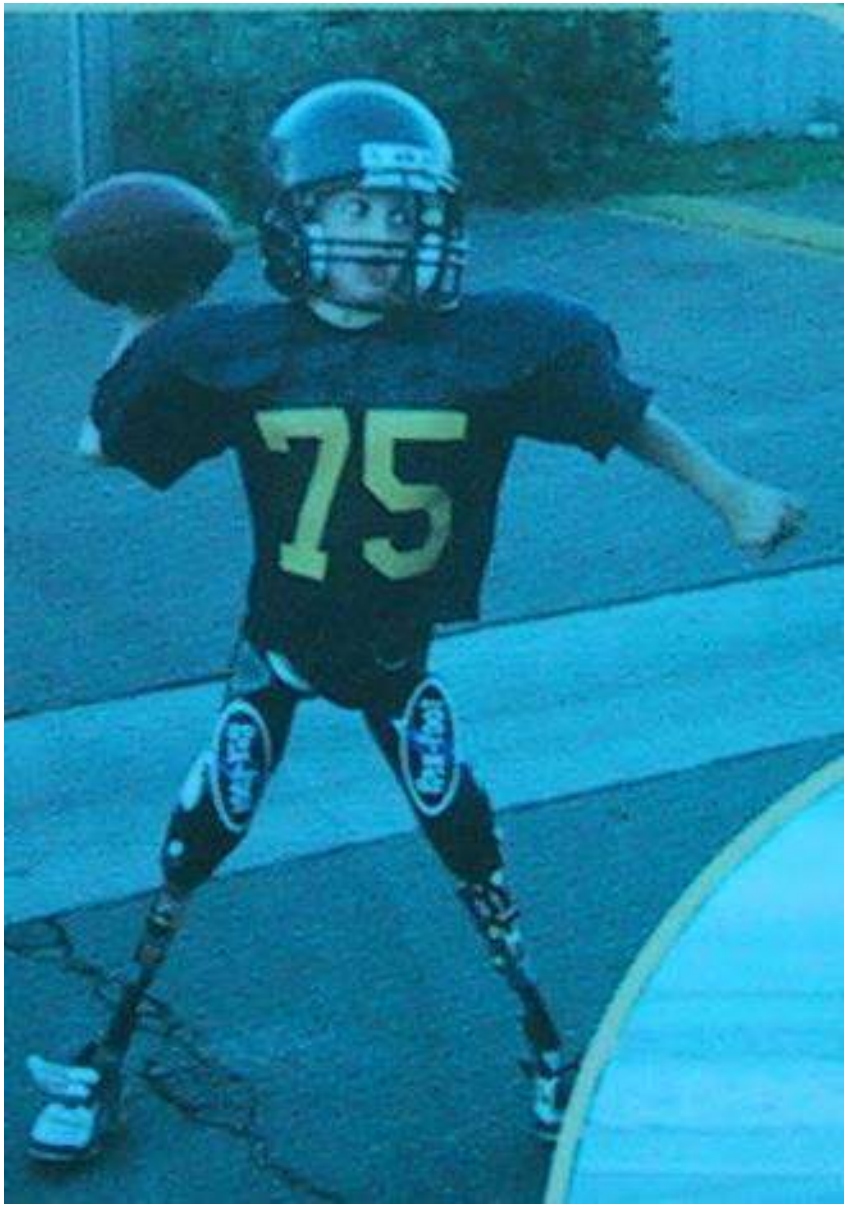
Razlika v dolžini spodnjih udov



Razlika v dolžini spodnjih udov

- Anisomelia- skrajšanost
- Preteklost: polio
- Sedanjost:

1. Kongenitalno- razvojne anomalije
2. Motnje rasti- poškodba, vnetje
3. Po zlomih

- Pospešena rast:

1. Kongenitalno, žilne deformacije
2. Vnetja (RA, zlomi)

- Npr. 2/3 ameriških vojakov razlika nekaj mm do 2 cm, desna krajša

Razlogi za razliko v dolžini

Fig. 4..31 Causes of Limb Length Discrepancy. The common causes of limb shortening and lengthening are shown.

CATEGORY	SHORTENING	LENGTHENING
CONGENITAL	Aplasia Hypoplasia Hip dysplasia Clubfoot	Hyperplasia
NEUROGENIC	Paralysis Disuse	Sympathectomy
VASCULAR	Ischemia Perthes disease	AV fistula
INFECTION	Physeal injury	Stimulation
TUMORS	Physeal involvement	Vascular lesions
TRAUMA	Physeal injury Malunion	Fx stimulation Distraction

Pospešena in zavrta rast

FACTOR	REDUCES	INCREASES
PHYSEAL COMPRESSION	X	
DENERVATION	X	
PHYSEAL ISCHEMIA INJURY	X	
SYMPATHECTOMY		X
AV FISTULA		X
DIVISION PERIOSTEUM		X
STRIPPING PERIOSTEUM		X
INTRAMEDULLARY OBST.		X
FRACTURE DIAPHYSIS		X
FOREIGN BODY REACTION		X
CHRONIC OSTEOMYELITIS		X

Fig. 1.40 Local Factors Affecting Growth.

Razvoj dolgih kosti

- Apozicijska: rast osteoblastov pod periostom – intramembranozna osifikacija in istočasna resorbcija endostalno
- Enhondralna osifikacija: rastne cone
- Remodeliranje kosti: Wolffov zakon

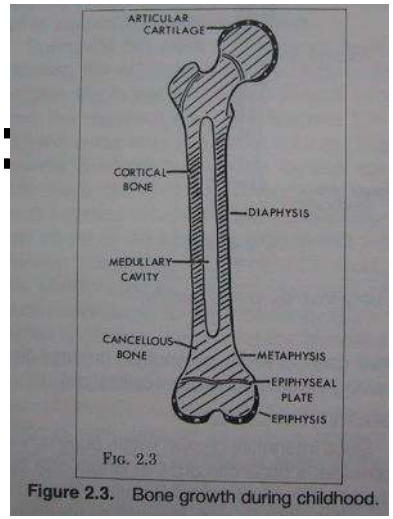


Figure 2.3. Bone growth during childhood.

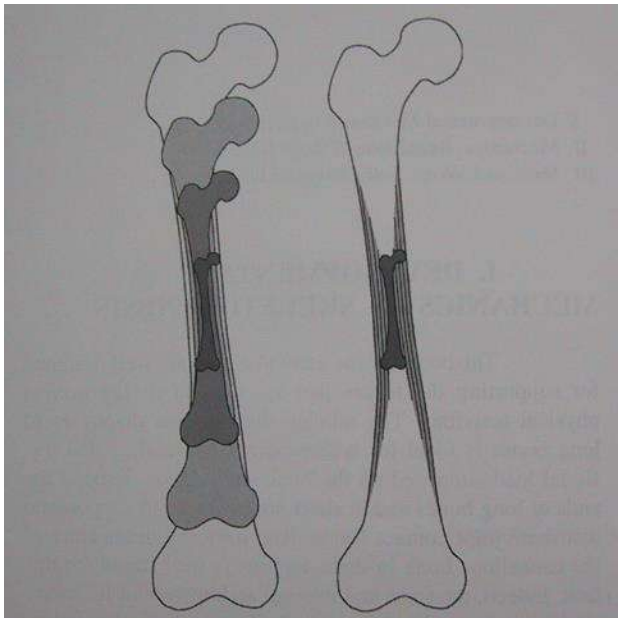
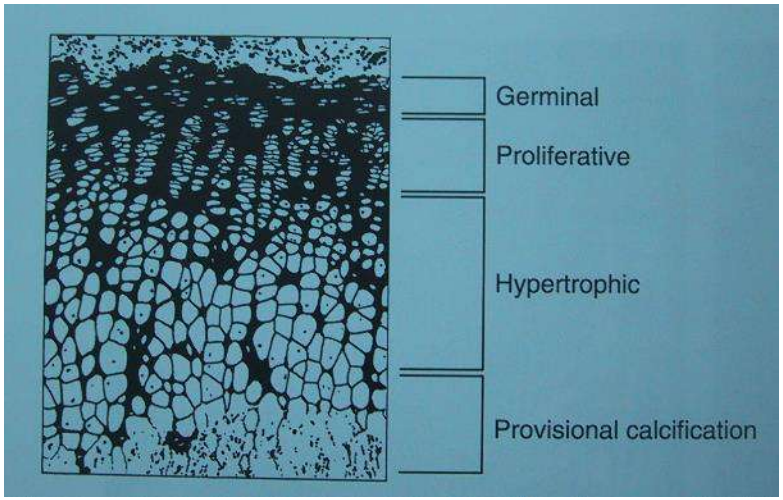
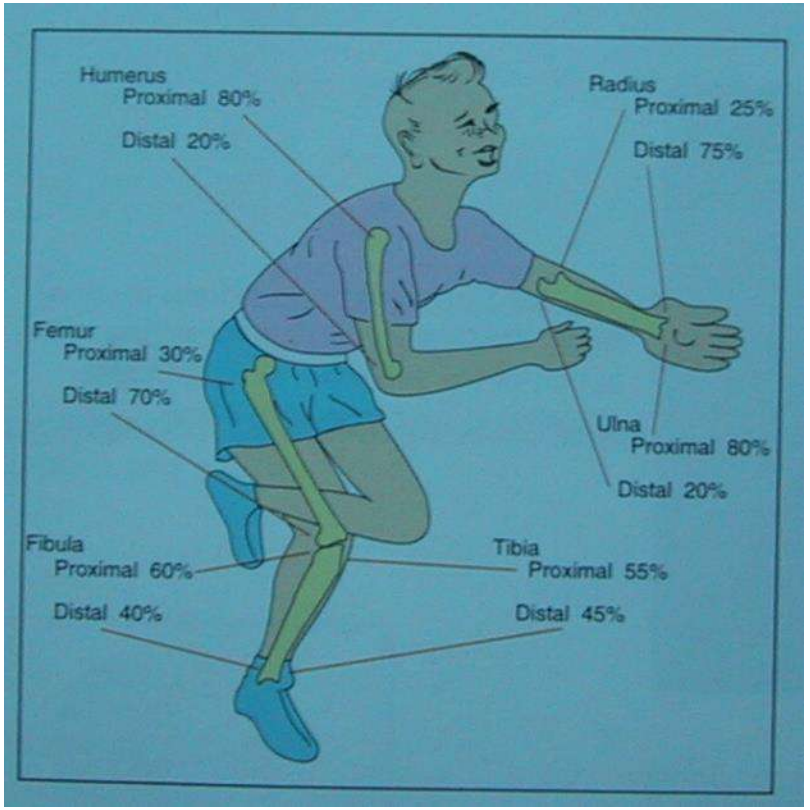


