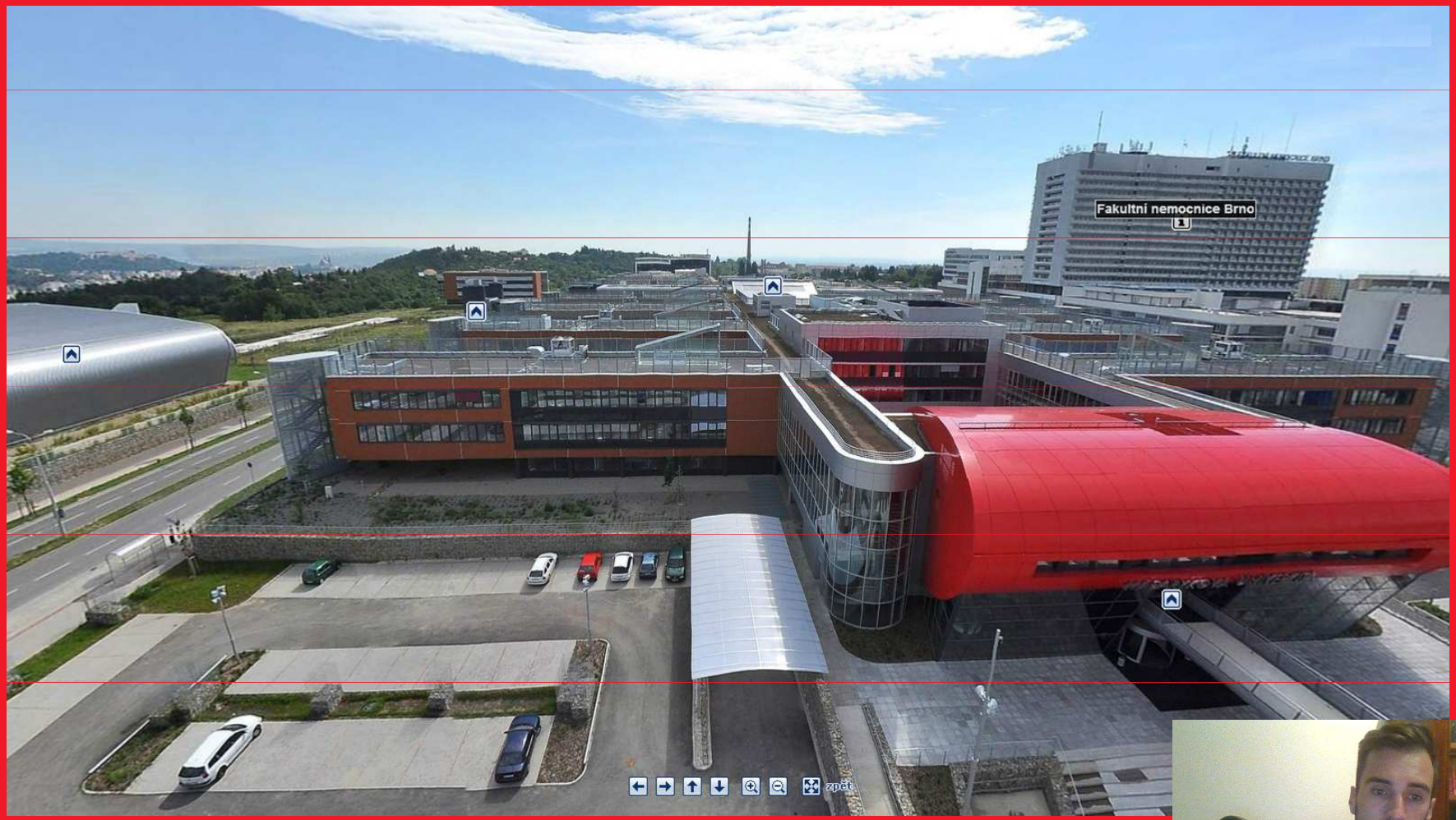

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Prosthetics

- 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

Corsetotherapy

- 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 fo
Neuromuscular kyph
Degenerative change

Conservative treatment of trauma

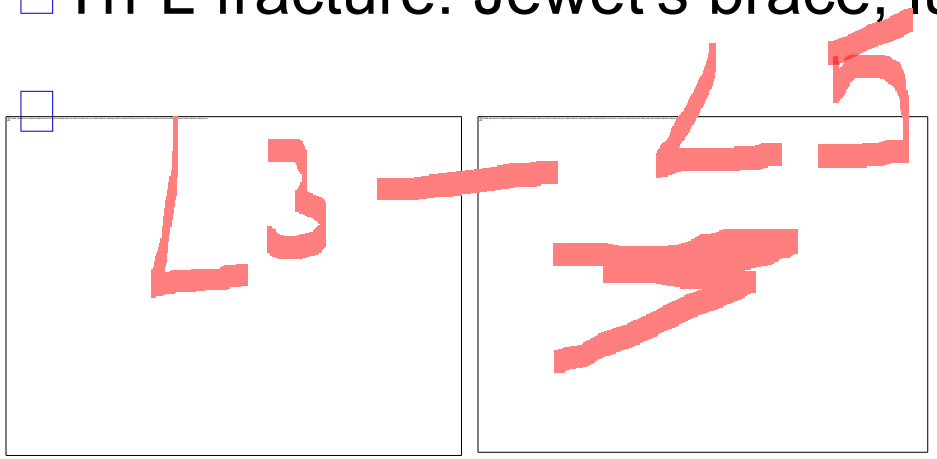
- A) Rest
- B) Collars:
  - soft/molitan
  - Philladephia

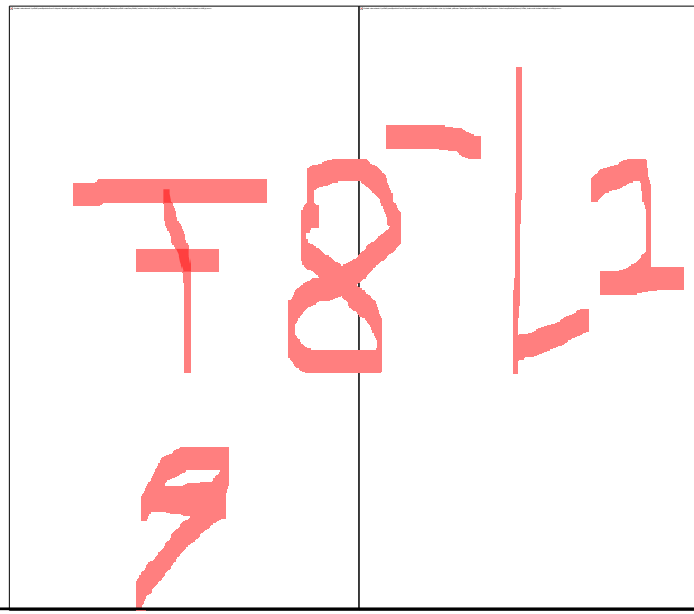
Conservative treatment of trauma

- rest
- C: Halo traction

Conservative treatment of trauma

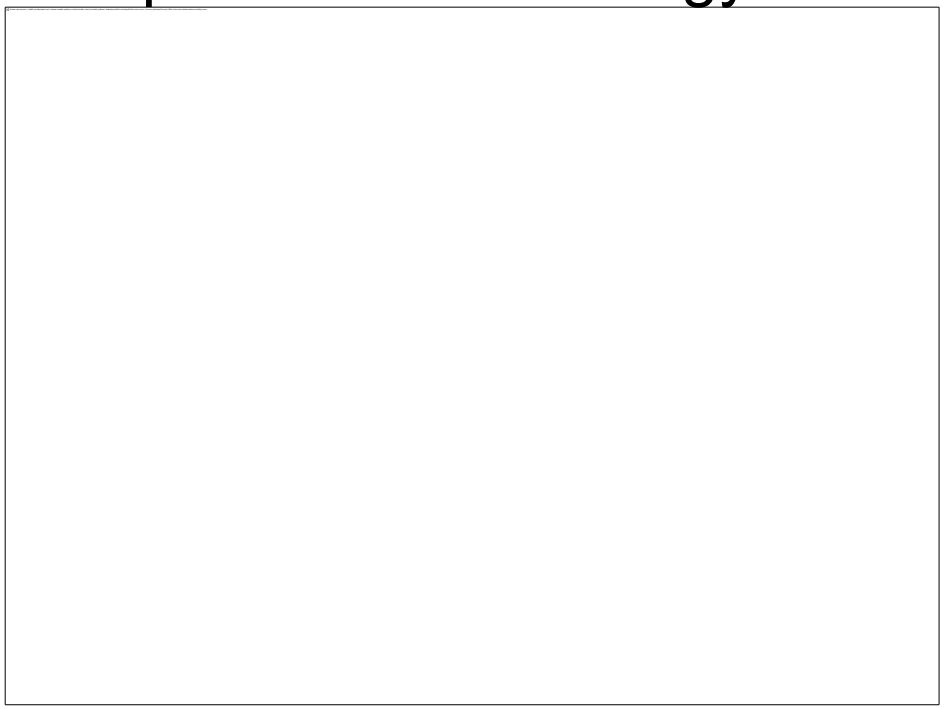
- Rest
- Th fracture: Jewet's brace/TLSO
- Th-L fracture: Jewet's brace, lumbar belt
-



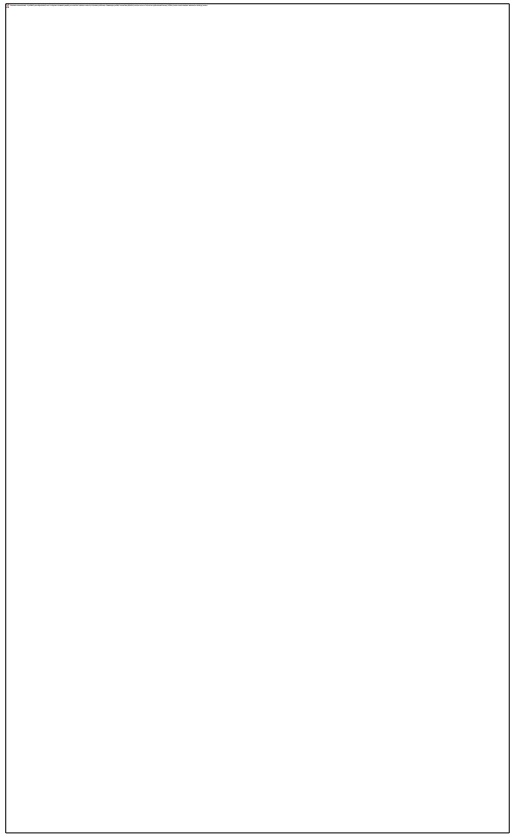


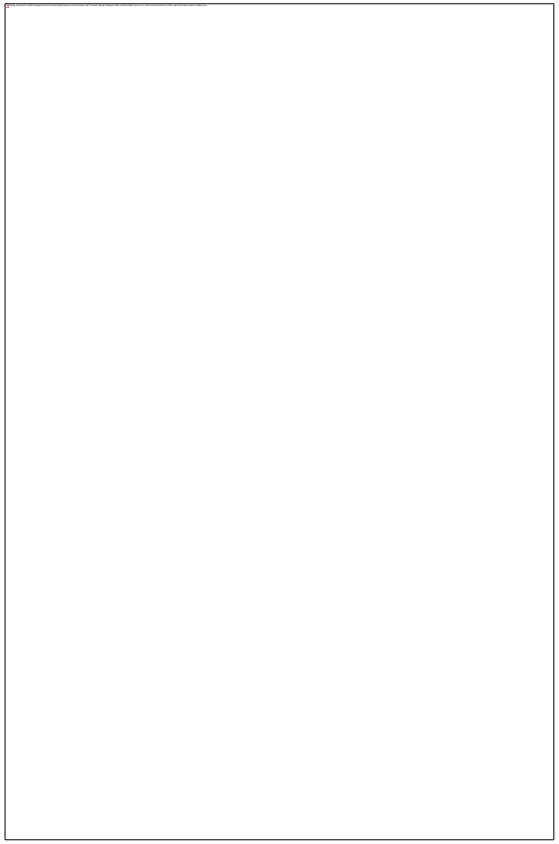
Conservative treatment of trauma

- 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

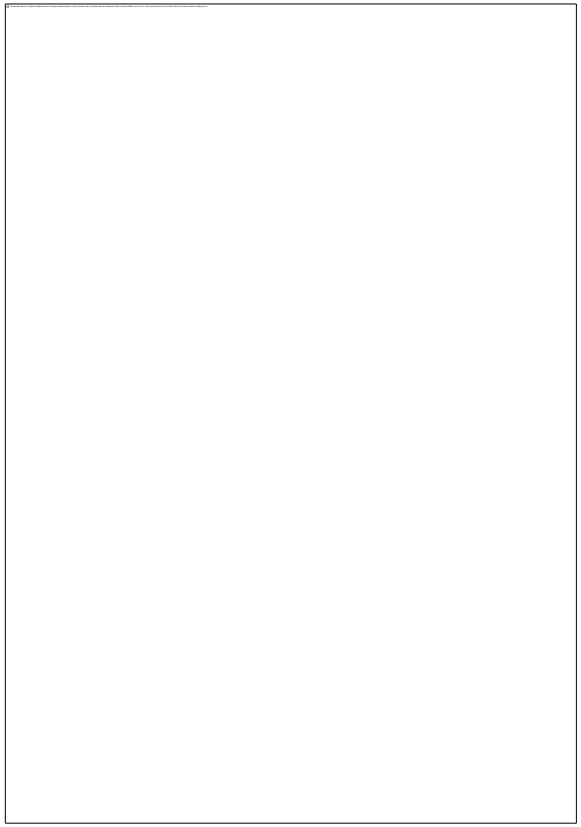
Pelvic belt – neck circle – side pressure pellets

- 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 (CTLSO).
- Carlson and Payette (2017) braces supporting sed

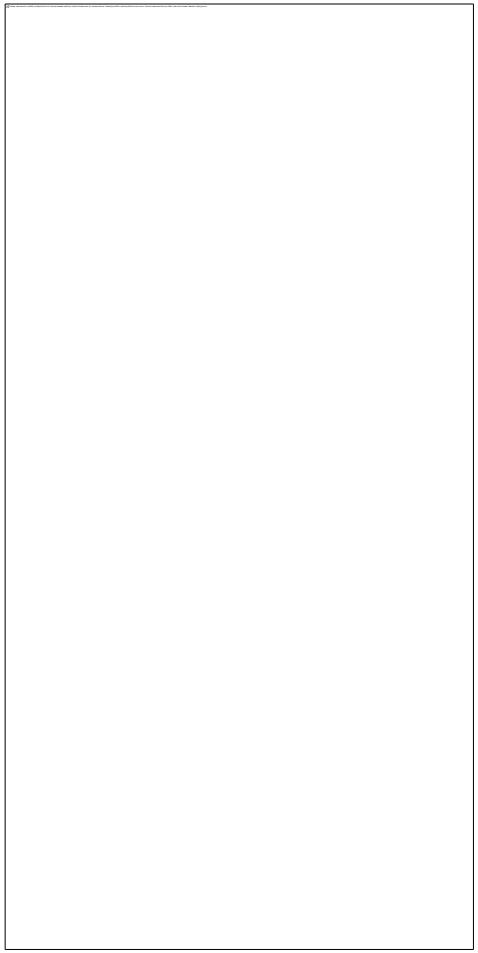
Principle of three-point fixation

Milwaukee Brace (May & Lockard, 2011)



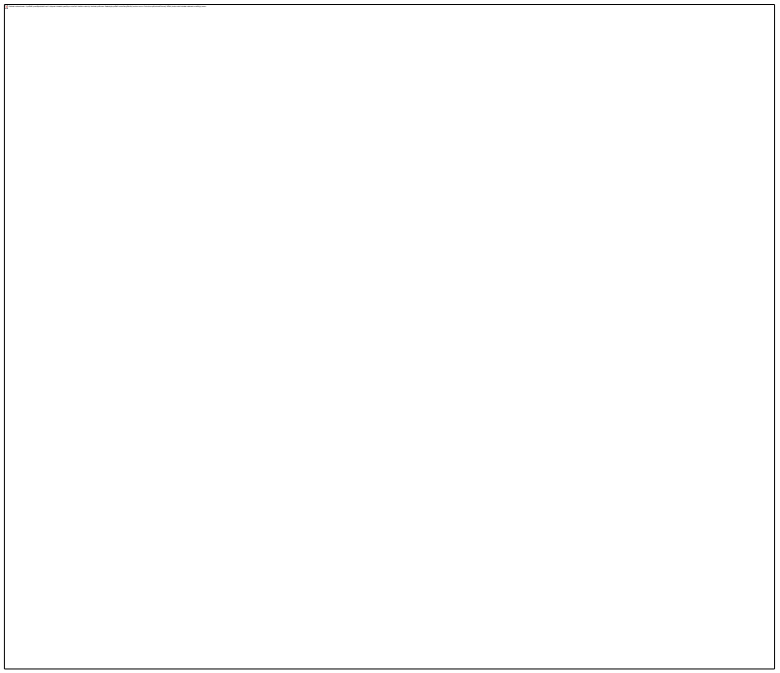
Principle of three-point fixation

Thorakolumbossacral orthosis (author unknown, 2018)



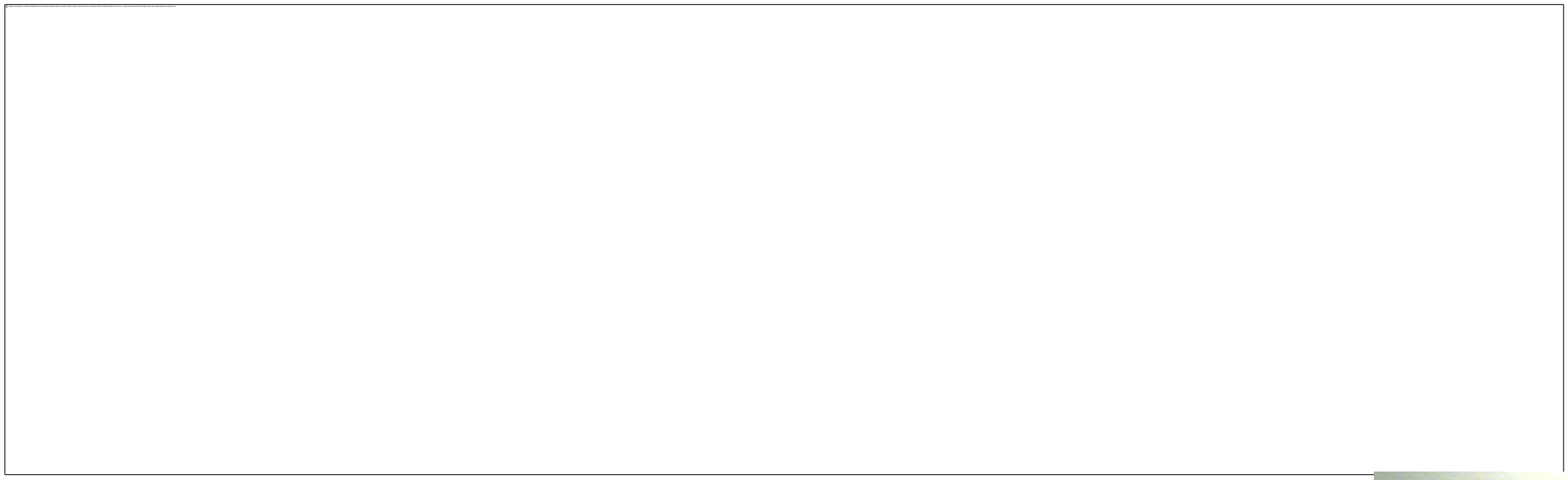
Principle of three-point fixation

Thoracosocal corset of synthetic material



Principle of three-point fixation

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



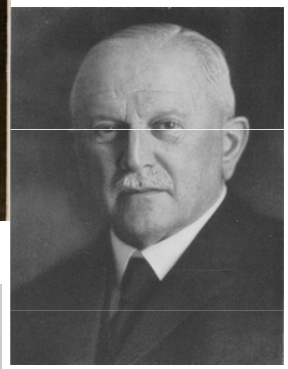
Morbus Scheuermann

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

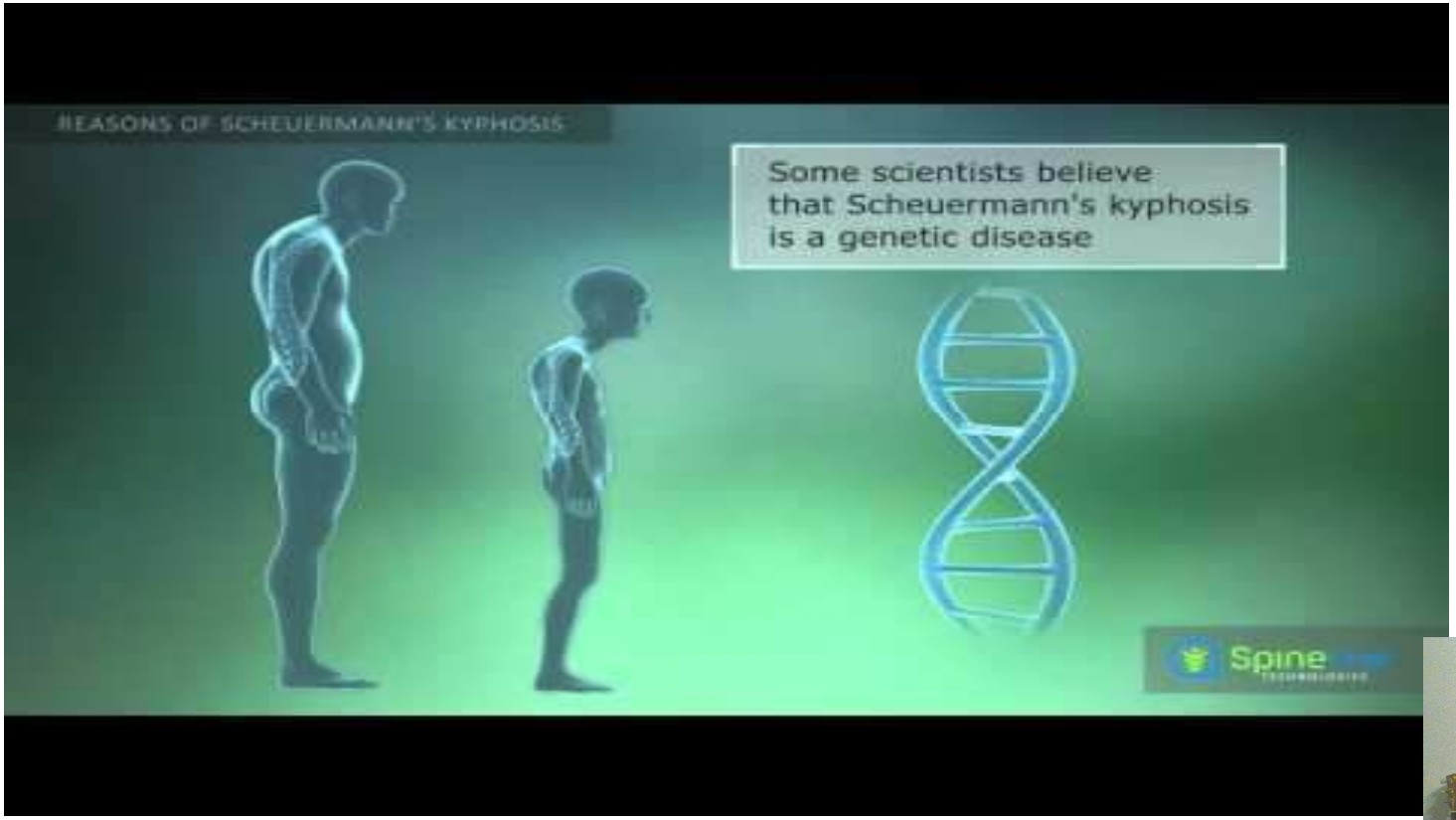
Morbus Scheuermann



- 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…“

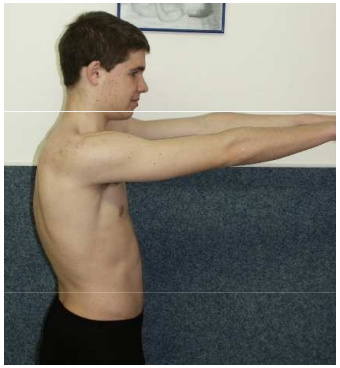
Sorensen KH. Scheuermann's Juvenile Kyphosis: clinical appearances, radiography, aetiology and prognosis. Munk-

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

Clinical examination

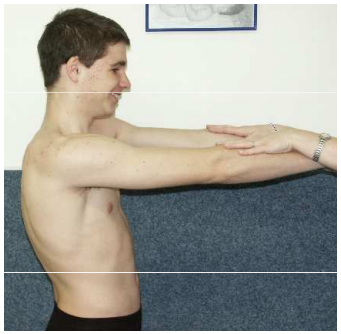
- Round back at the bottom t8-9 (48%)
- Thoracic or lumbar spine pain (28%)
- Rigidity of deformity
- Scoliosis in 49%
- Muscle dysbalance "texas attitude"
- Reflective changes in soft tissues
- Positive tests (Matthias, Frank, hyperextion)

Clinical examination



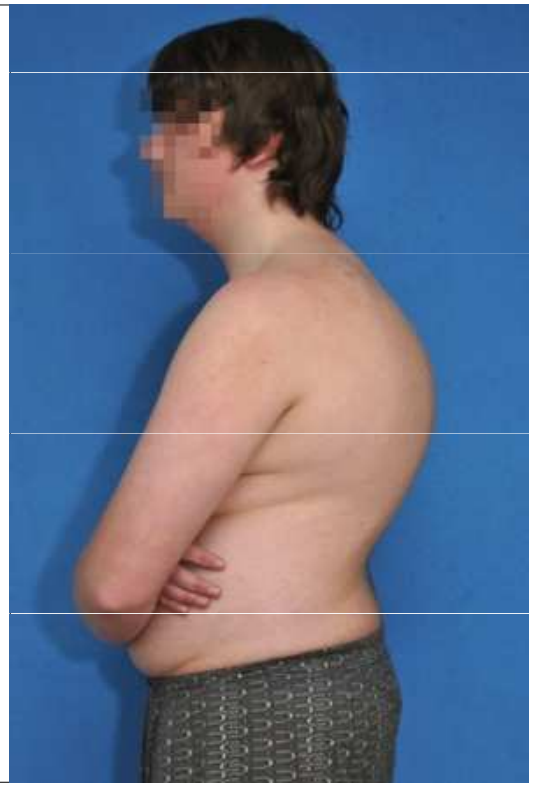
Matthias

hyperextension



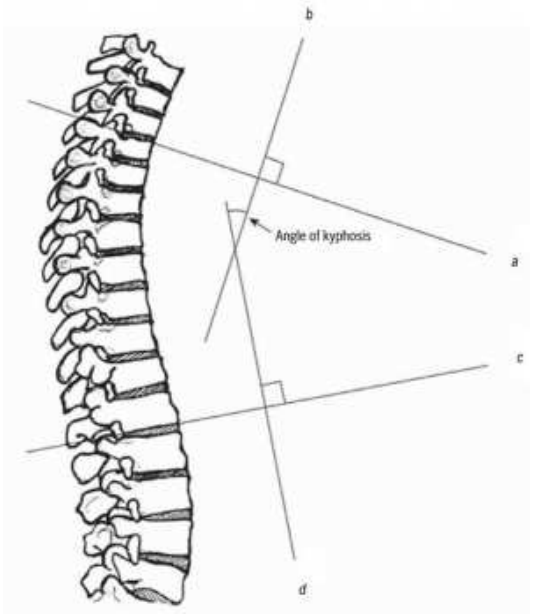
Franke

Clinical examination

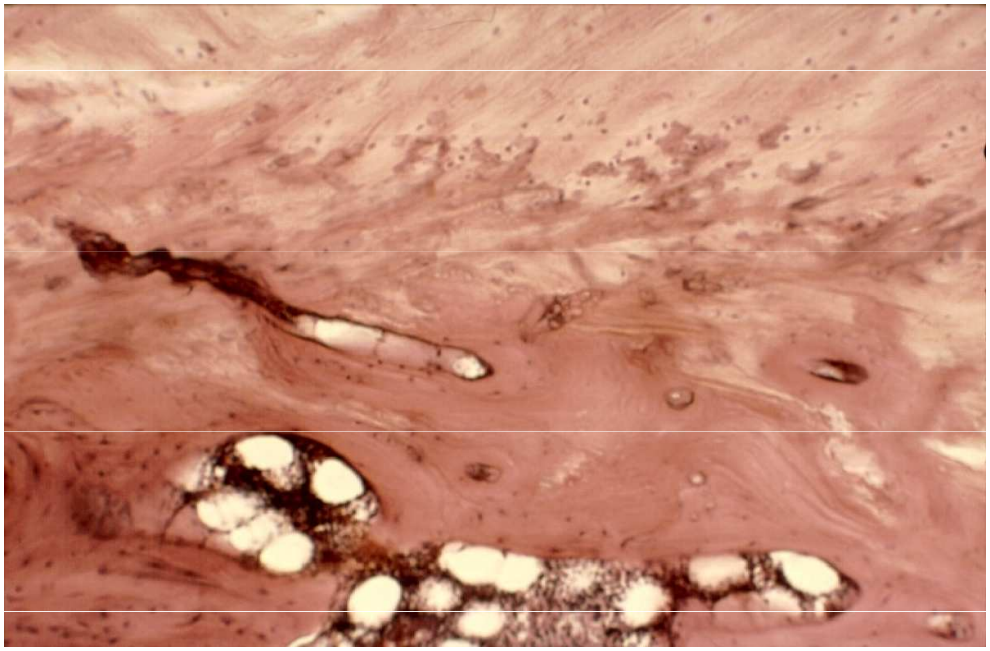


Morphology

- Histology, X-ray, CT, MRI
- C lordosis, Th kyphosis, L lordosis
- Th kyphosis: 20° - 40° (< 20° hypo; > 45° 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
  - reclination
  - 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

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:

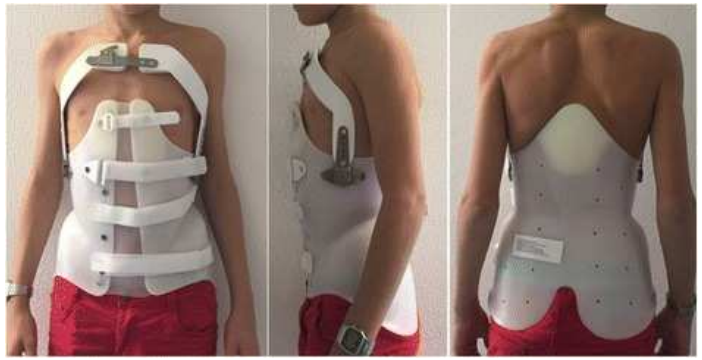
    Rigid deformity above 70°
    Pain
    Cosmetics
    Posterior spondylodesis
    SPO/PSO

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)