FIGURE 2 Schematic representation of long bone growth. The shaded regions on the right-hand figure are areas of appositional growth. Metaphyseal and epiphyseal cancellous bone is formed by endochondral ossification, shown in the white conical regions and bone ends. Used with permission from Carter *et al.*, *Bone* **18** (Suppl. 1), 5S–10S (1996).

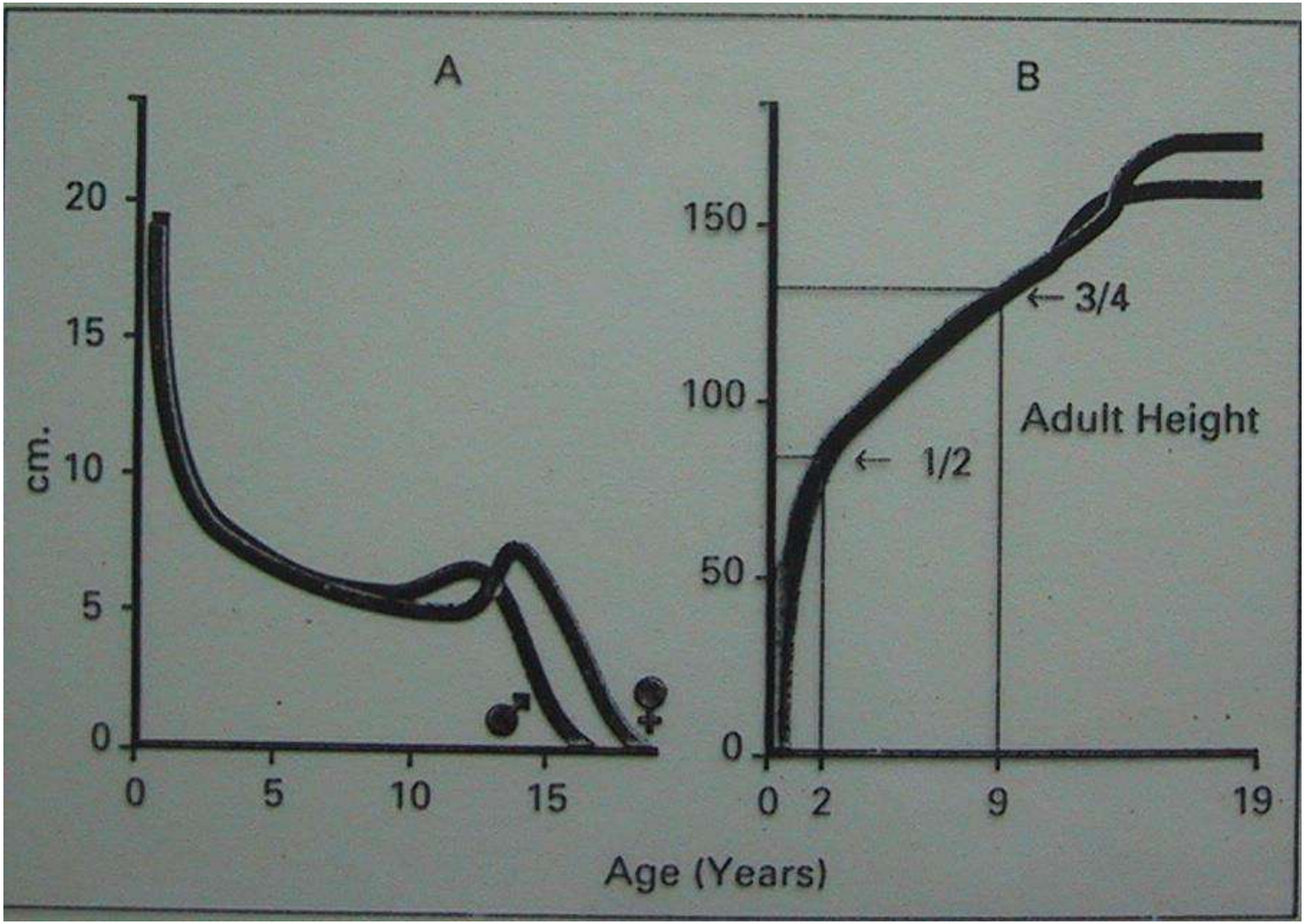
Normalna rast v dolžino

- Prispevek posameznih epifiz





Krivulja rasti



Telesna višina: dečki in deklice

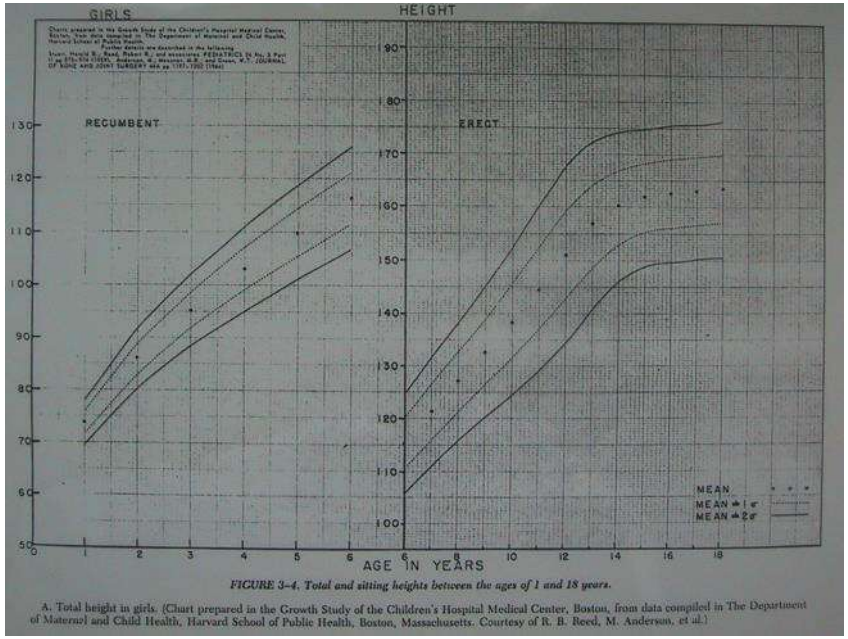


FIGURE 3–4. Total and sitting heights between the ages of 1 and 18 years.

A. Total height in girls. (Chart prepared in the Growth Study of the Children's Hospital Medical Center, Boston, from data compiled in The Department of Maternal and Child Health, Harvard School of Public Health, Boston, Massachusetts. Courtesy of R. B. Reed, M. Anderson, et al.)