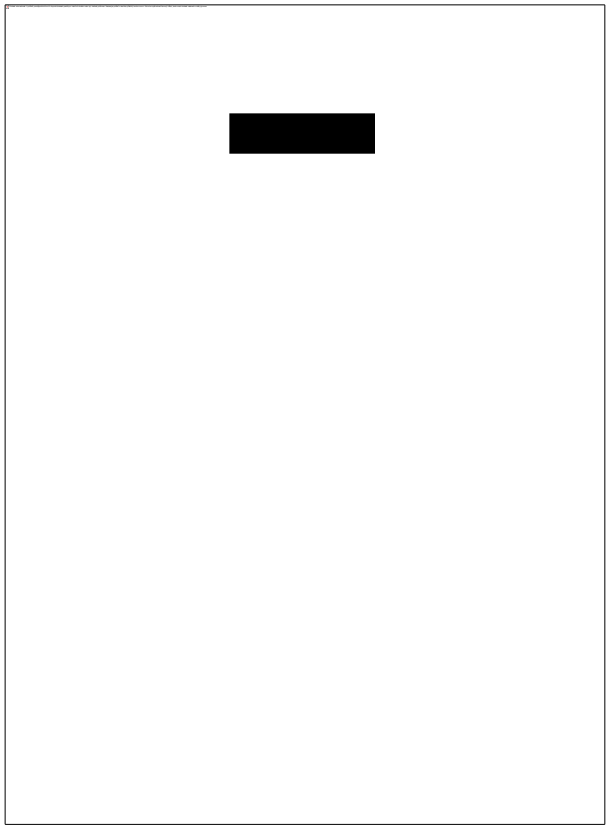
Rehabilitation and prosthetics

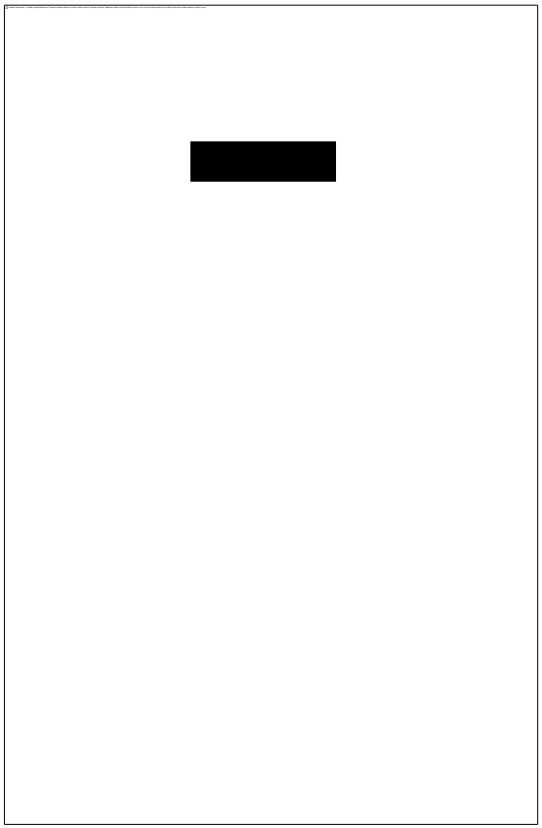
Brunkow

Prosthetics - Faculty of Medicine Masaryk University

Rehabilitation and prosthetics

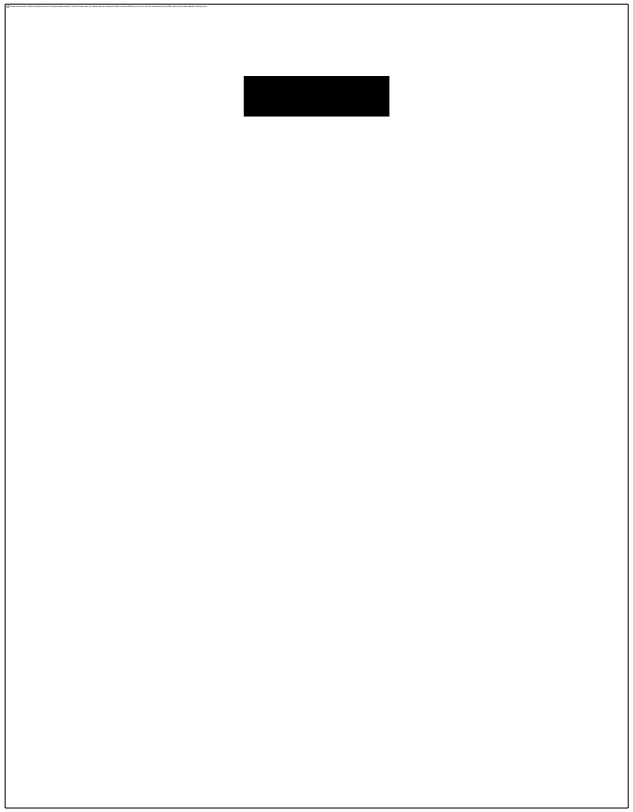
Brügger

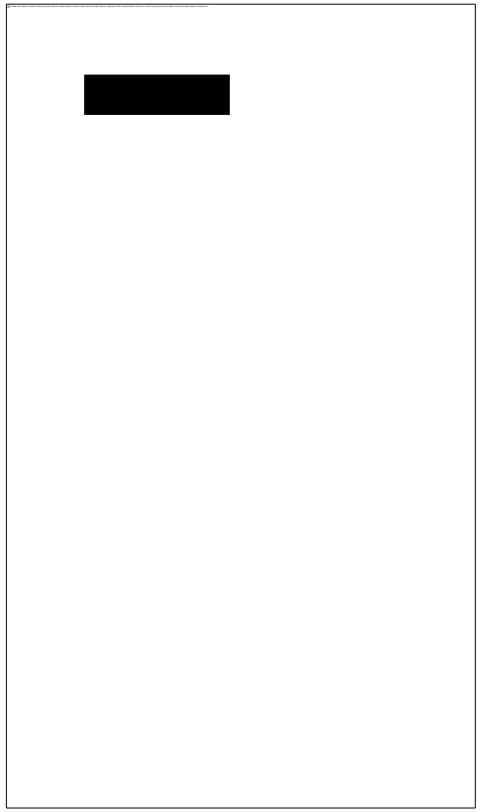




Rehabilitation and prosthetics

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

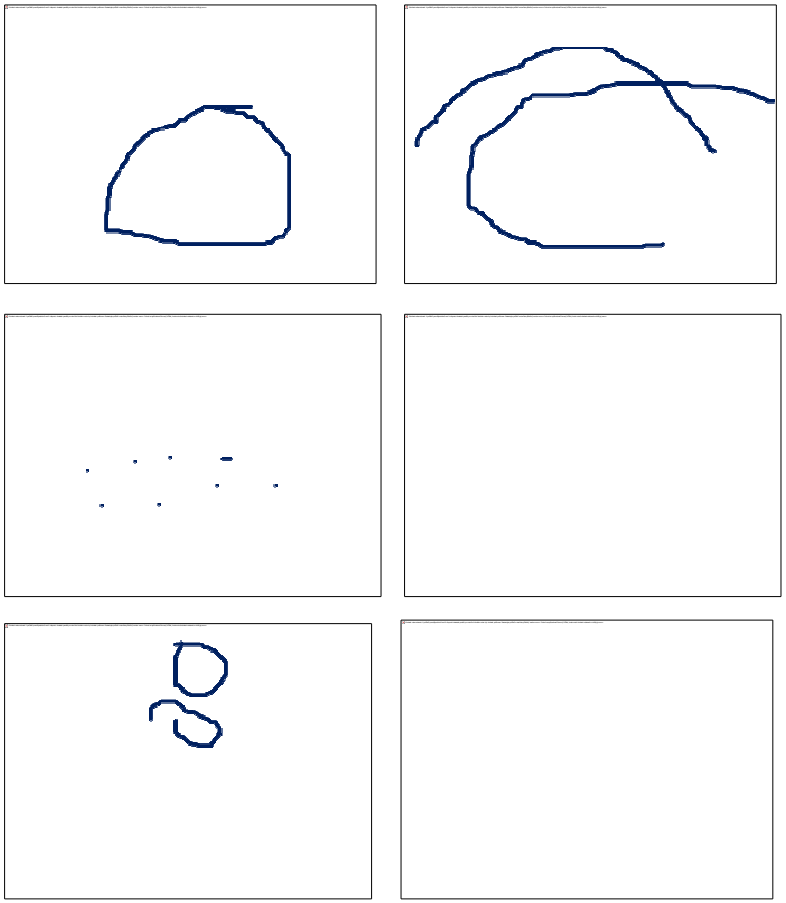
CAST SYNDROME = ACUTE CONDITION = THERAPY IMMEDIATELY

- 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 fluororoscopic 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 s

Surgical theatment

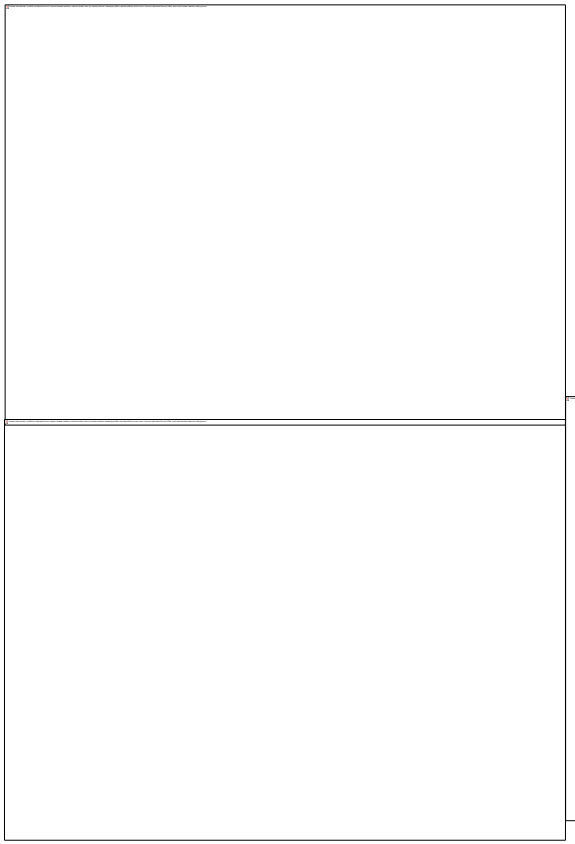
Late, severe diagnosis

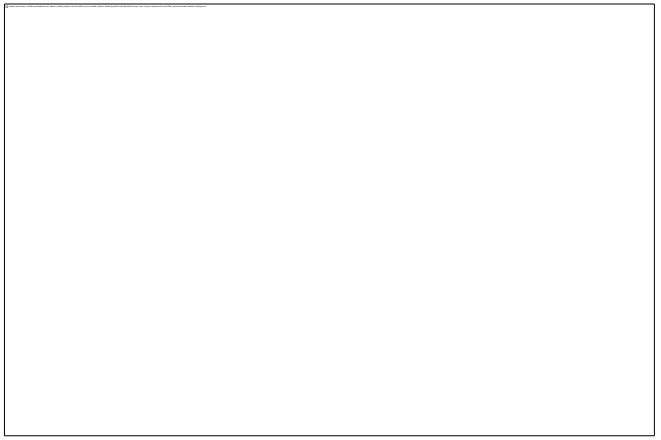
- Posterior spondylodesis
- Osteotomy: SPO/PSO
- + treatment in TLSO
-

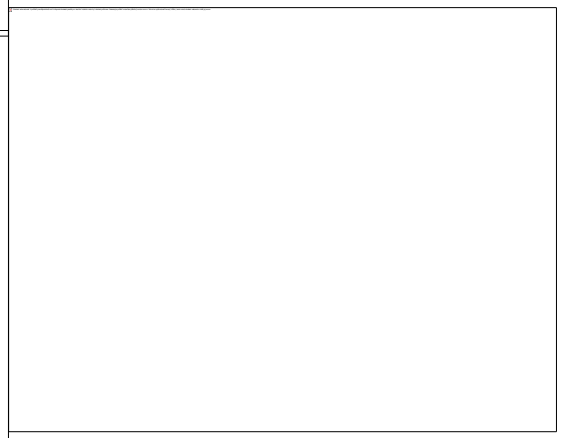


Surgical therapy

Smith-Petersen osteotomies

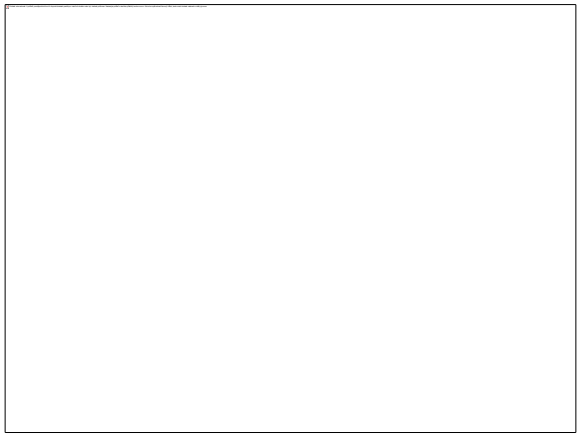


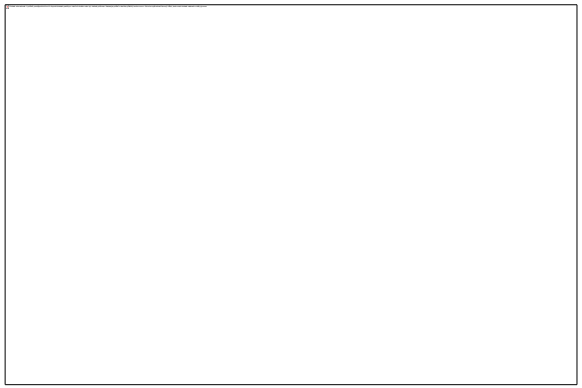


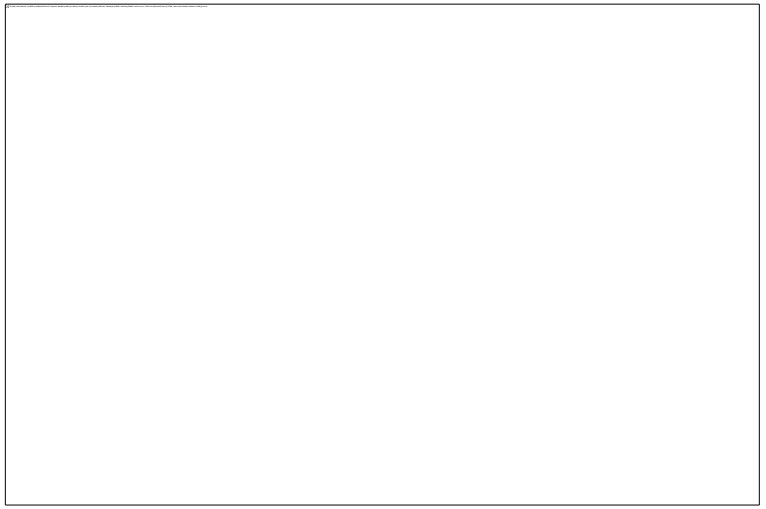


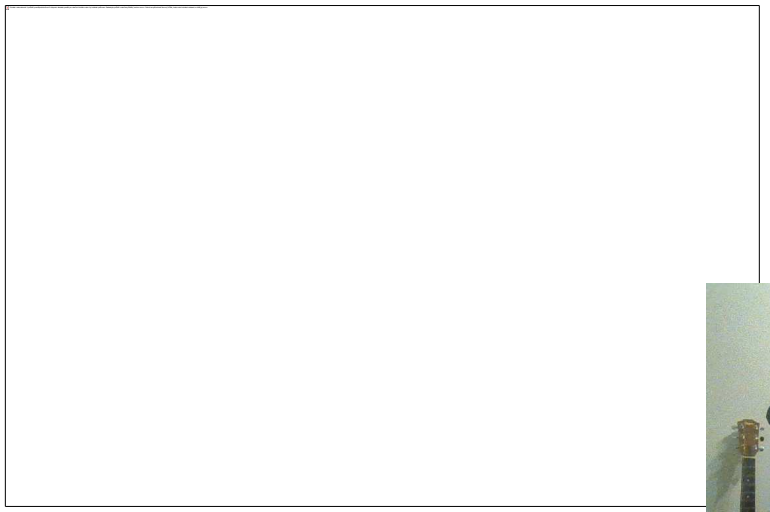
Surgical therapy

Cantilever maneuver







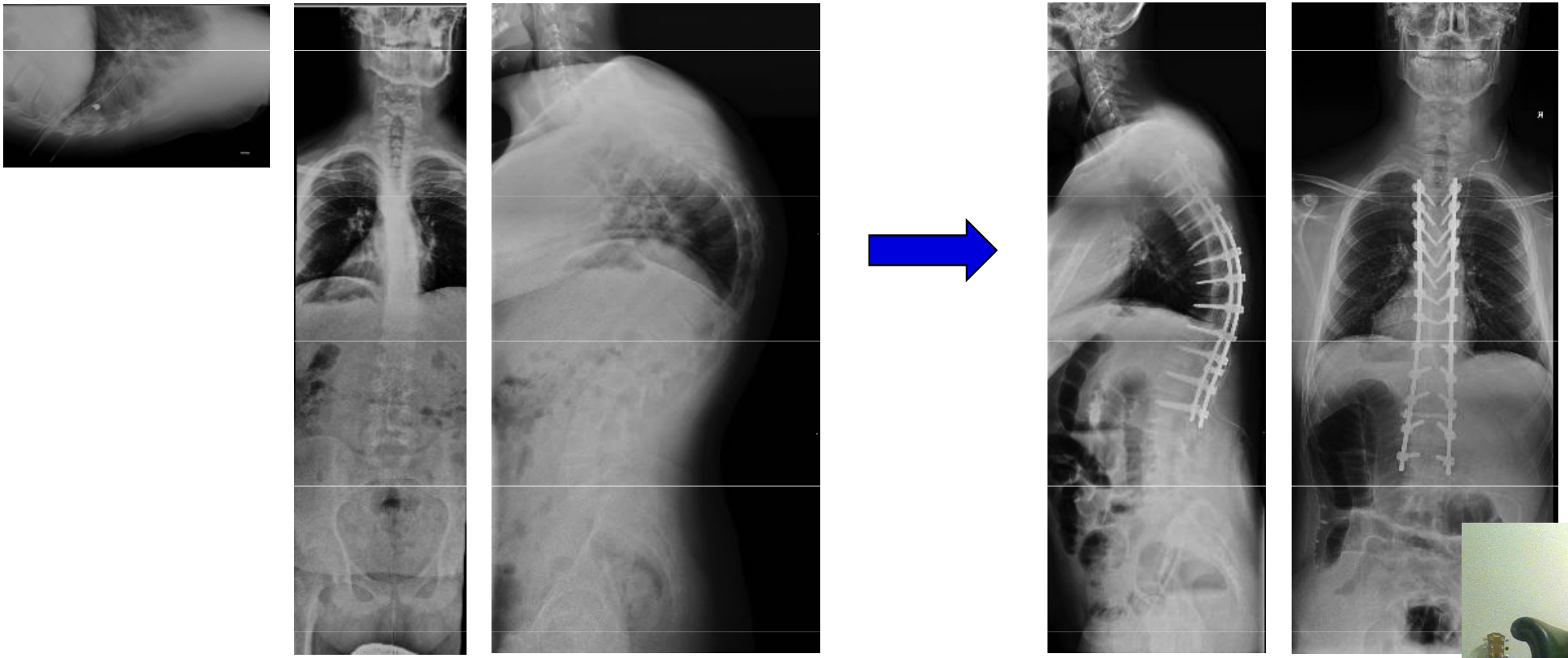


Surgical therapy

Xrays Follow ups (16y + 2m)

Surgical therapy

XR FU (17y + 3m)



Faulty posture

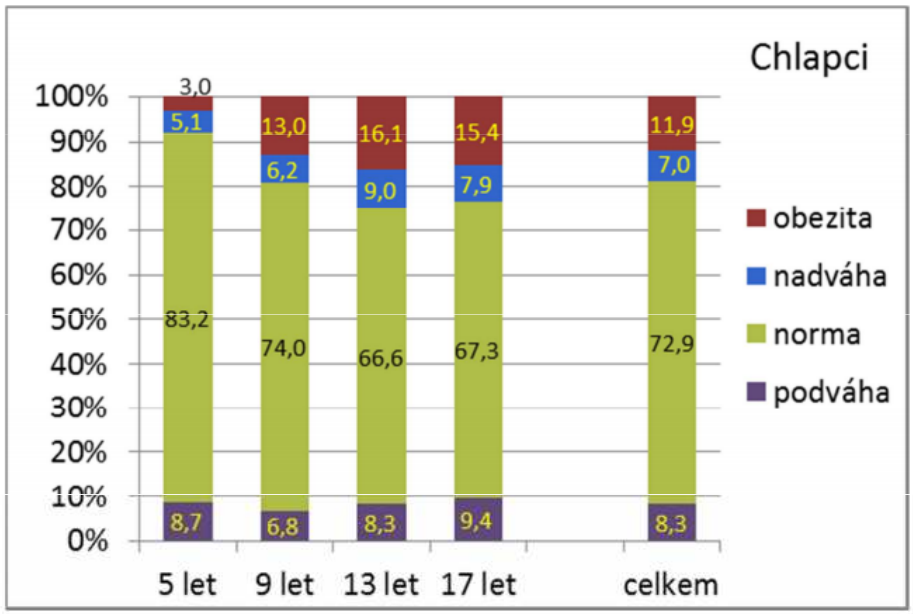
Most common

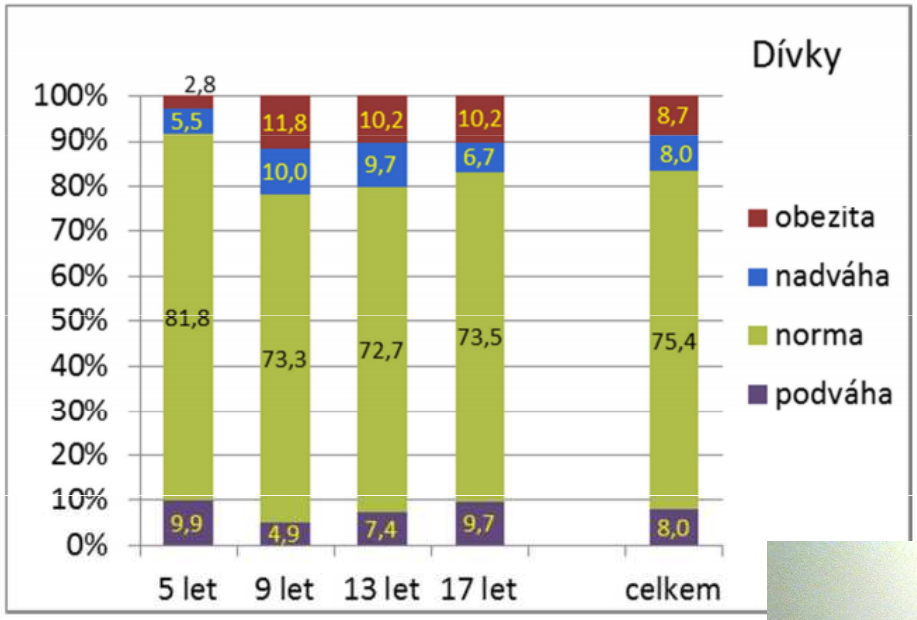
- It arises with muscle imbalance, lack of exercise and „sitting“ lifestyle.
- Poor musculature of the back and abdominal.
- Increased lumbar lordosis and thoracic kyphosis
- Treatment:
  - "Good lifestyle"
  - Regular exercises of back and abdominal muscles
  - Endurance
  - Physiotherapist

Faulty posture

BMI a „bad posture“?

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

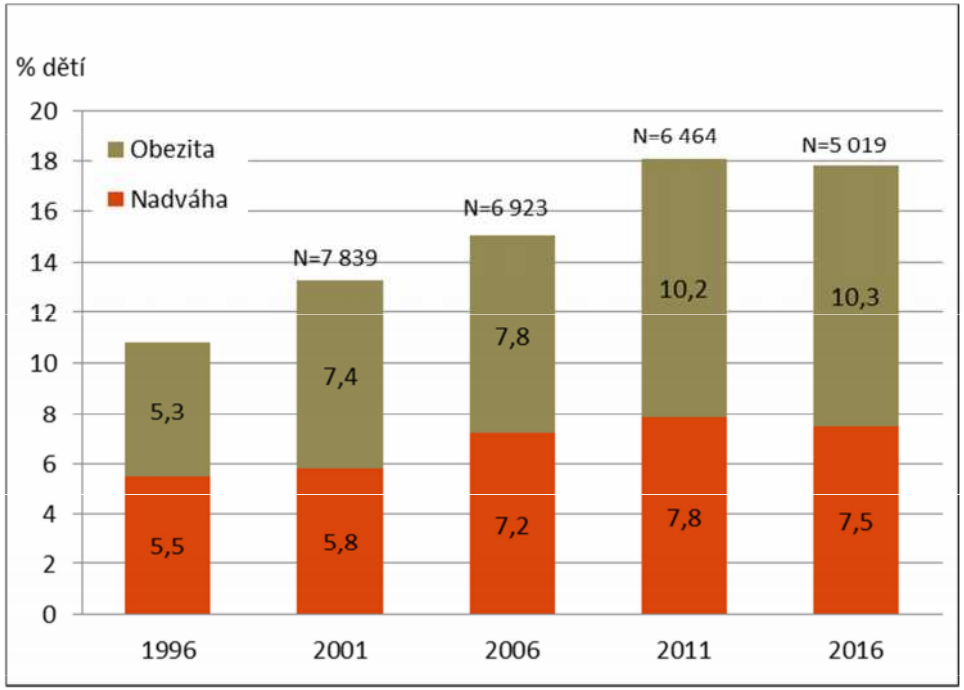




Zdroj: http://www.szu.cz/uploads/documents/chzp/odborne_zpravy/OZ_16/OZ_BMI_VDT.pdf
Výsledky studie „Zdraví dětí 2016“ Tělesná hmotnost a vadné držení těla

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



Zdroj: http://www.szu.cz/uploads/documents/chzp/odborne_zpravy/OZ_16/OZ_BMI_VDT.pdf
Výsledky studie „Zdraví dětí 2016" Tělesná hmotnost a vadné držení těla

Faulty posture

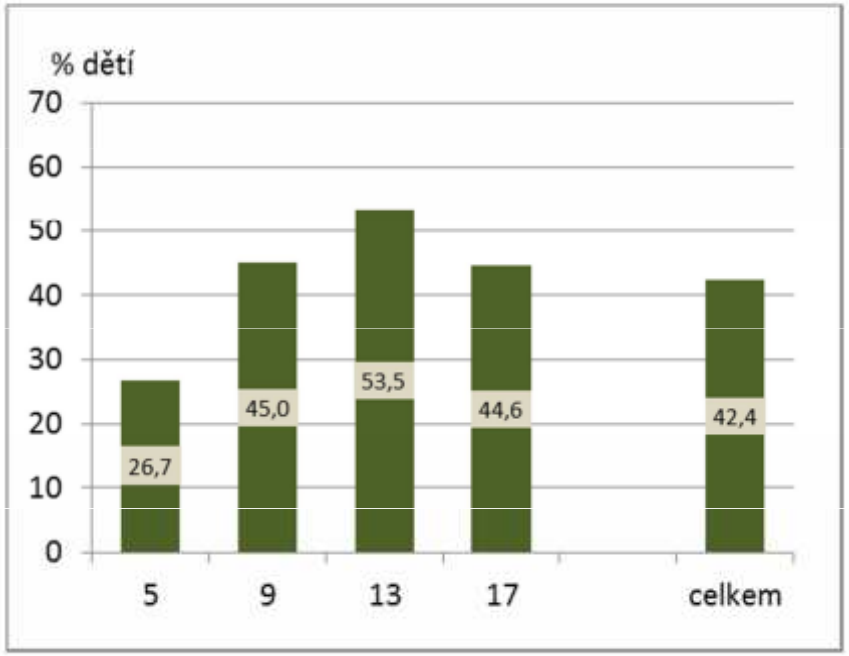
Nejčastější zjištěnou vadou v držení těla byl předsun hlavy (25,5% dětí), kulatá záda / zvýšená hrudní kyfóza (14 %) a skoliotické držení (13 %). Předsun hlavy a kulatá záda byly častější u chlapců, ve výskytu skoliotického držení se chlapci a dívky nelišili. Všechny tyto tři vady byly nejčastější u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

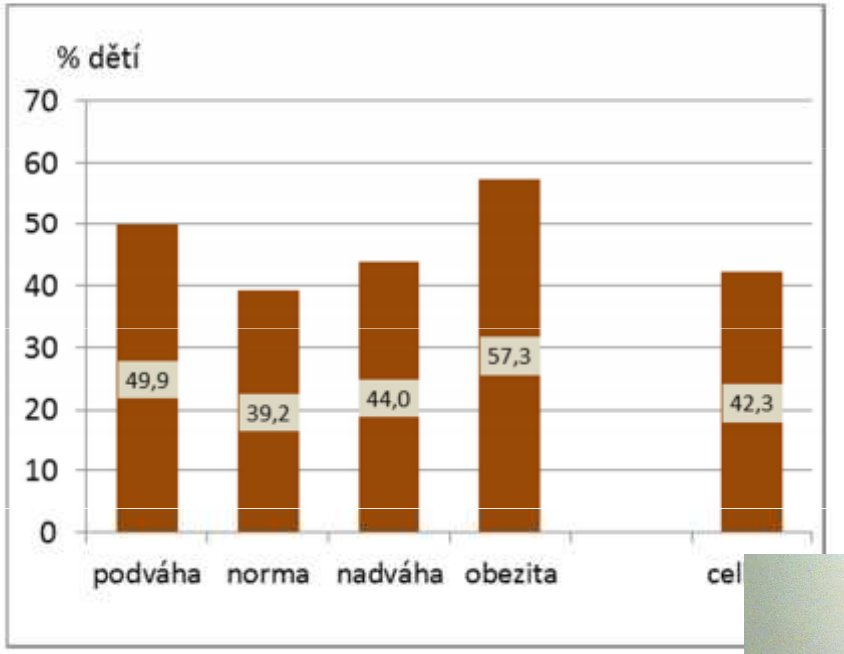
Součástí rodičovského dotazníku byly otázky zjišťující, jestli děti trpí bolestmi hlavy a páteře.

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 jí 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 %

Graf č 17. Prevalence VDT dle věku



Graf č. 18. Prevalence VDT dle BMI



Zdroj: http://www.szu.cz/uploads/documents/chzp/odborne_zpravy/OZ_16/OZ_BMI_VDT.pdf
Výsledky studie „Zdraví dětí 2016" Tělesná hmotnost a vadné držení těla