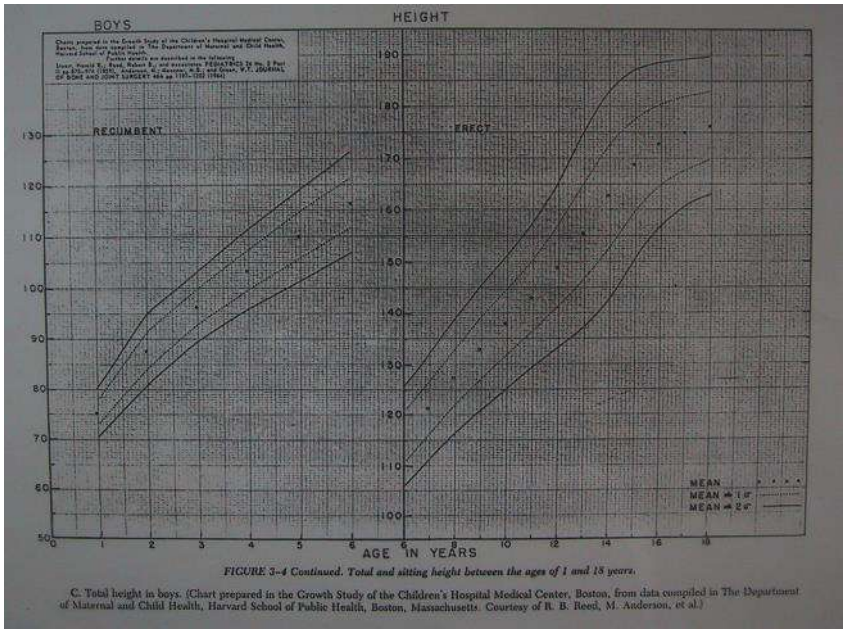


FIGURE 3–4 Continued. Total and sitting height between the ages of 1 and 18 years.

C. Total height in boys. (Chart prepared in the Growth Study of the Children's Hospital Medical Center, Boston, from data compiled in The Department of Maternal and Child Health, Harvard School of Public Health, Boston, Massachusetts. Courtesy of R. B. Reed, M. Anderson, et al.)

Rast stopala

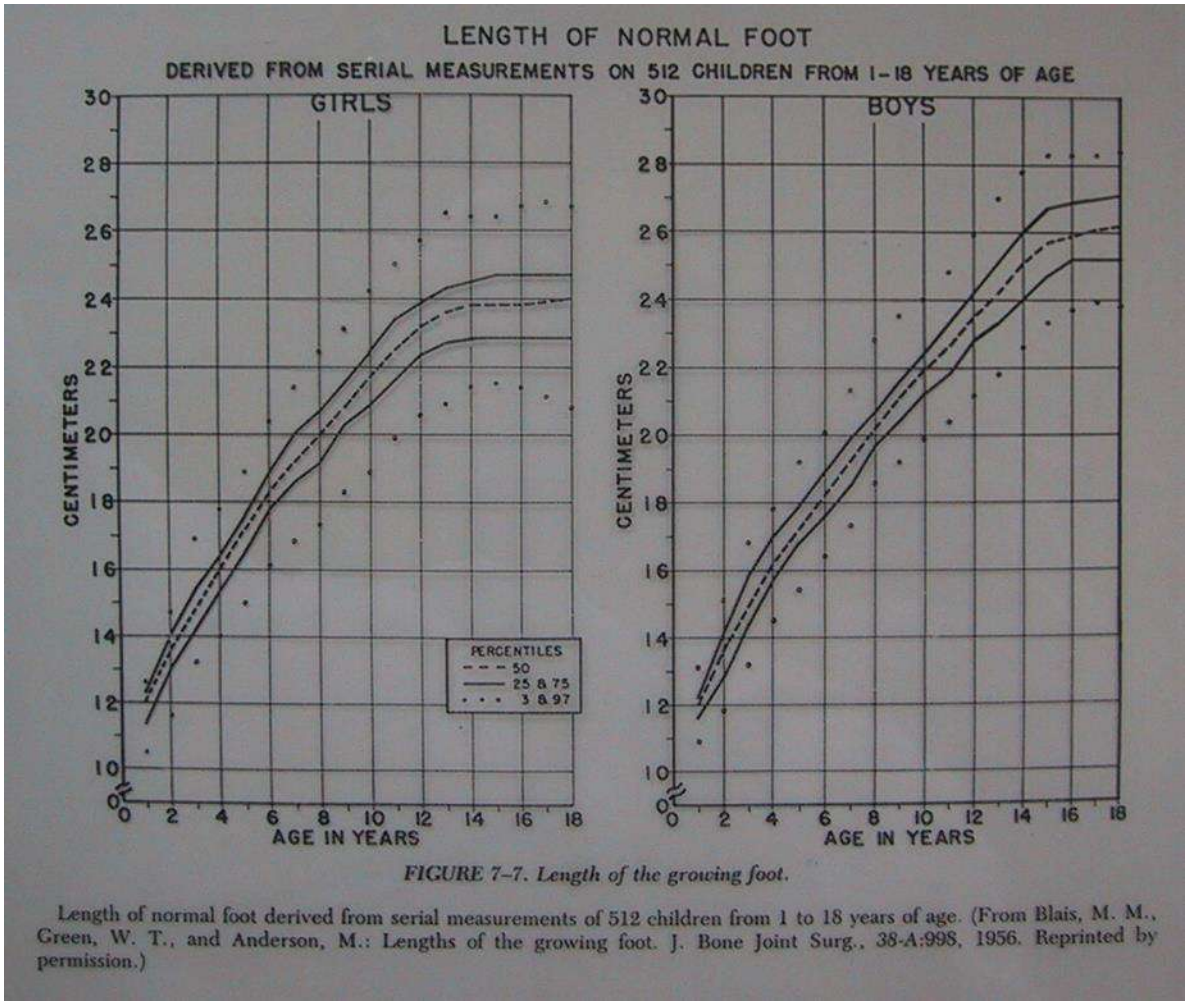
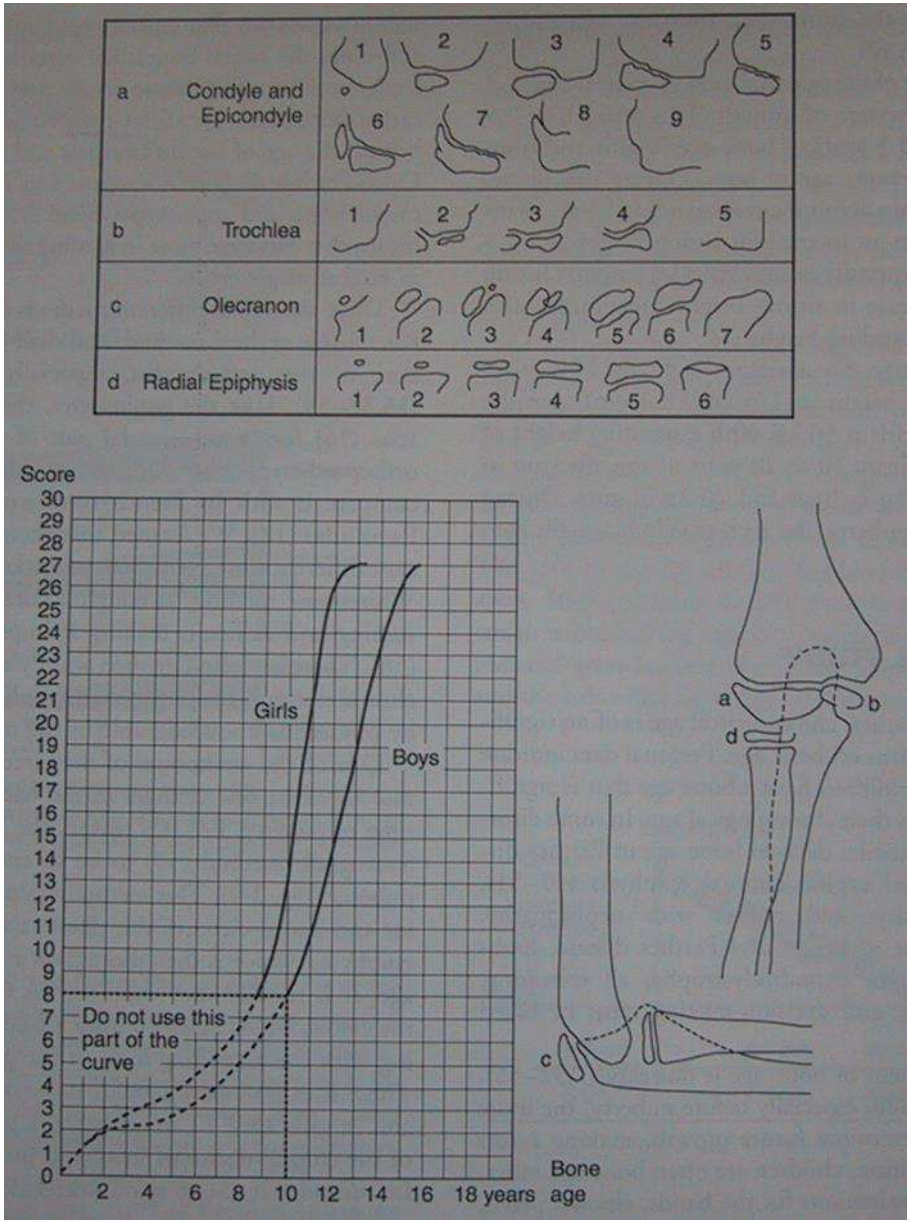


FIGURE 7–7. Length of the growing foot.

Length of normal foot derived from serial measurements of 512 children from 1 to 18 years of age. (From Blais, M. M., Green, W. T., and Anderson, M.: Lengths of the growing foot. J. Bone Joint Surg., 38-A:998, 1956. Reprinted by permission.)

Izračunavanje kostne starosti



Izračunavanje preostanka rasti

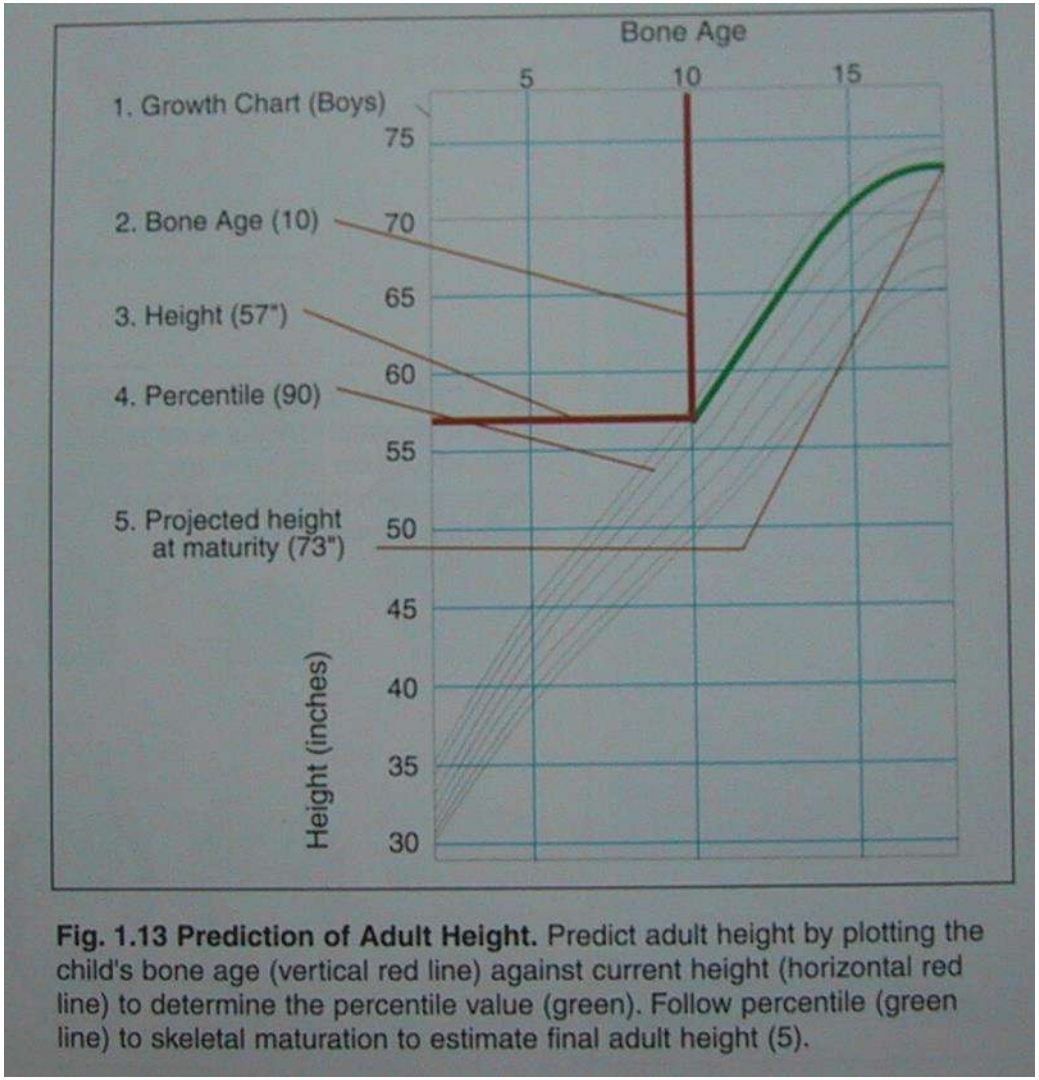
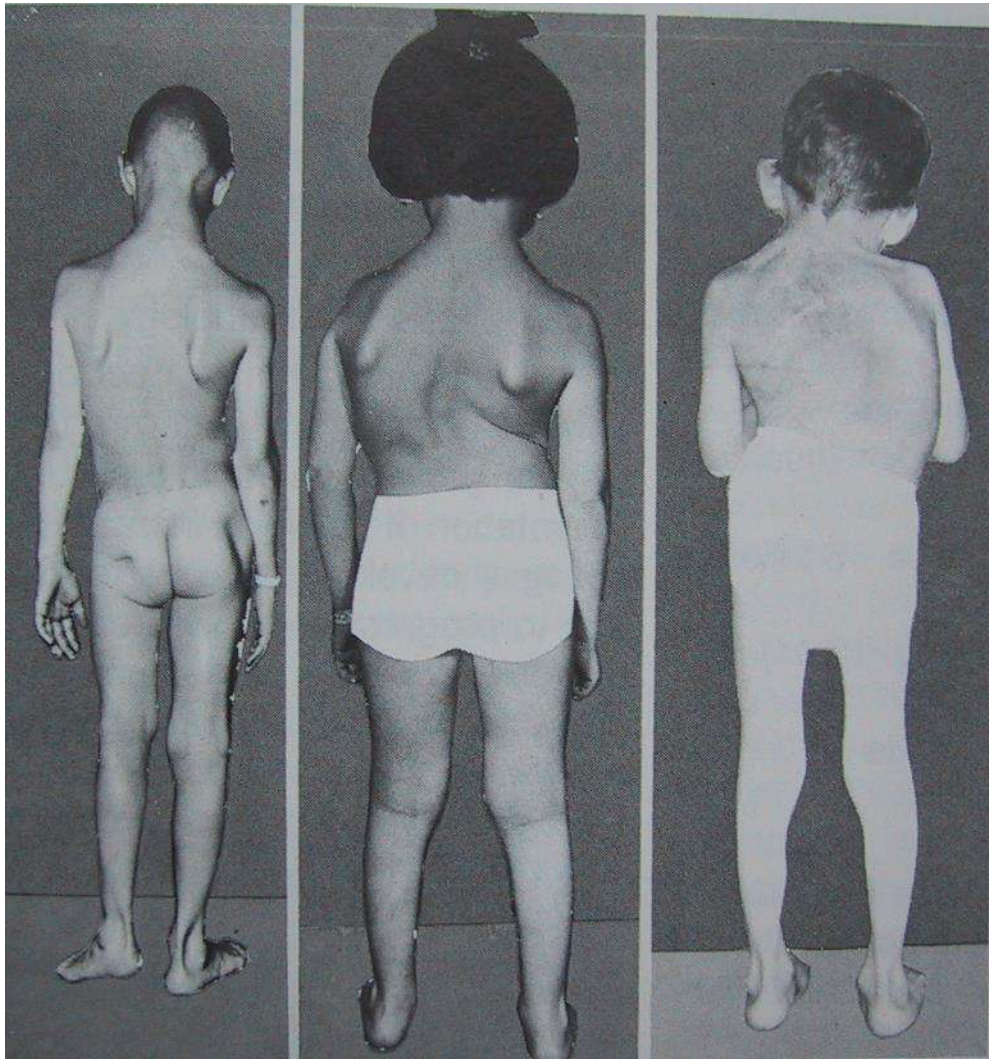


Fig. 1.13 Prediction of Adult Height. Predict adult height by plotting the child's bone age (vertical red line) against current height (horizontal red line) to determine the percentile value (green). Follow percentile (green line) to skeletal maturation to estimate final adult height (5).