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

06/2011

06/2011

04/2012

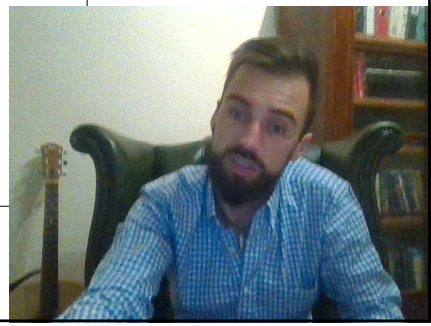
10/2012

03/2013

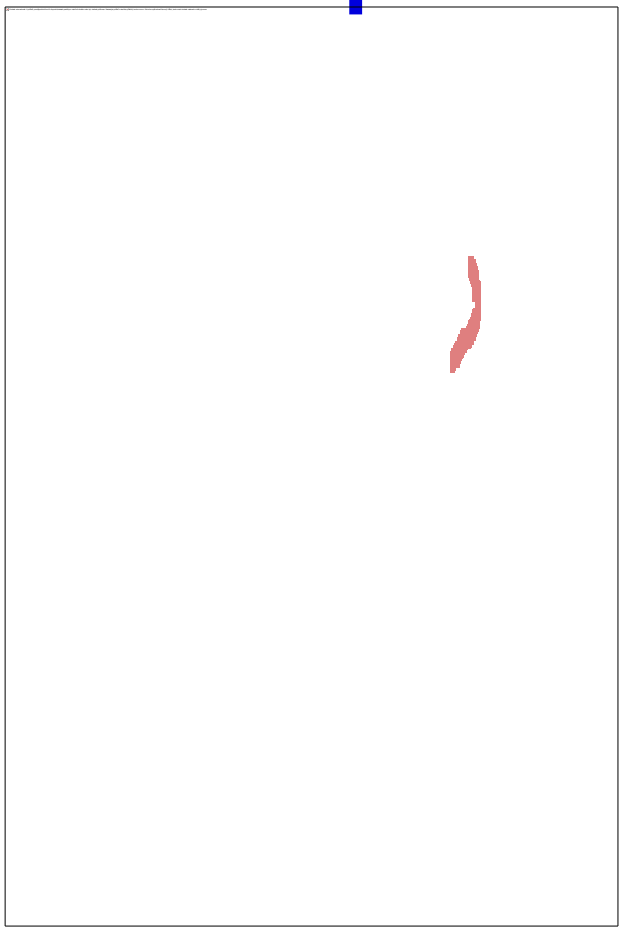
Case report – JH 1997

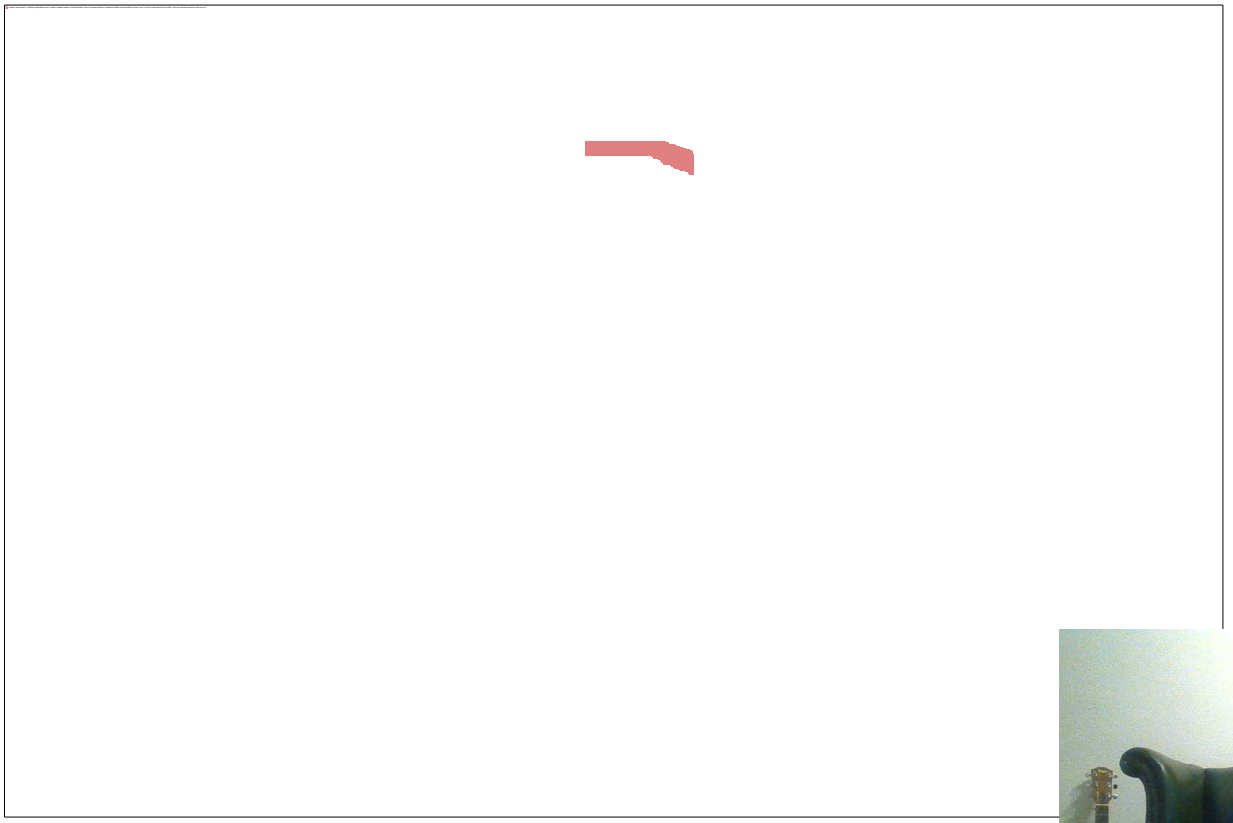
05/2013

10/2013

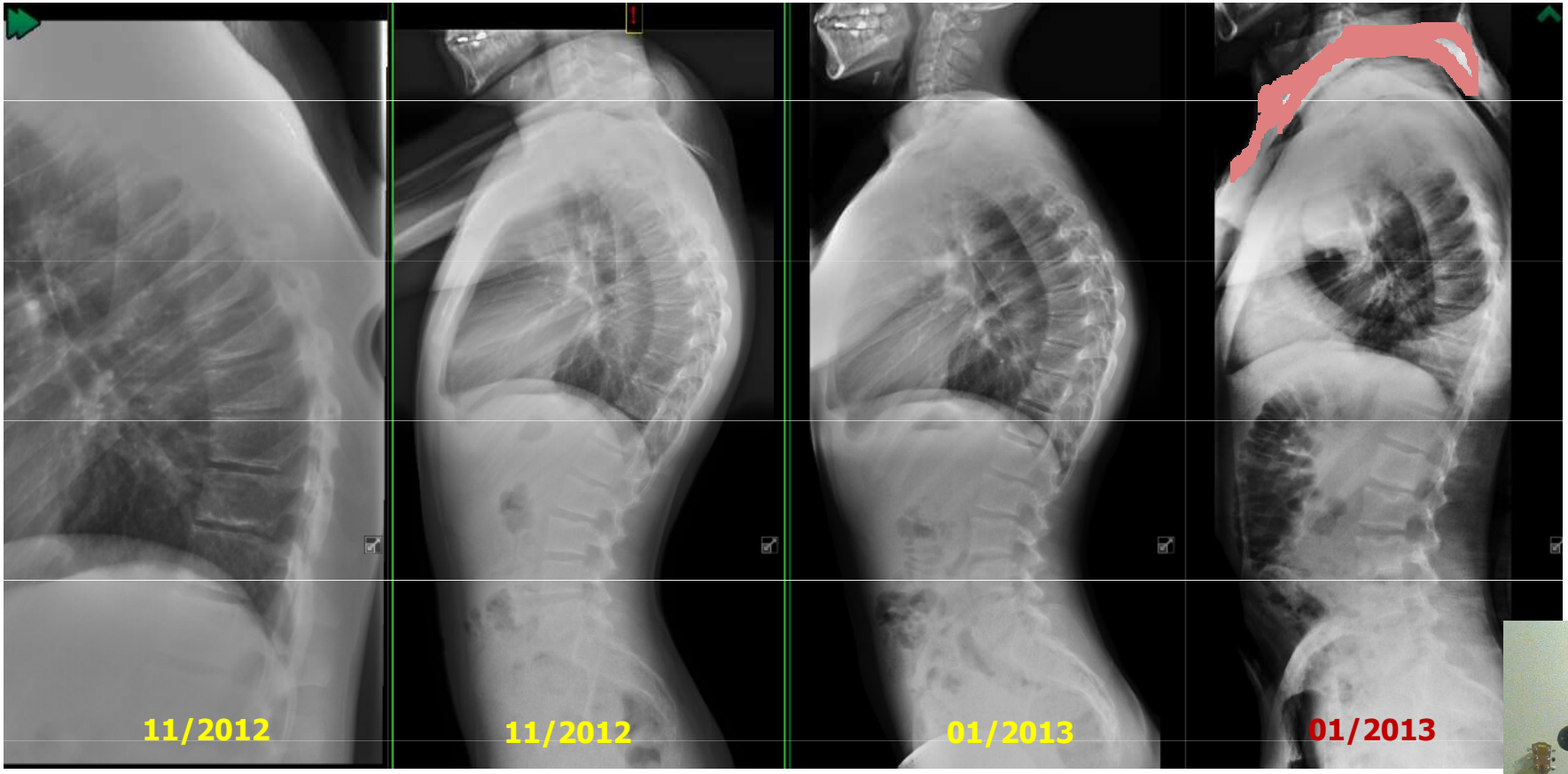


Case report – AF 1999

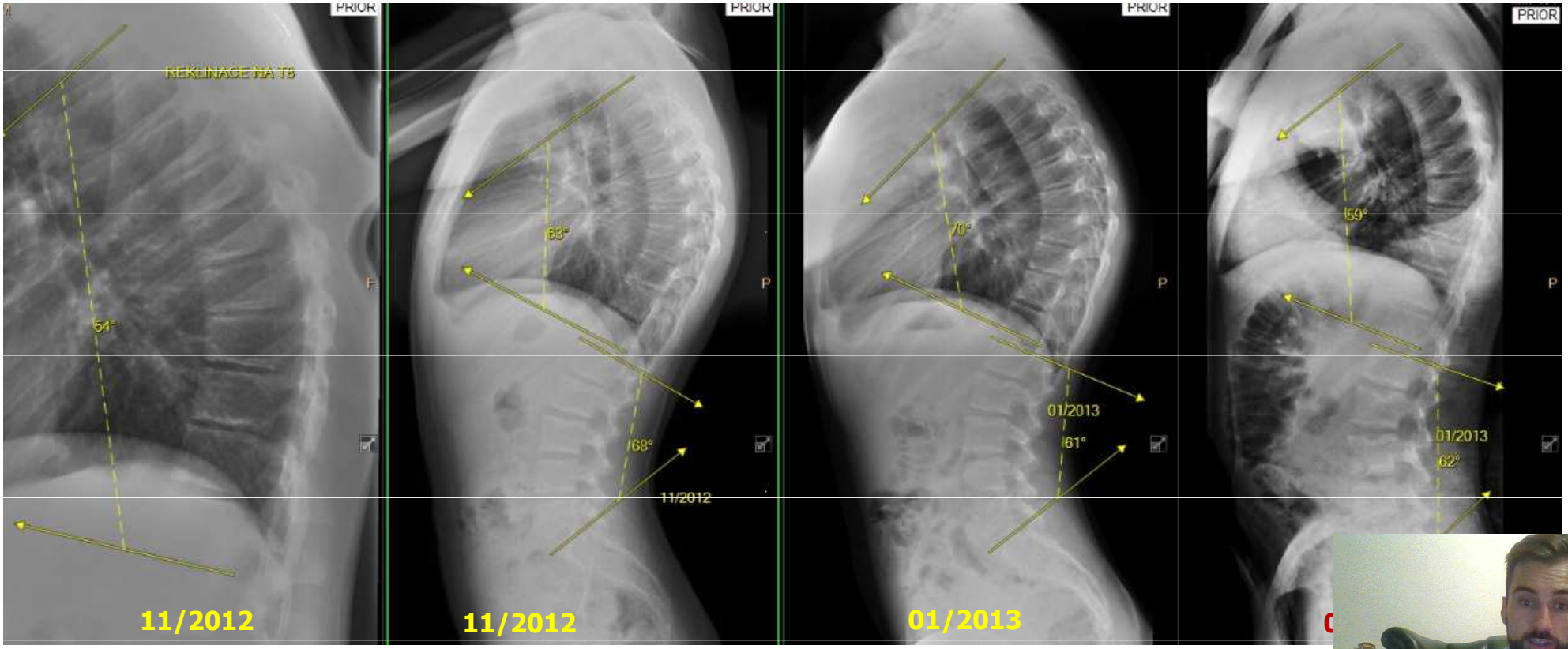




Case report– AF 1999



Case report – AF 1999



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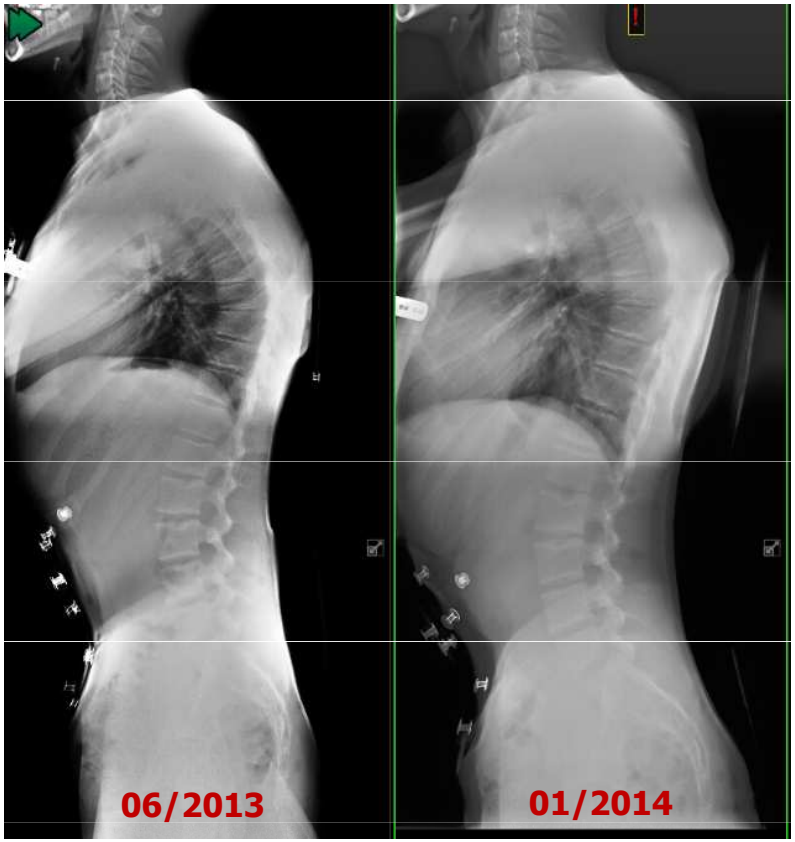
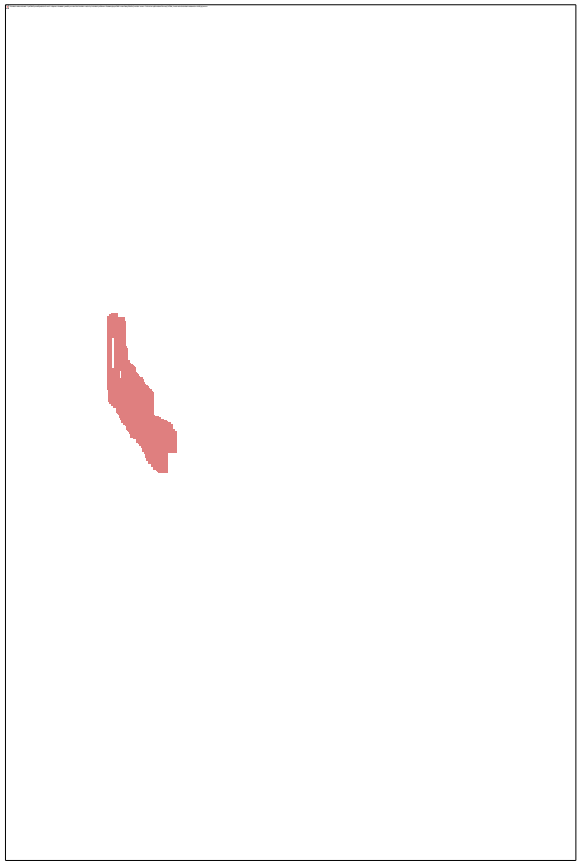
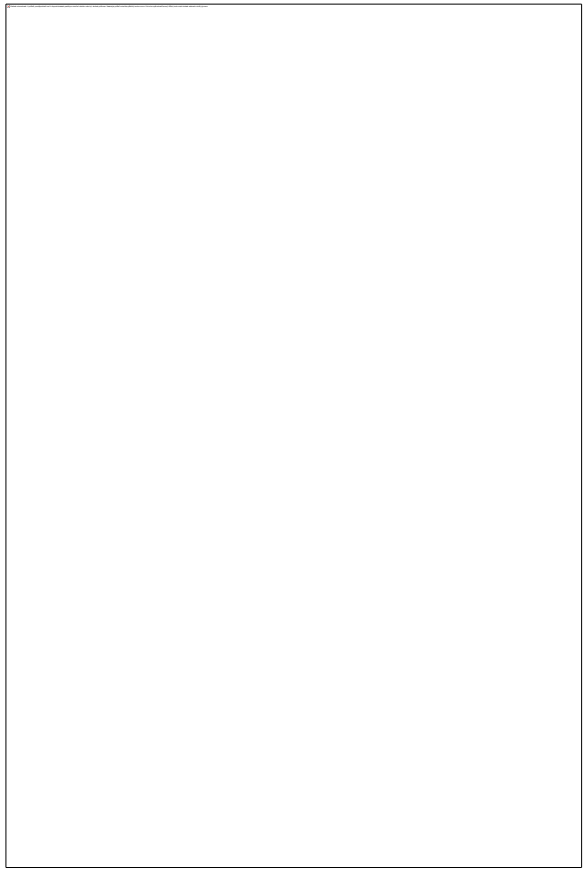
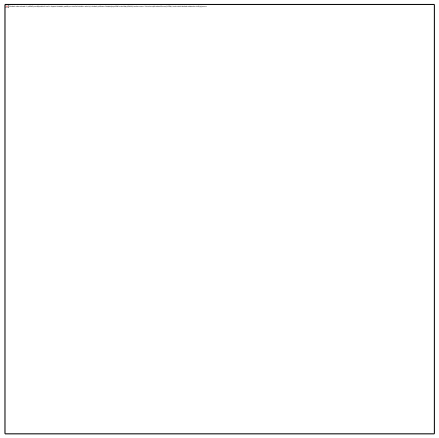


CR – RS 1999







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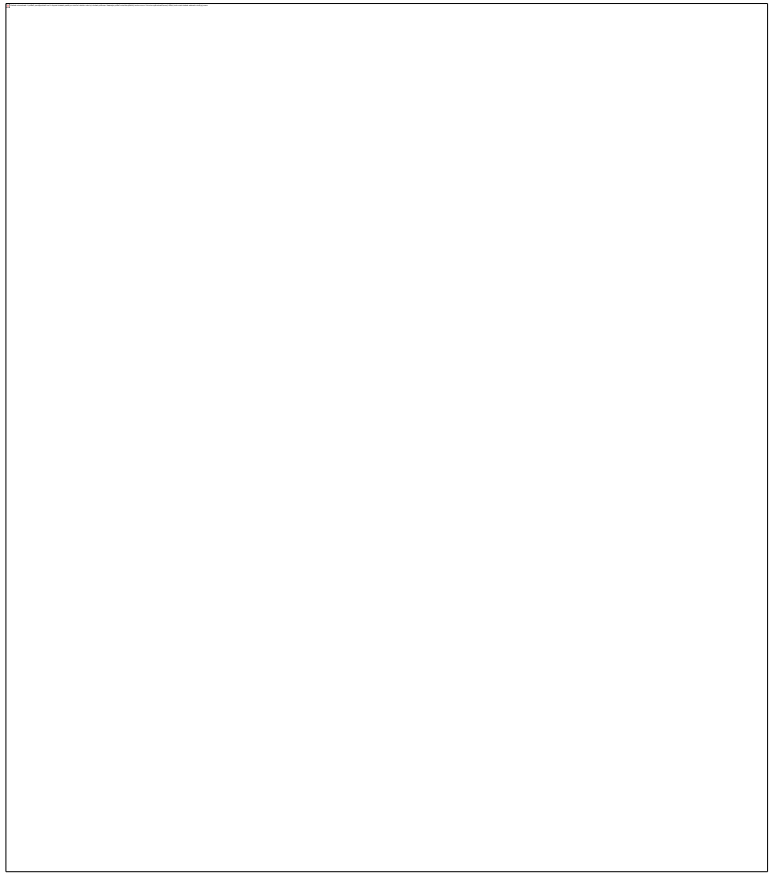
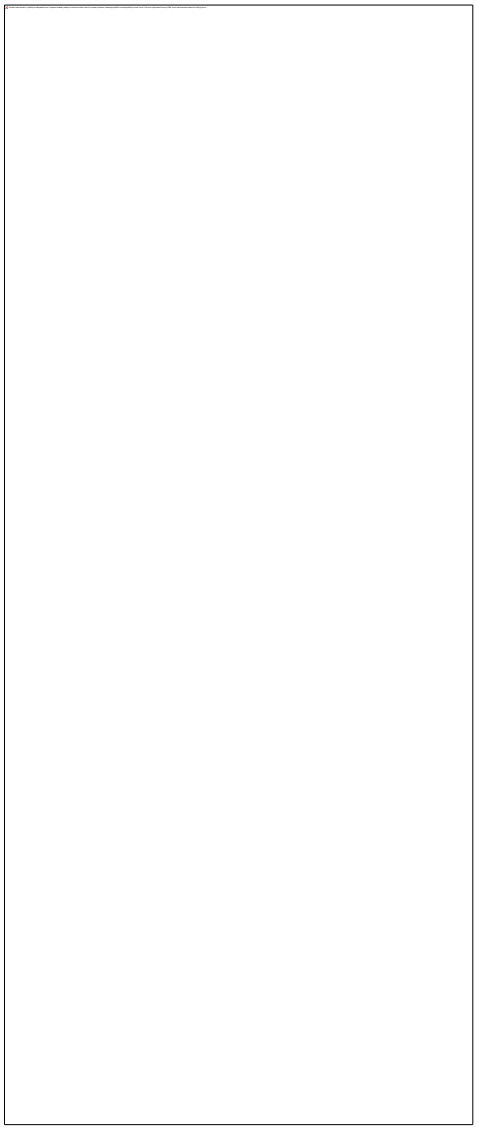