Navidezna skrajšanost

- Kontrakture kolka, kolena, gležnja in stopala

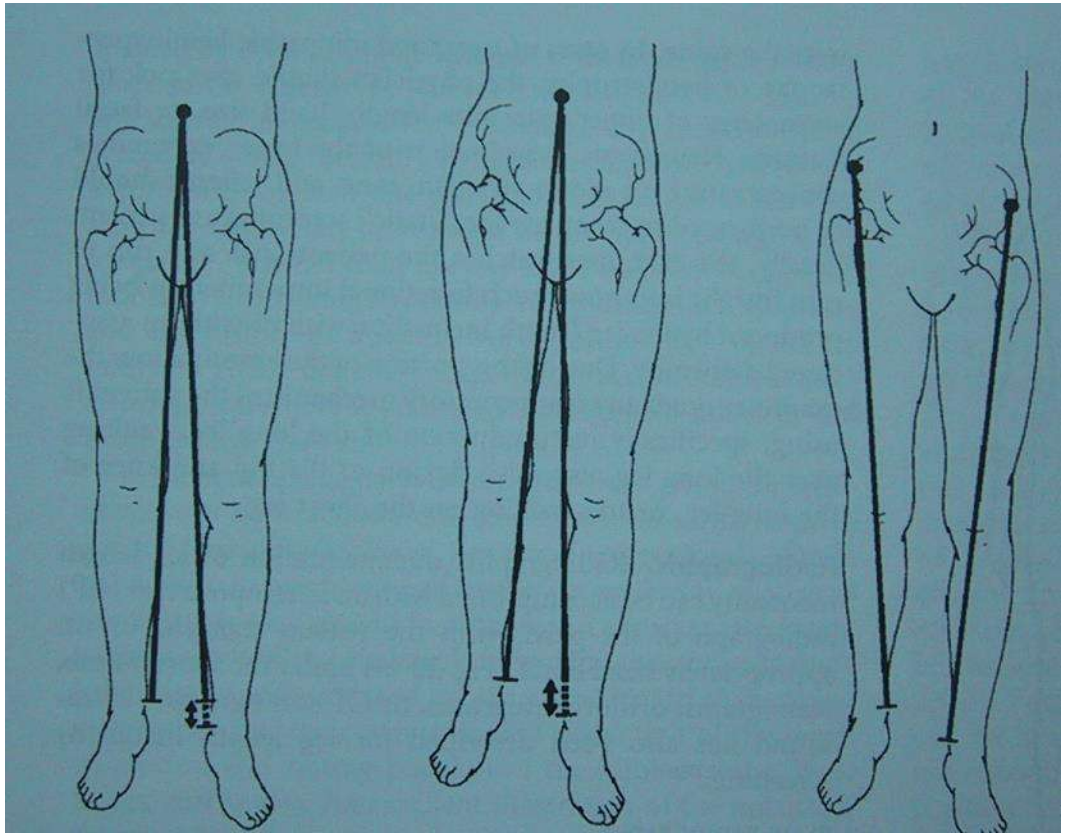
Skolioza



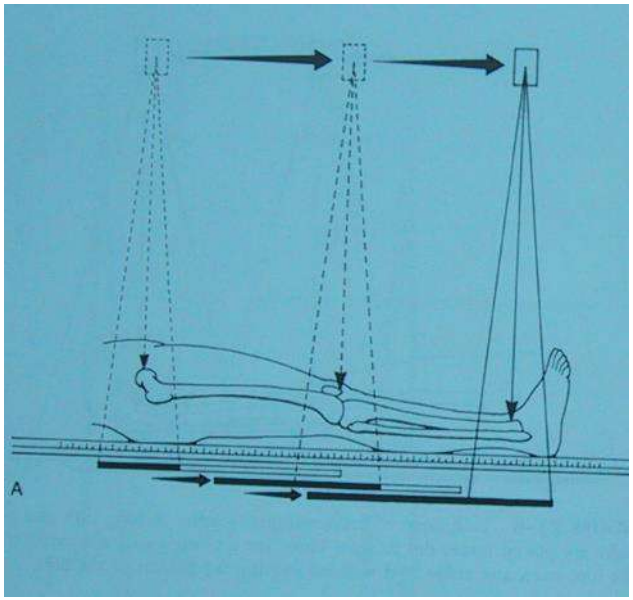
Funkcionalna, kongenitalna, nevromišična

Prava-absolutna skrajšanost

- Stegnenica
- Golenica
- Pod gležnjem

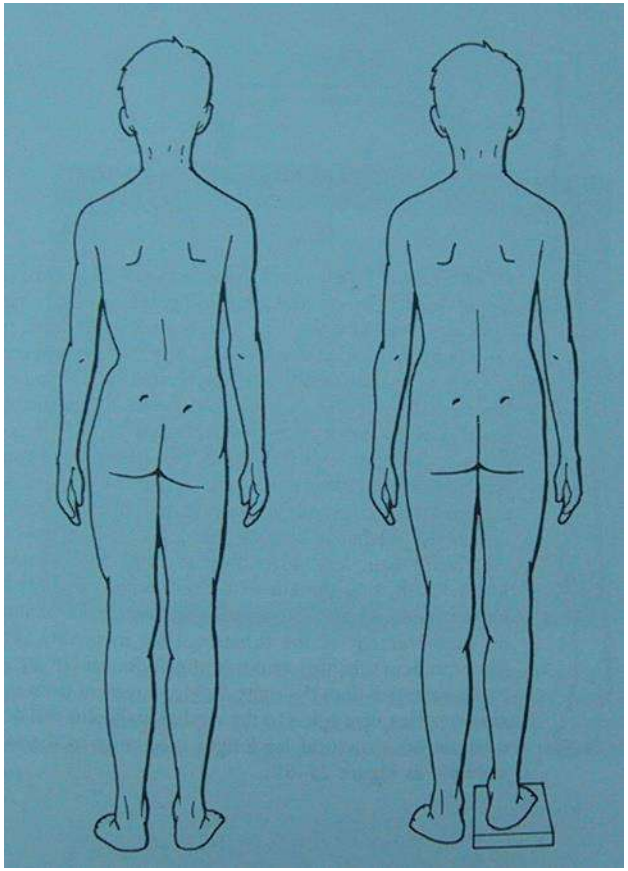


Skanometrija

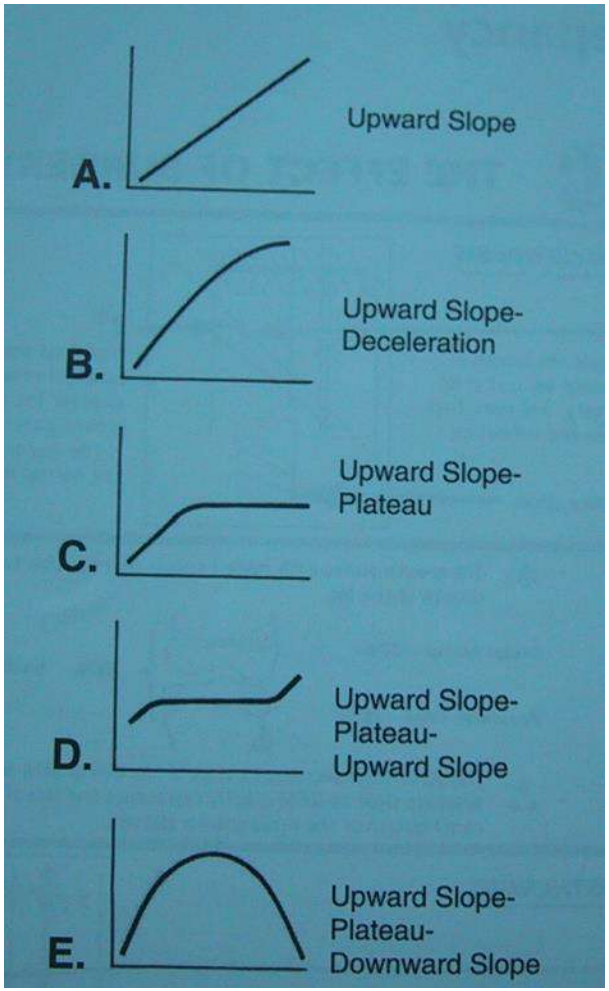


Funkcionalna dolžina

- Klinično ali rtg kolkov stoje AP (ali kolen)
- Osnova za morebitni predpis vložka
- Upošteva vse (tudi kontrakture)