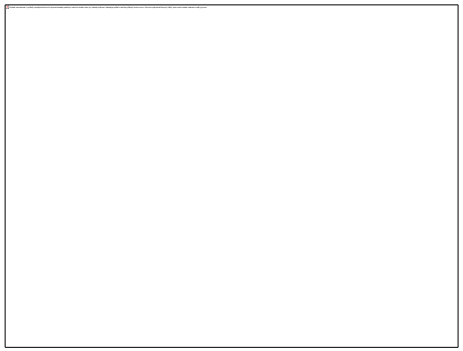
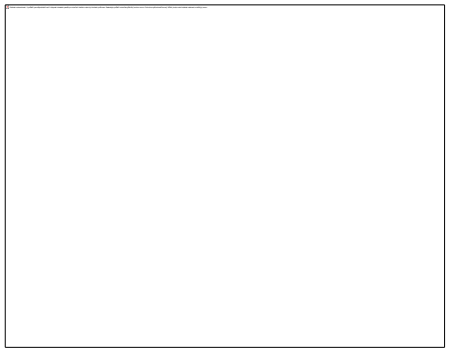
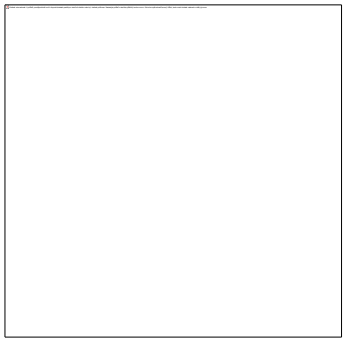
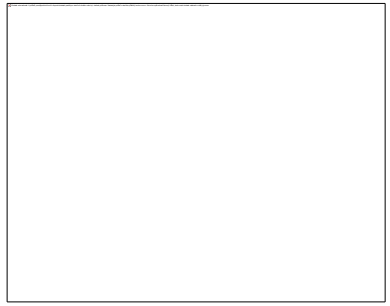
CR – RS 1999

CR – RS 1999

Epithetics

doctrine on cosmetic cover of the body part

- Replacement of lost, undeveloped or atrophied body parts

Epithetics

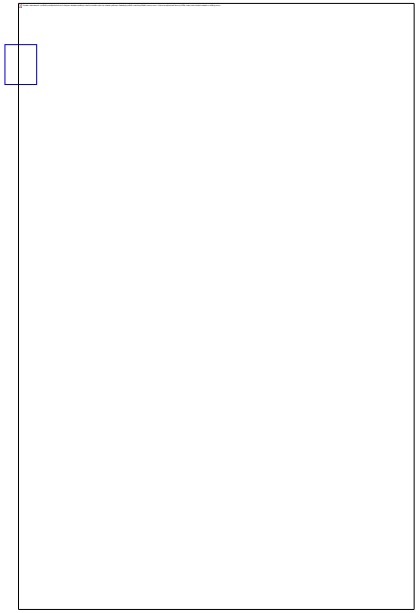
3D

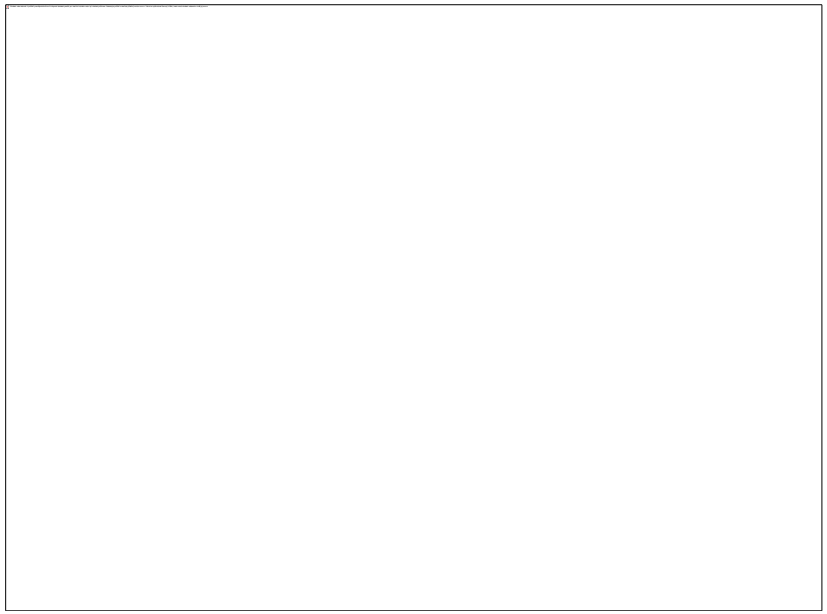
- In the abode of paired organs, parts (ears, fingers, amputation of the foot)
- Skenner: sensing – CAD - positives
- Maxillacafacial epithesis (Bibb et al.)
- Design Covers - SLS (Selective Laser Sintering)
-

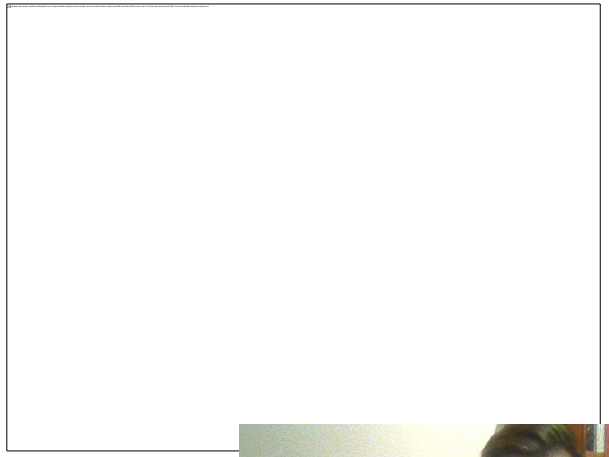
Calceotics

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:
-

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

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

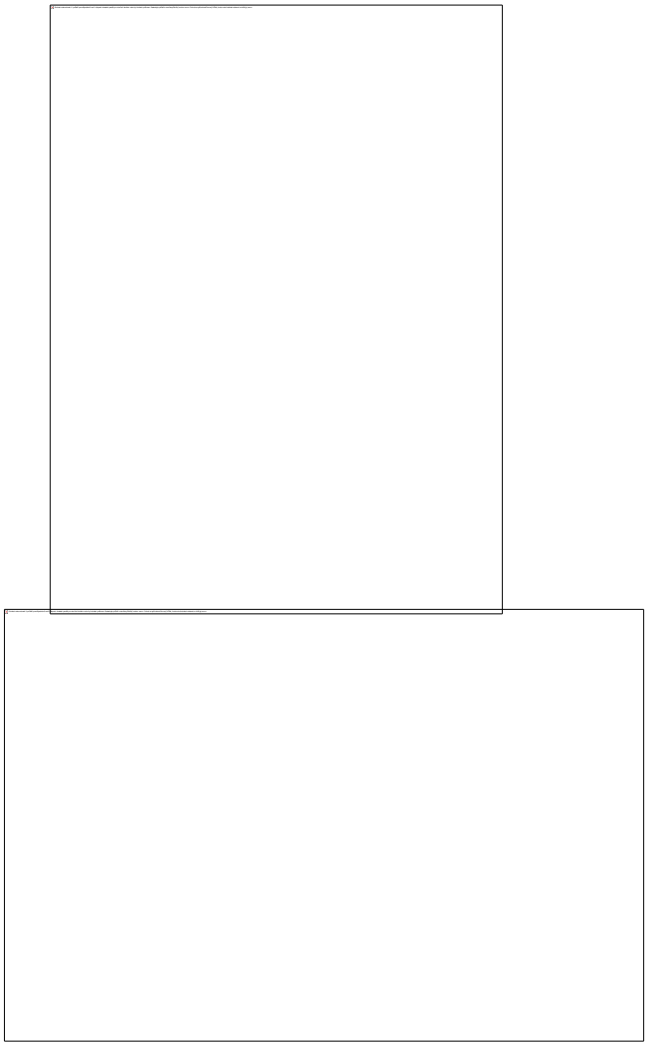
- 1. Stiff
- 2. Soft

- 1. Active
- 2. Passive

Calceotics

Inserts

- Shell inserts
- Helfet heel insert
-



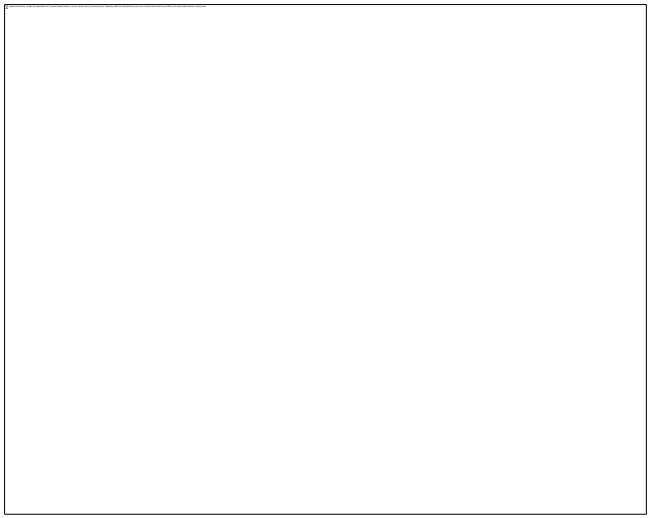
Calceotics

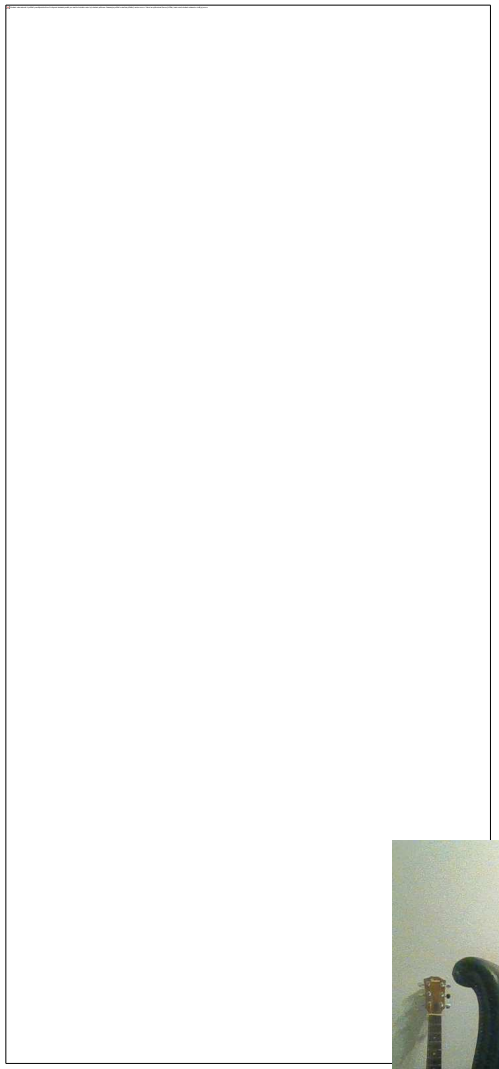
3D

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

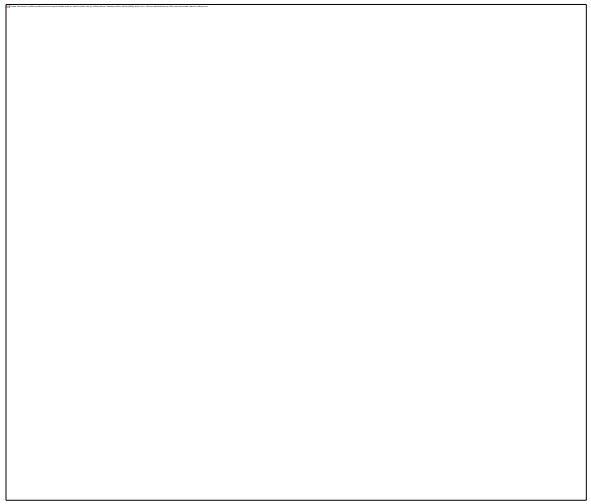
teaching of operator aids

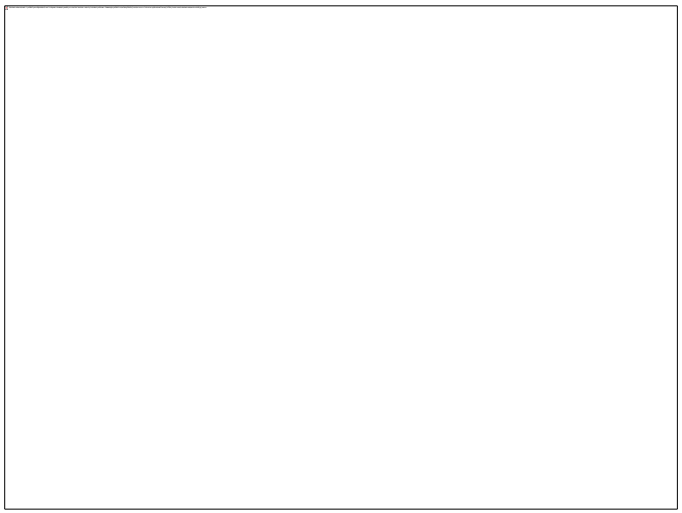
- positioning and fixing
- for locomotion, its training and compensation
- Hygiene
- facilitating the performance of practical activities
- for the implementation of leisure, work activities
-

Adjuvatics

positioning and fixing

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

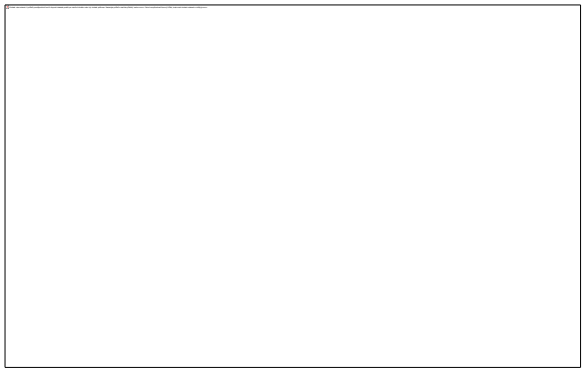


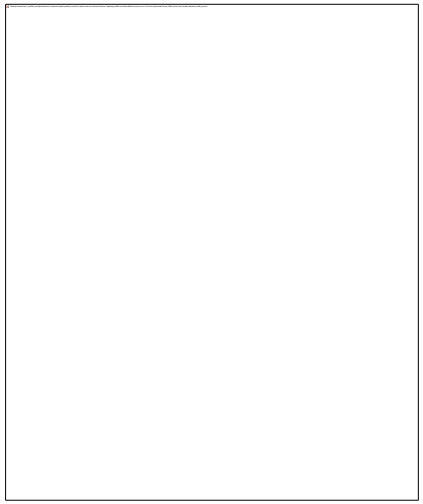


Adjuvatics

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

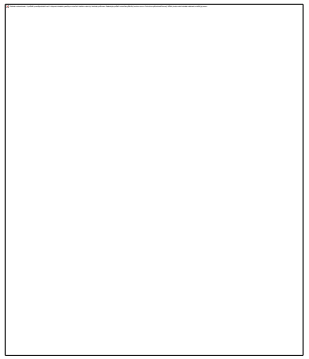
positioning and fixing

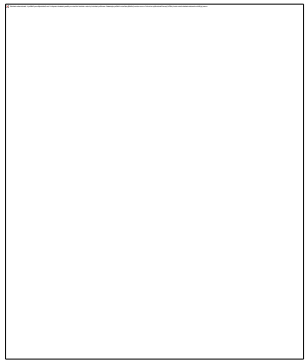
- Positioning, verticalizing stands:
- Fixation in the areas of the feet, calves, knees and thighs, pelvis, hips and hare
- + working stations
- Sliding plate:
- Makes it easy to move from trolley to bed or car

Adjuvatics

For locusming, practicing and compensating

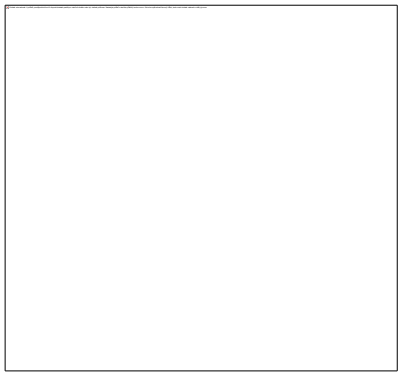
- Medical strollers:
- For children of early age
- Combination with duct wedges, backrests, tables ap
- Rehabilitation carts:
- according to the drive - mechanical x electric
- according to the environment - interior x exterior
- by age - for children, young people and adults
- according to construction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

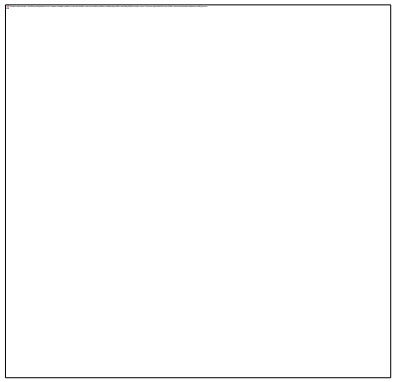


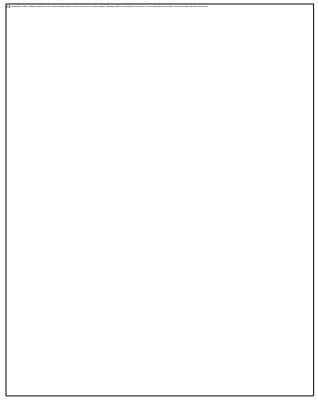


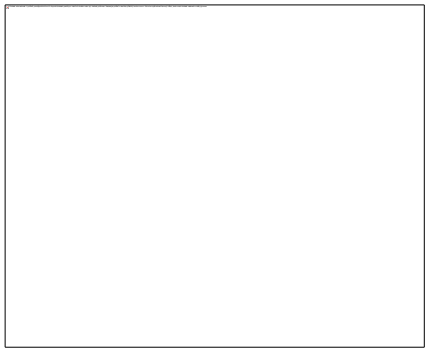
Adjuvatics

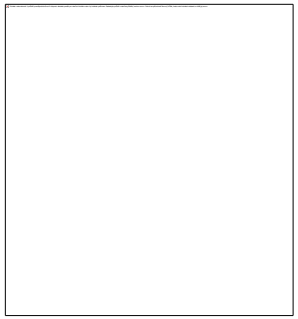
Rehabilitation trucks – mechanical: activating, mechanical, multi-blow, for hemiparetics, amelia, dysmels





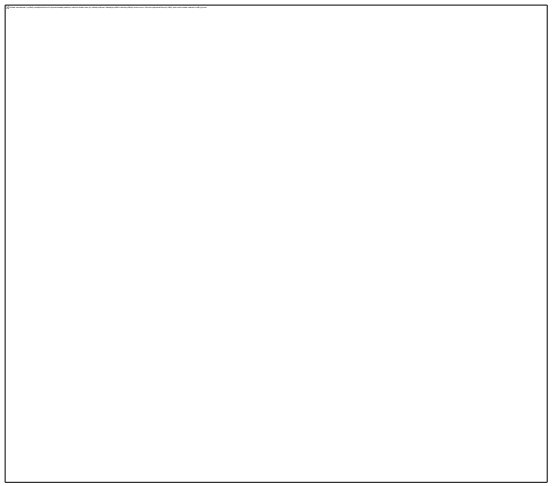


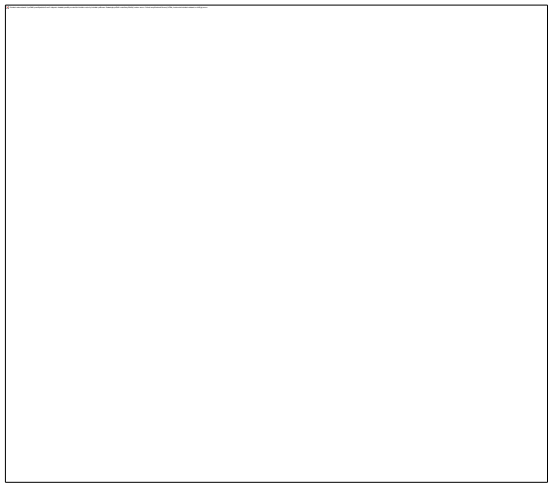


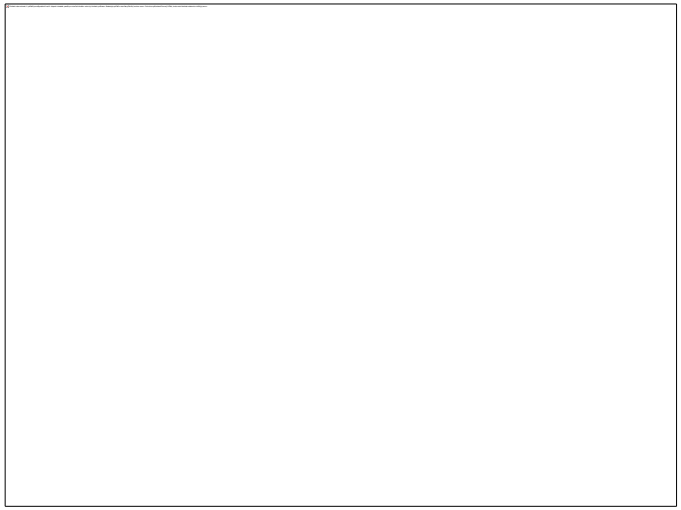


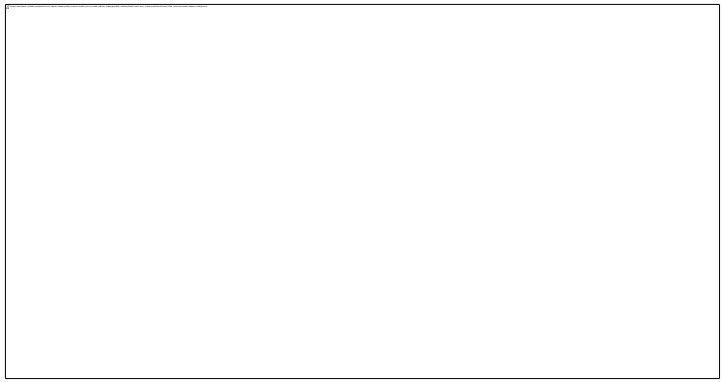
Adjuvatics

Special sports carts: basketball, rugby, tennis, bencykl



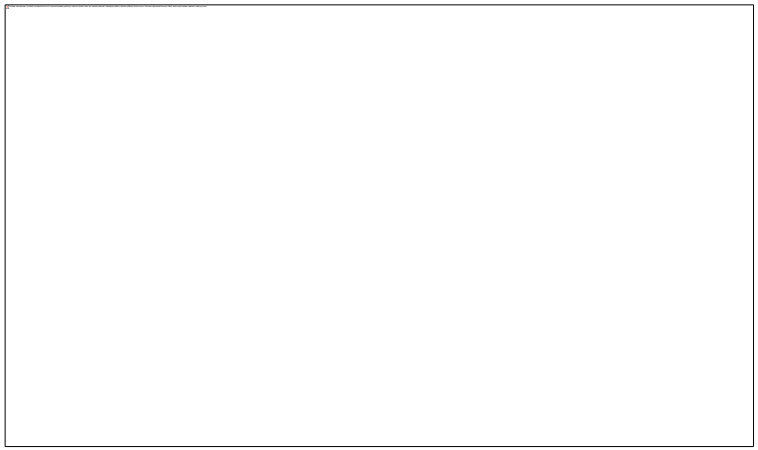


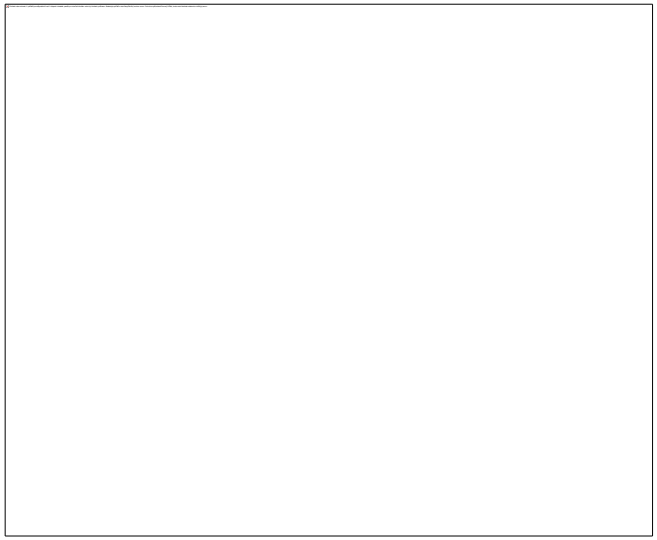


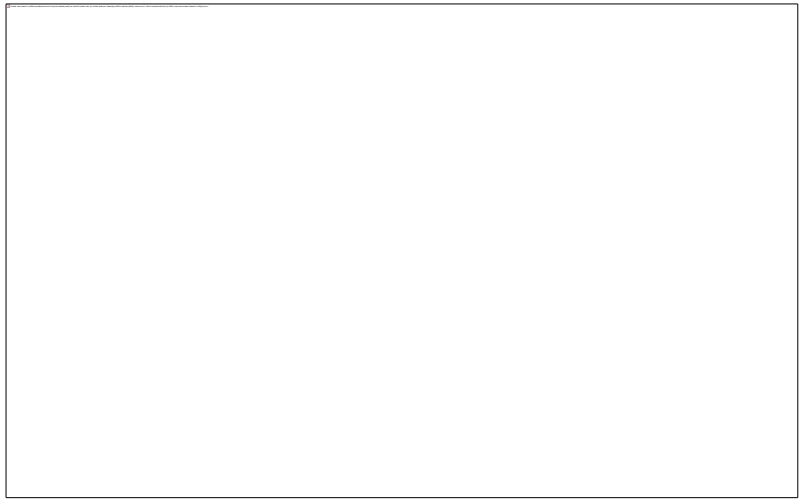


Adjuvatics

For sports: handbike, monocross, monoski







Adjuvatics

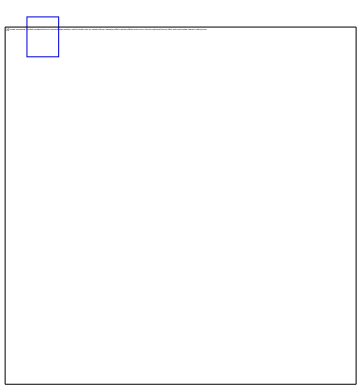
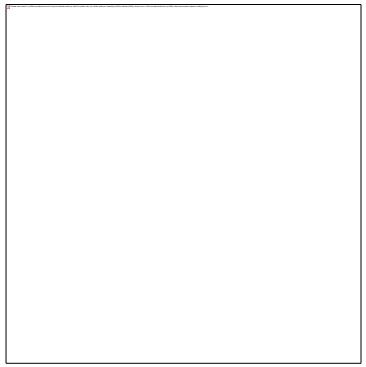
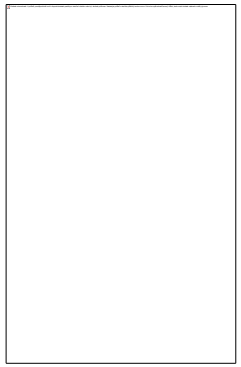
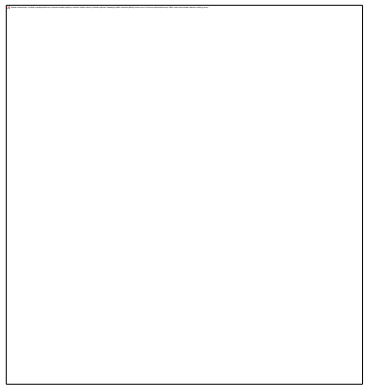
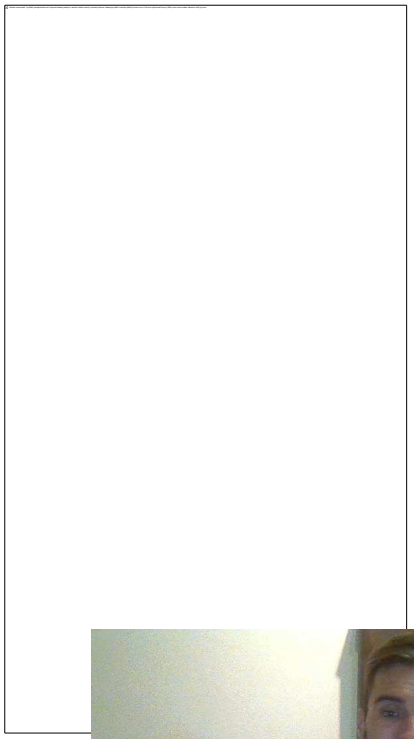
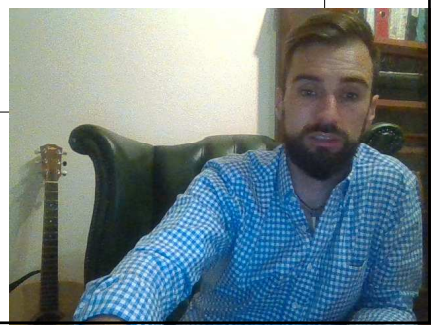
Limb movement trainers, e.g. after operations

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

Adjuvatics

Limb movement trainers, e.g. after operations

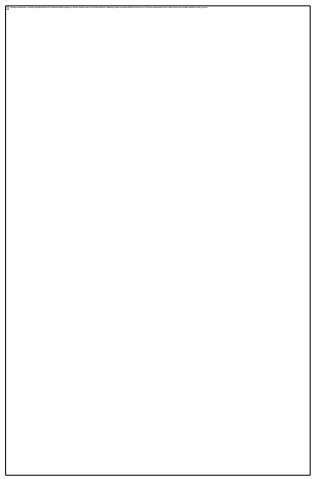
- Climbers: nana for children with cerebral palsy - diparetic form
- Walkers: walking practice:
- Four-point immobile/mobile
- Two-wheeled: mobile
- Three-wheeled....

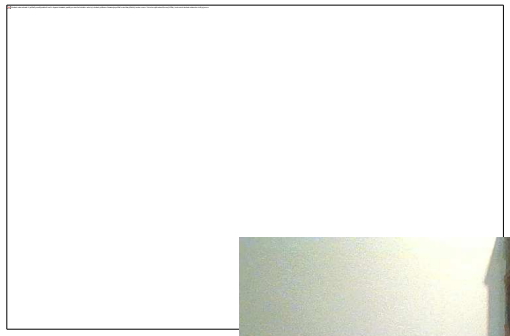







Adjuvatics

Crutches: support function

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

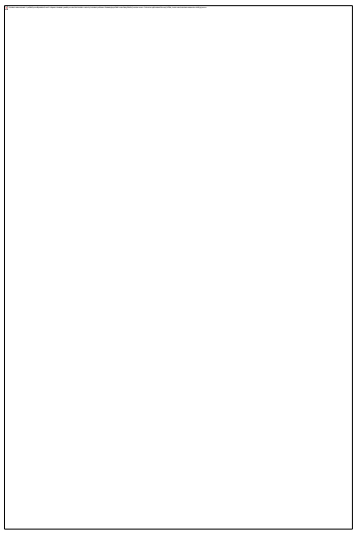
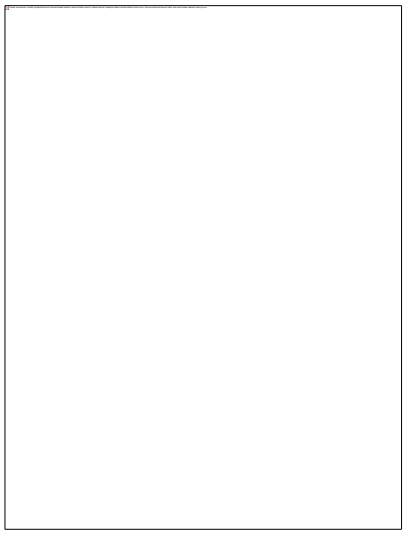
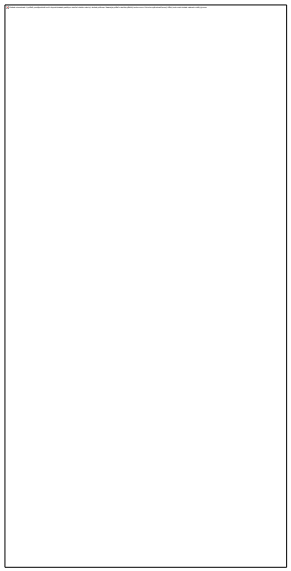
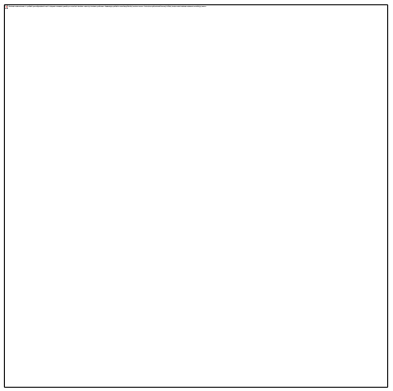