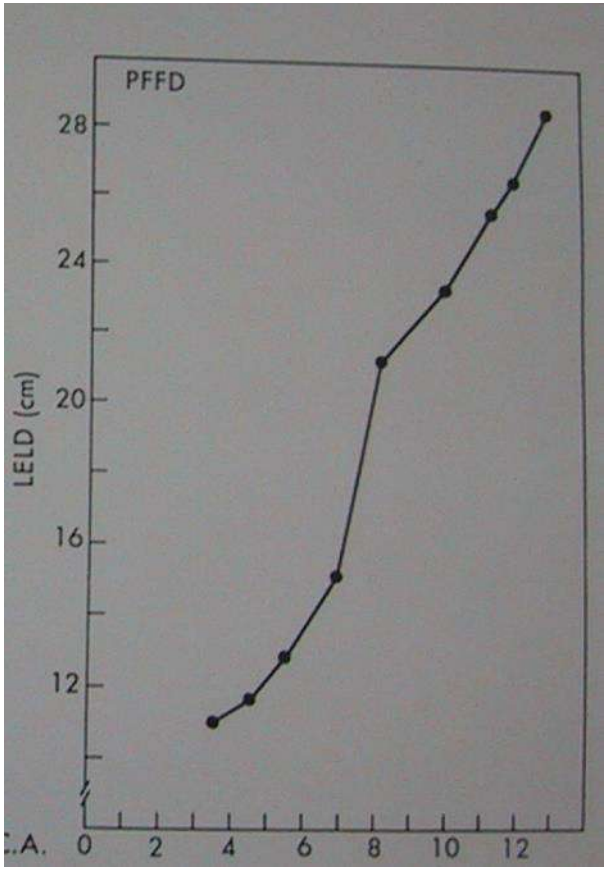


Krivulje razlike v dolžini po Shapiru



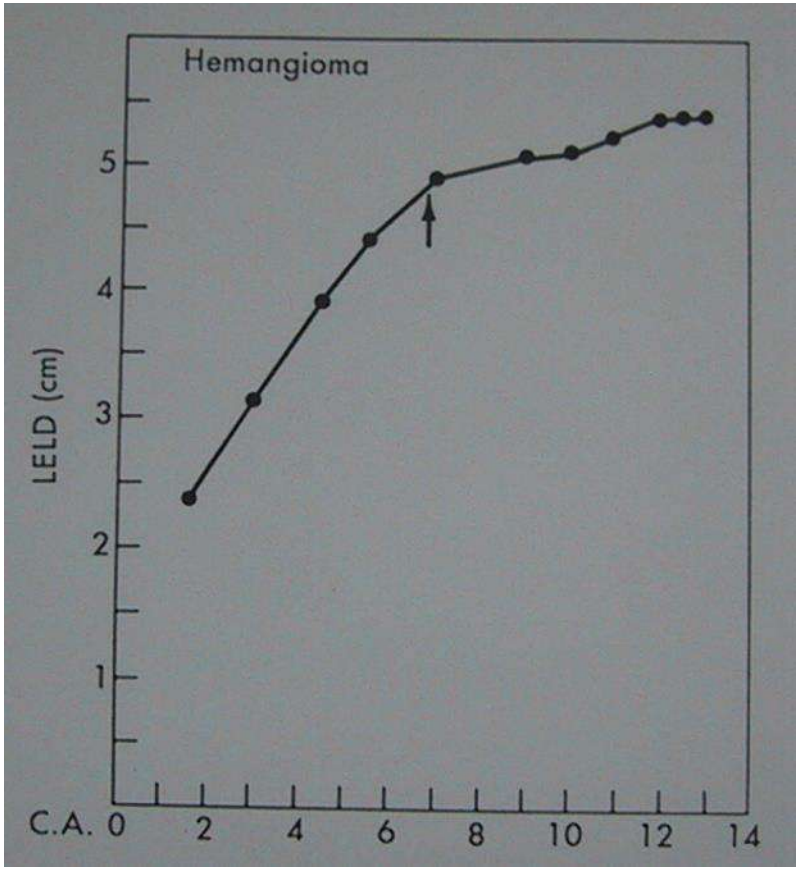
Tip A po Shapiru

- Anizomelija
- Destrukcija apifiz
- PFFD



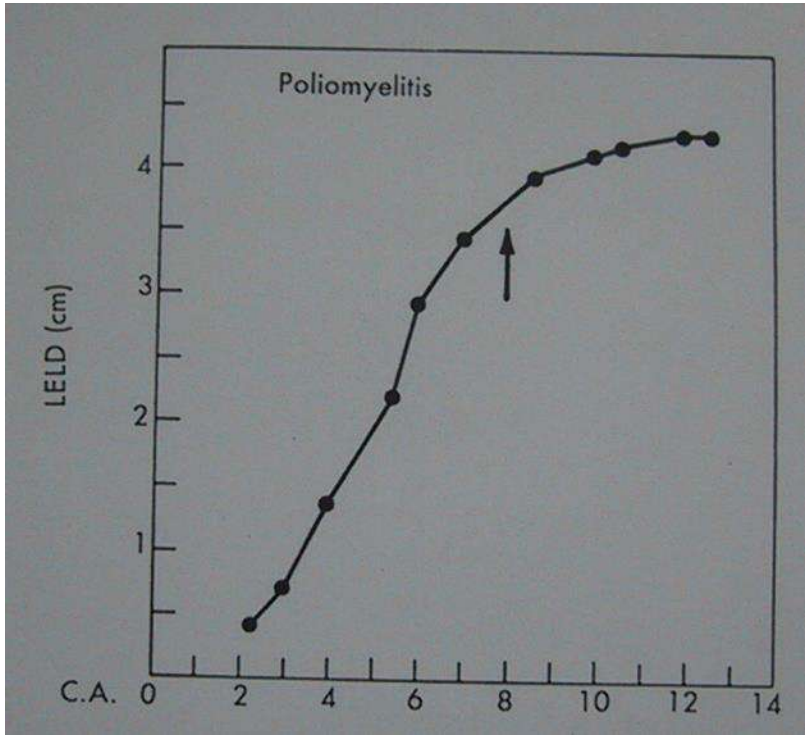
Tip B po Shapiru

- Težko napovedati končno razliko
- Hemangiom, septični artritis, zlom stegnenice



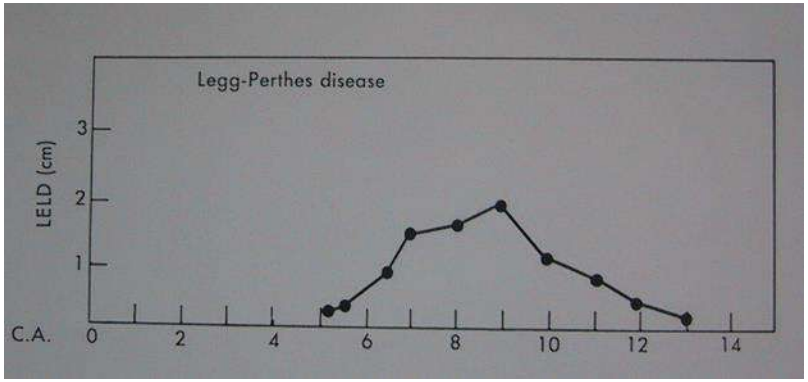
Tip C po Shapiru

- Poliomielitis
- Pretirana rast po anatomski repoziciji femurja

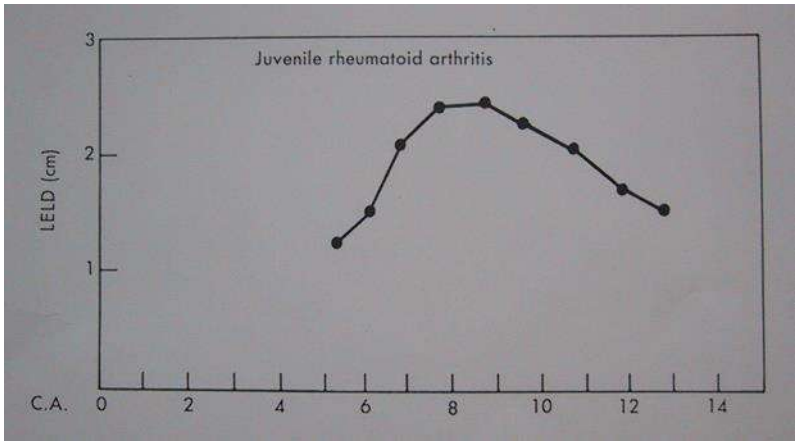


Tip D po Shapiru

- Bolezni proksimalne epifize v otroštvu

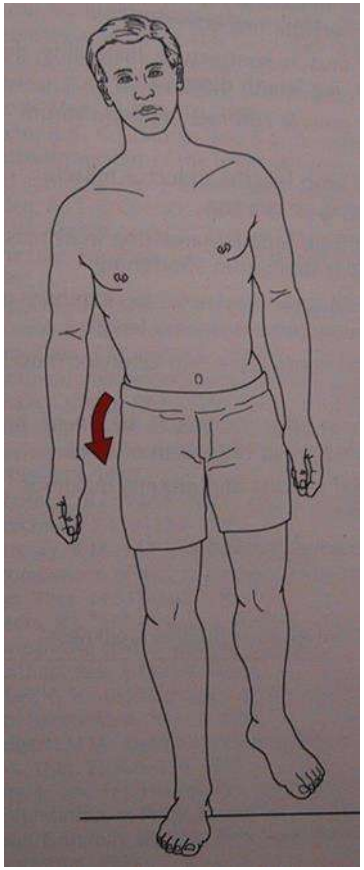


- Hemangiom, JRA



Klinična slika

- Neboleče šepanje zaradi skrajšanosti
- Pogojuje jo osnovna bolezen, upoštevati je potrebno vse, ne samo razlike v dolžini (gibljivost, moč, senzibilnost, koordinacija, CŽS itd)
- Deformacije so praviloma dolgo časa neboleče, kasneje se razvije bolečina zaradi degenerativnih sprememb