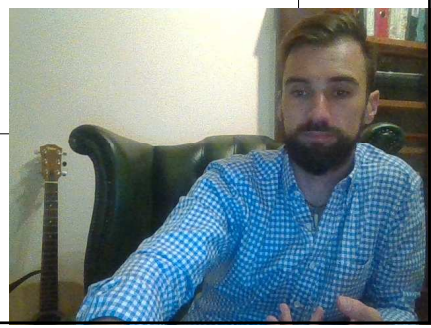


Adjuvatics

Overcoming barriers

- Stair platforms: oblique, vertical
- „stairclimbers“
- ramps
-

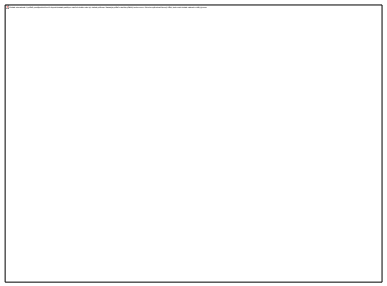





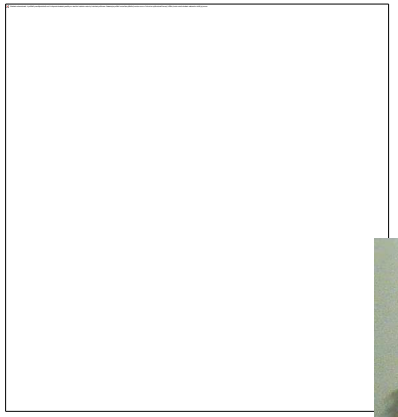


Adjuvatics

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

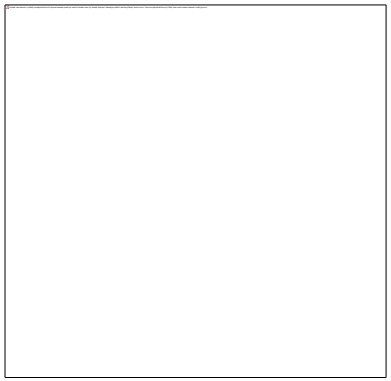


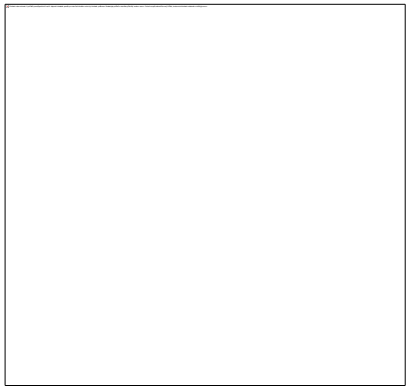


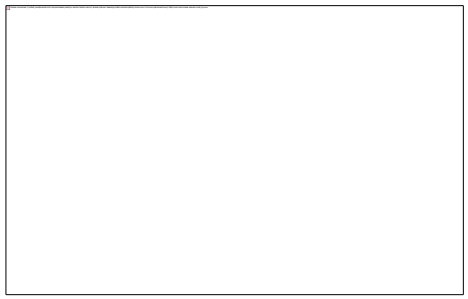
Adjuvatics

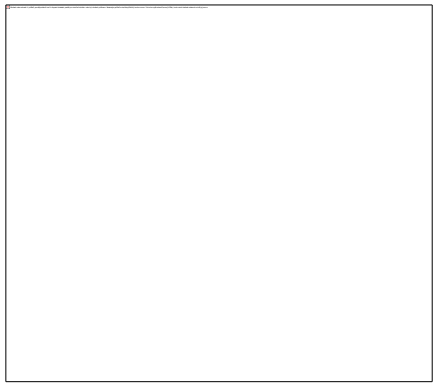
Usnadňující výkon praktických činností

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









Adjuvatics

IT

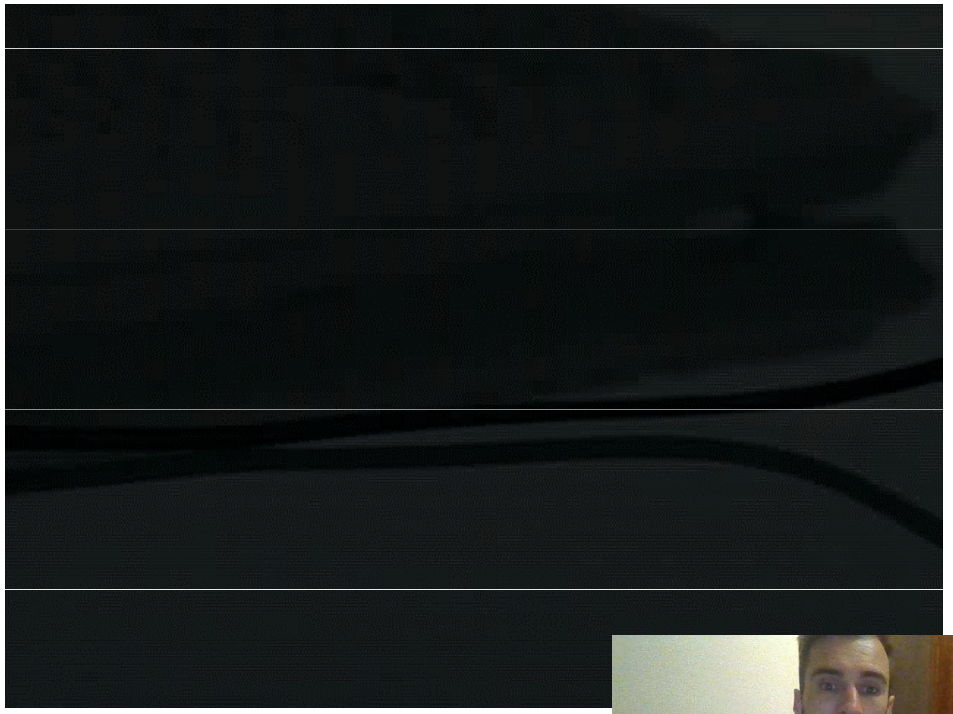
- Trackball, mouse
- Keyboard
-

Adjuvatics

IT

Adjuvatics

Smart NAV a 14 Control

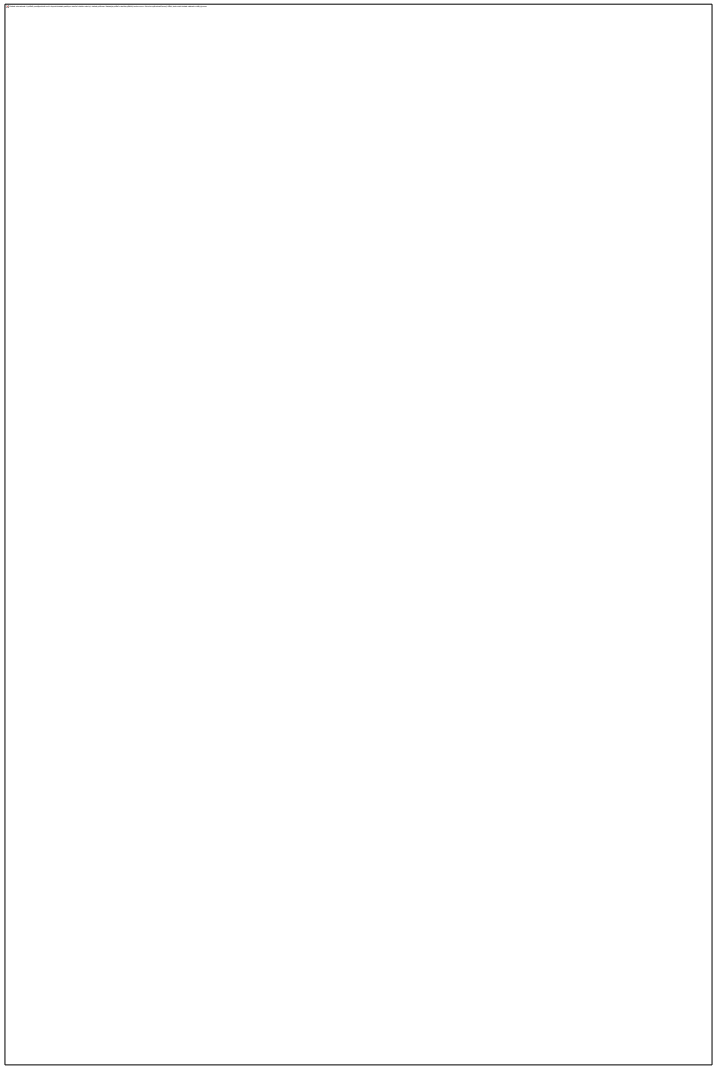


Adjuvatics

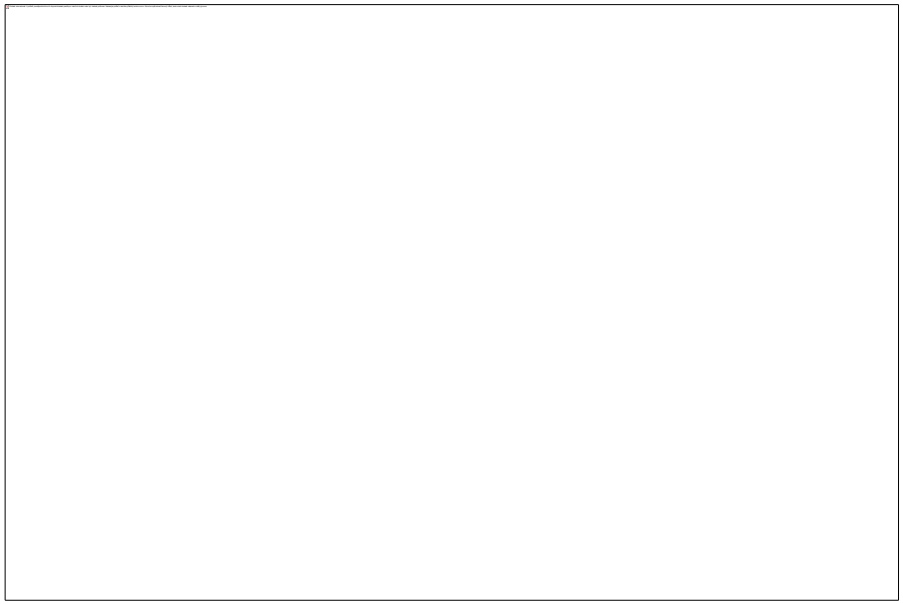
Strollers, trolleys

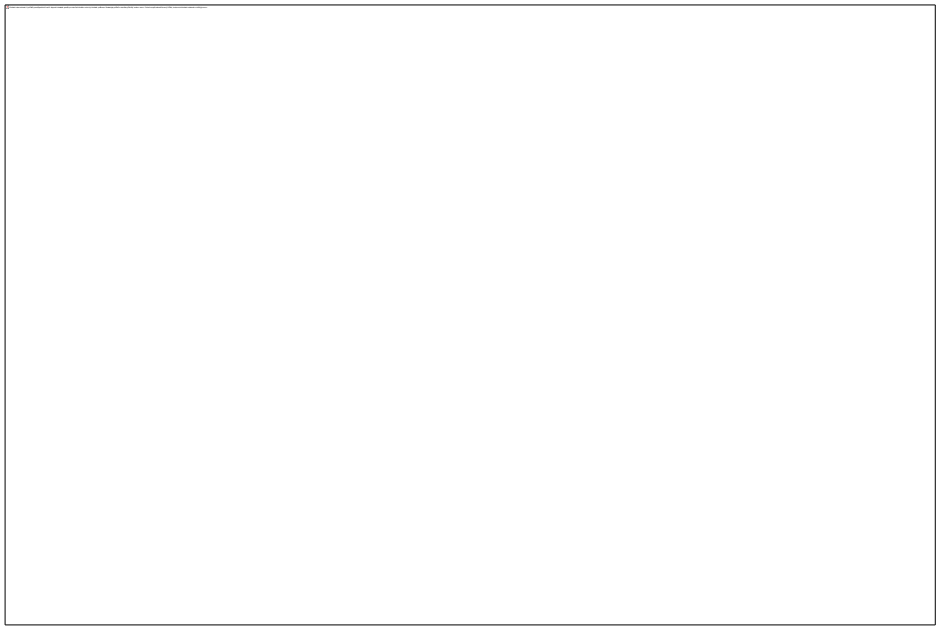
- Medical strollers:
- For children of early age
- Combination with abduction wedges, armrests, tables ap
- Rehabilitation carts:
- according to drive - mechanical x electric
- according to the environment - interior x exterior
- by age - for children, young people and adults
- according to the design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

Conclusion



Conclusion





Conclusion

21st century

Source

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

- BENDOVÁ, P., JEŘÁBKOVÁ, K., RŮŢIČKOVÁ, V. *Kompenzační pomůcky pro osoby se specifickými potřebami.* Olomouc, 2006. ISBN 80-244-1436-8.
- JONÁŠKOVÁ, V. *Protetické pomůcky osob s poruchou mobility*. In Renotiérová M., Ludíková, L. a kol. Speciální pedagogika. Olomouc: UP, 2006. ISBN 80-244-1475-9.
- TŘASOŇOVÁ, Miroslava, LF MU 2005 PPT
- http://www.oajl.cz, http:// www.ms-protetik.cz, http:// www.ergon.czm ,http:// www.altech-uh.cz, http:// www.ortoservis.cz, http:// www.zdravotniprodejna.cz
- http:// www.medicco.cz, http:// www.meyra.cz, http:// www.dmapraha.cz, http:// www.petit-os.cz
- Janíček, P.: Ortopedie. Lékařská fakulta MU v Brně, 2001 Spoluautoři: Dufek, P., Chaloupka, R., Krbec, M.,Poul, J.,Procházka, P., Rozkydal, Z.
- Näder, E.M., Näder, H.G., Blomke, F: Otto- Bock Prothesen- Kompendium Prothesen für die untere Extermität. 2. Auflage, Schiele and Schön, 1993.
- Otto Bock: Technische Information, 2.3.5. ISNY – Island- Schweden, New York, 1990.
- Sosna, A., Vavřík, P., Krbec, M., Pokorný, D.: Základy ortopedie. Triton, 2001.
- Fotografie z LAOS (soukromá databáze Jan Kocanda)

Source

1. Scheuermann HW. Kyphosis dorsalis juvenilis. Orthop Chir. 1921;41:305–317.
2. Sorensen KH. Scheuermann's Juvenile Kyphosis: clinical appearances, radiography, aetiology and prognosis. Munksgaard; Copenhagen: 1964.
3. Stoddasd A, Osborn JF. Scheuermann's disease or spinal osteochondrosis: its frequency and relationship with spondylosis. J Bone Joint Surg Br. 1979;61(1):56–58.
4. Taylor TC, Wenger DR, Stephen J, Gillespie R, Bobechko WP. Surgical management of thoracic kyphosis in adolescents. J Bone Joint Surg Am. 1979;61(4):496–503.
5. Ali RM, Green DW, Patel TC. Scheuermann's kyphosis. Curr Opin Pediatr. 1999;11(1):70–75.
6. Bradford DS. Juvenile kyphosis. In: Lonstein JE, Bradford DS, Winter RB, Ogilvie J, editors. Moe's textbook of scoliosis and other spinal deformities. 3rd ed. Saunders; Philadelphia: 1995. pp. 349–367.
7. 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
8. Gilsanz V, Gibbens DT, Carlson M, King J. Vertebral bone density in Scheuermann disease. J Bone Joint Surg Am. 1989;71(6):894–897
9. Lopez RA, Burke SW, Levine DB, Schneider R. Osteoporosis in Scheuermann's disease. Spine. 1988;13(10):1099–1103.
10. Lowe TG. Scheuermann disease. J Bone Joint Surg Am. 1990;72(6):940–945
11. Aufdermaur M. Juvenile kyphosis (Scheuermann's disease): radiography, histology, and pathogenesis. Clin Orthop Relat Res. 1981;(154):166–174.
12. Ferguson AB., Jr The etiology of preadolescent kyphosis. J Bone Joint Surg Am. 1956;38(1):149–157
13. Scoles PV, Latimer BM, Diglovanni BF, Vargo E, Bauza S, Jellema LM. Vertebral alterations in Scheuermann's kyphosis. Spine. 1991;16(5):509–515
14. Bradford DS, Moe JH, Montalvo FJ, Winter RB. Scheuermann's kyphosis. Results of surgical treatment by posterior spine arthrodesis in twenty-two patients. J Bone Joint Surg Am. 1975;57(4):439–448.
15. Murray PM, Weinstein SL, Spratt KF. The natural history and long-term follow-up of Scheuermann kyphosis. J Bone Joint Surg Am. 1993;75(2):236–248.
16. Tribus CB. Scheuermann's kyphosis in adolescents and adults: diagnosis and management. J Am Acad Orthop Surg. 1998;6(1):36–43.
17. Gill JB, Levin A, Burd T, Longley M. Corrective osteotomies in spine surgery. J Bone Joint Surg Am. 2008;90(11):2509–2520
18. Berven SH, Deviren V, Smith JA, Hu SA, Bradford DS. Management of fixed sagittal plane deformity: outcome of combined anterior and posterior surgery. Spine (Phila Pa 1976) 2003;28:1710–1716.
19. Bridwell KH. Decision making regarding Smith-Petersen vs. pedicle subtraction osteotomy vs. vertebral column resection for spinal deformity. Spine (Phila Pa 1976) 2006;31(19 Suppl):S171–S178
20. Lee SS, Lenke LG, Kuklo TR, Valenté L, Bridwell KH, Sides B, Blanke KM. Comparison of Scheuermann kyphosis correction by posterior-only thoracic pedicle screw fixation versus combined anterior/posterior fusion. Spine (Phila Pa 1976) 2006;31(20):2316–2321
21. Macedo RD, Fontes BPC, Cunha FM, Werlang PM. Sistema de parafusos pediculares no tratamento de deformidades vertebrais: Rev Bras Ortop. 2006;41(10):417–424.
22. Suk SI, Kim WJ, Lee SM, Kim JH, Chung ER. Thoracic pedicle screw fixation in spinal deformities: are they really safe? Spine (Phila Pa 1976) 2001;26(18):2049–2057.
23. Kim YJ, Lenke LG, Bridwell KH, Cho YS, Riew KD. Free hand pedicle screw placement in the thoracic spine: is it safe? Spine (Phila Pa 1976) 2004;29(3):333–342
24. Bradford DS, Ahmed KB, Moe JH, Winter RB, Lonstein JE. The surgical management of patients with Scheuermann's disease: a review of twenty-four cases mana
posterior spine fusion. J Bone Joint Surg Am. 1980;62(5):705–712

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