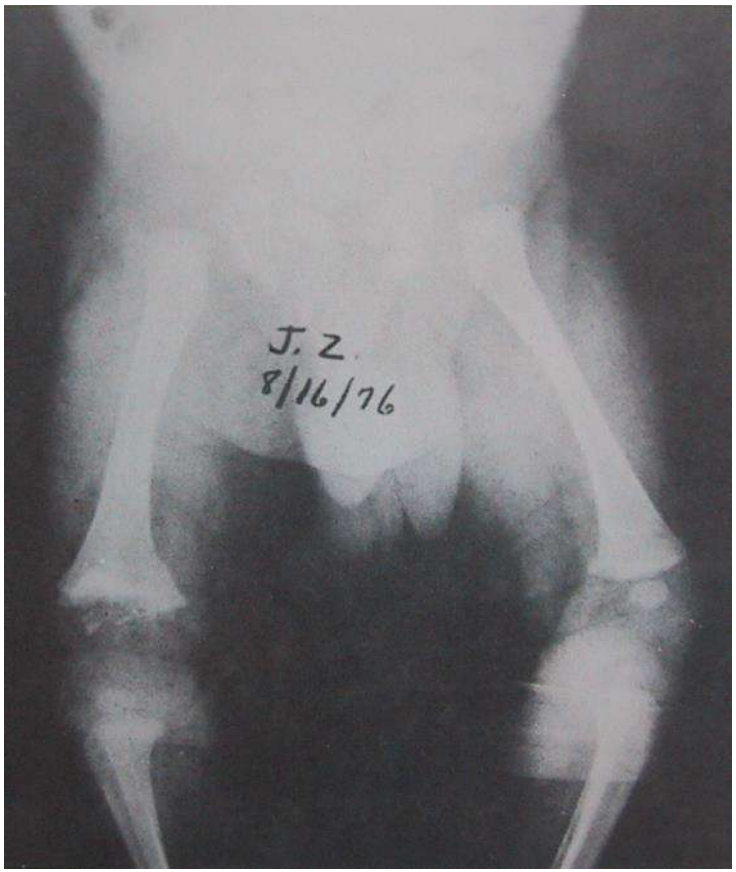


Short leg gait

Nagib medenice navzdol, supinacija Stopala, na zdravi strani pretirana fl.

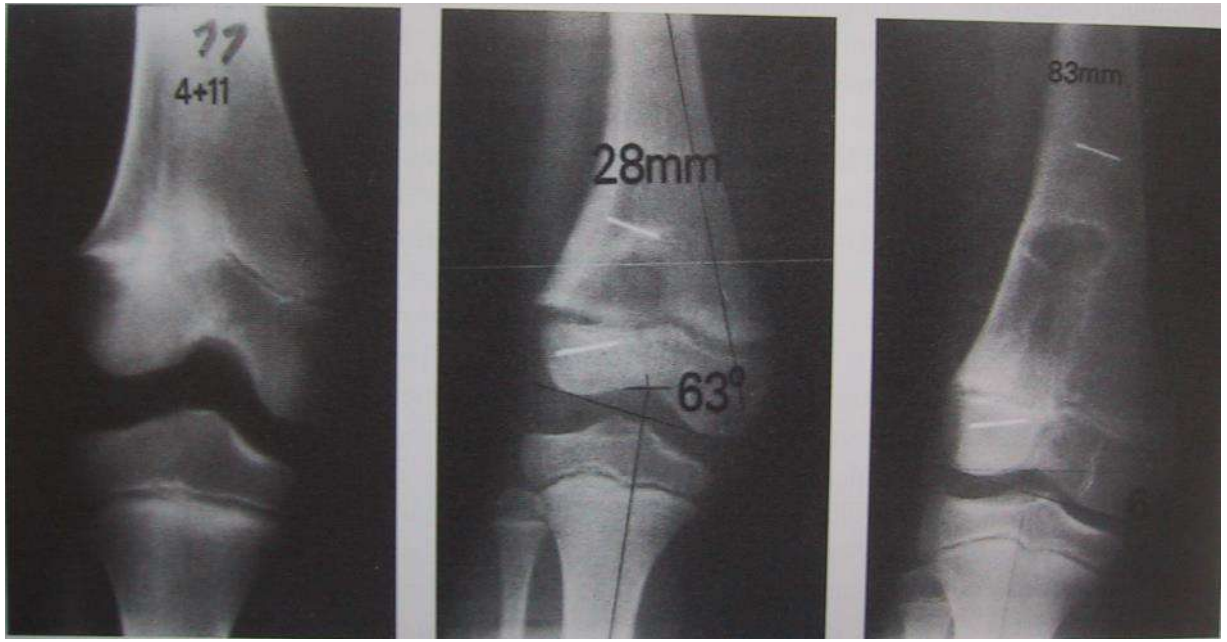
Skrajšanost stegnenice

- stanja po zlomu diafize, stanje po osteomielitisu, popoškodbena epifiziodeza, dismelije, prirojena asimetričnost, OI, Ollier, aklazija, displazije, Russell-Silver
- PFFD, coxa vara, Perthes, epifizioliza, RA, tumorji



Popoškodbena epifiziodeza

- Gnojno vnetje, zlom, tumor

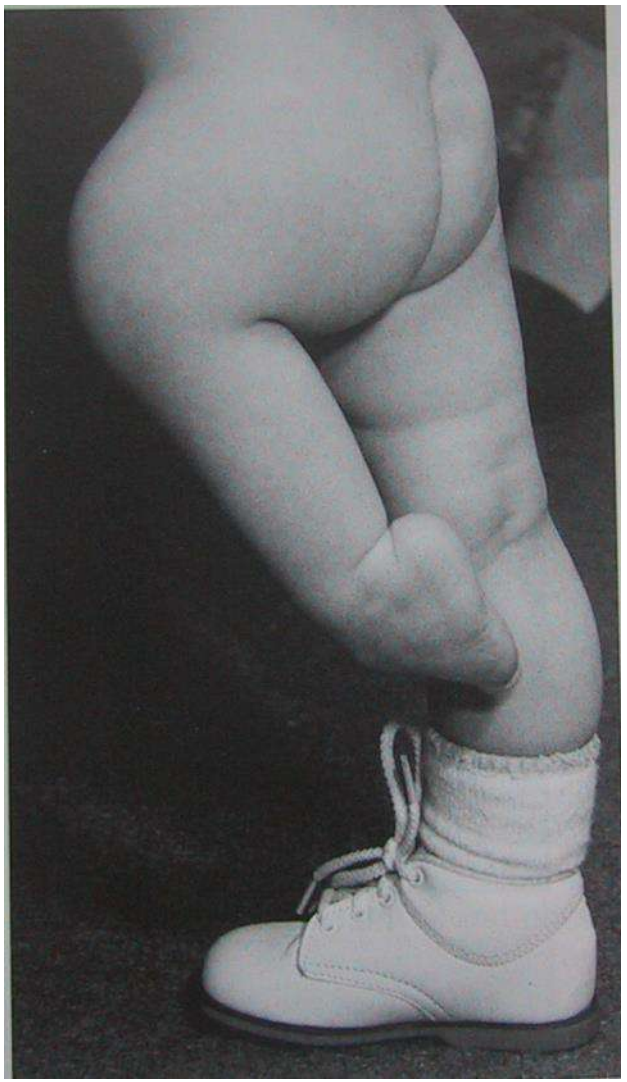


PFFD

TYPE		FEMORAL HEAD	ACETABULUM	FEMORAL SEGMENT	RELATIONSHIP AMONG COMPONENTS OF FEMUR AND ACETABULUM AT SKELETAL MATURITY
A		Present	Normal	Short	Bony connection between components of femur Femoral head in acetabulum Subtrochanteric varus angulation, often with pseudarthrosis
B		Present	Adequate or moderately dysplastic	Short, usually proximal bony tuft	No osseous connection between head and shaft Femoral head in acetabulum
C		Absent or represented by ossicle	Severely dysplastic	Short, usually proximally tapered	May be osseous connection between shaft and proximal ossicle No articular relation between femur and acetabulum
D		Absent	Absent Obturator foramen enlarged Pelvis squared in bilateral cases	Short, deformed	(none)

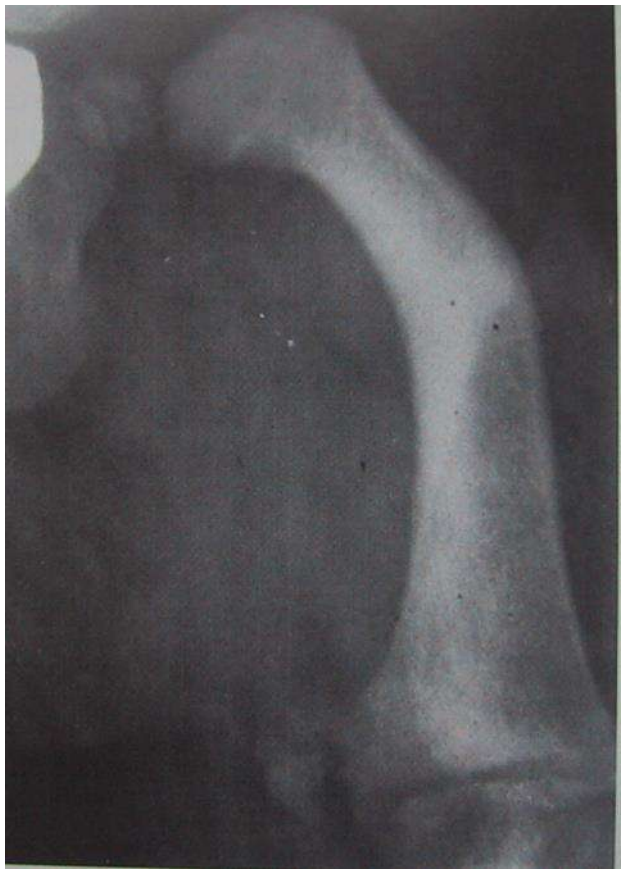
FIGURE 2–236. Aitken classification of proximal femoral focal deficiency.

A to D. The four types of deficiency. See text for explanation.



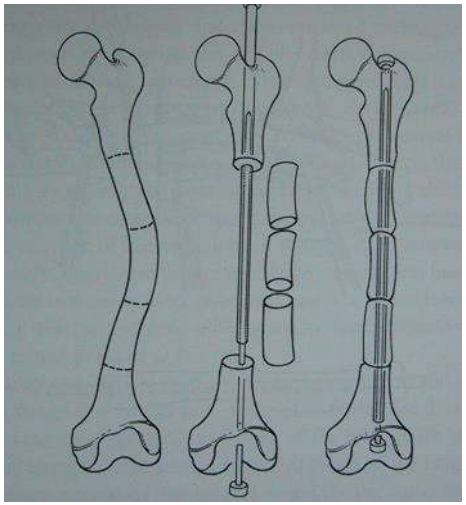
Kongenitalna dismelija

- Skrajšanost femurja, lahko del PFFD



Osteogenesis imperfecta

- Krhke kosti, 1/20.000
- Različne stopnje in oblike, defekt kolagena I (biopsija)
- Zlomi, normalna inteligenca, modre sklere, laksnost, dentinogenesis imperfecta, sluh, nižja rast, skolioza, prsni koš
- Au dom



Mb. Ollier

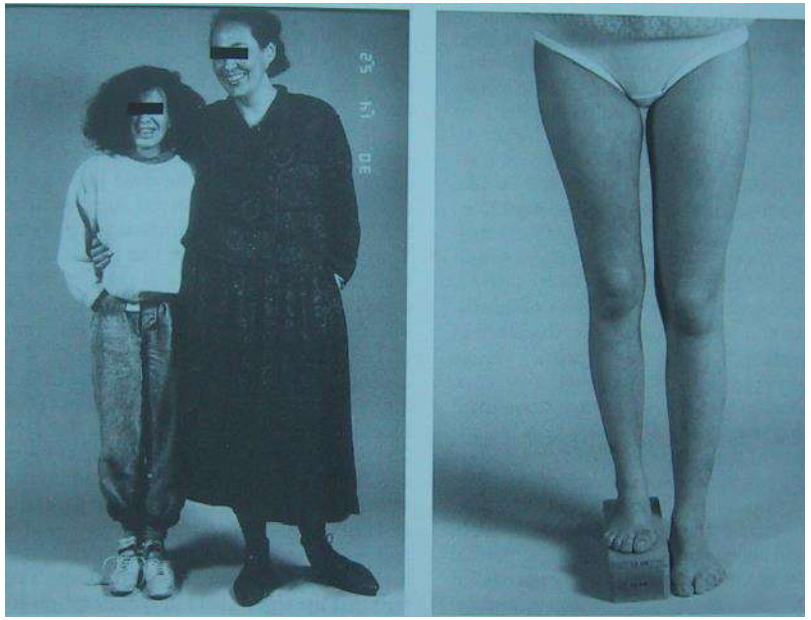
- Multipli enhondromi
- Bilateralno, ena stran več
- Angularne in dolžinske deformacije
- Nevarnost sekundarnega hondrosarkoma (25%)
- Maffuci: plus hemangiomi
- Mozaicizem

Aklazija

- Heriditarne multiple eksostoze (Au dom, mutacije na 11,18 in 19
- Nižja rast, kompresije, alteracija, razlika v dolžini, angularne motnje

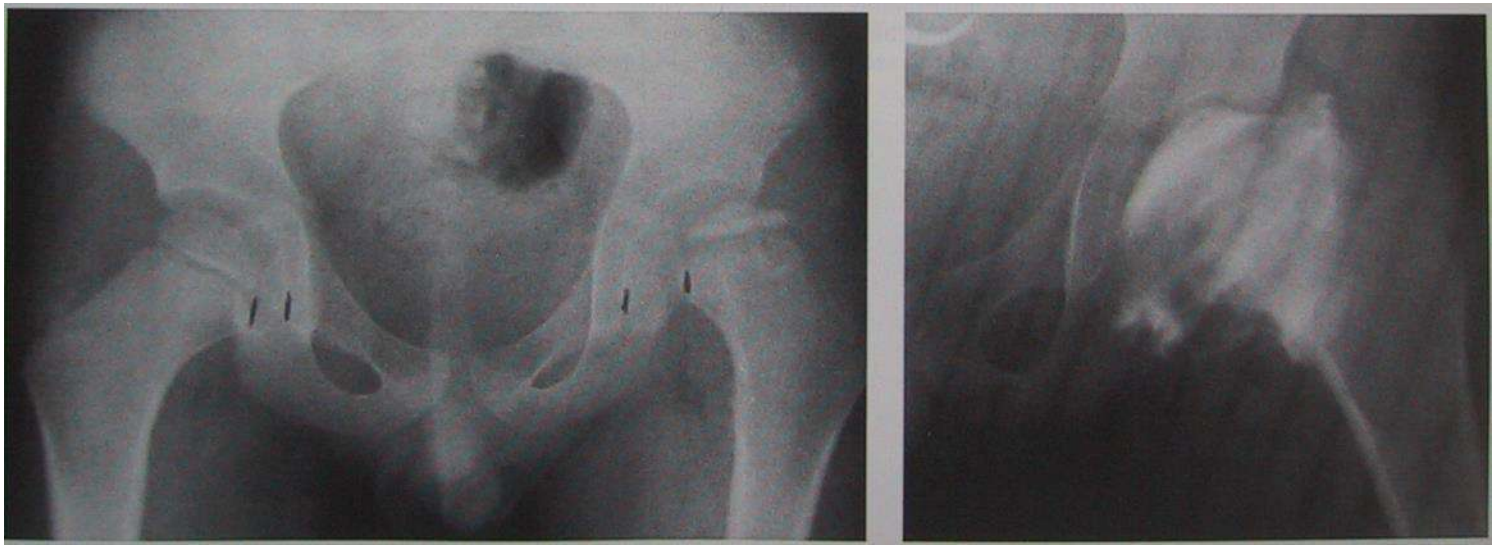
Russell-Silver

- Nizka rast, asimetrično telo in značilen obraz, prezgodnja puberteta
- Au dom?
- Skolioza, klinodktilija, kolk, razlika v dolžini



Mb. Perthes

- Aseptična nekroza
- 3-10 let
- Bergle nekaj let, op



Stanje po epifiziolizi glavice stegnenice

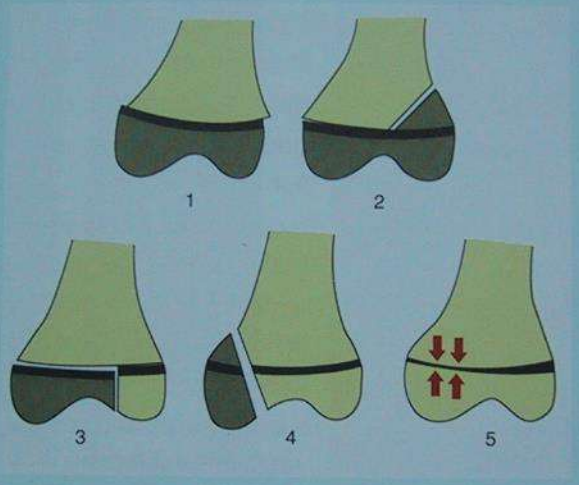
- Idiopatski zdrs
- habitus

Skrajšanost goleni

- stanja po zlomu diafize, stanje po osteomielitisu, popoškodbena epifiziodeza, dismelije, prirojena asimetričnost, OI, Ollier, aklazija, displazije, Russell-Silver
- Kongenitalna pseudartroza tibije

Popoškodbena epifiziodeza

- Salter- Harris



Type	Frequency	Reduction	Prognosis
1	++++	Nonanatomic	Good
2	+++	Nonanatomic	Good
3	++	Anatomic	Fair
4	++	Anatomic	Fair
5	Rare	Not relevant	Poor

Dismelija

- Fibularna hemimelija
- Tibialna insuficienca

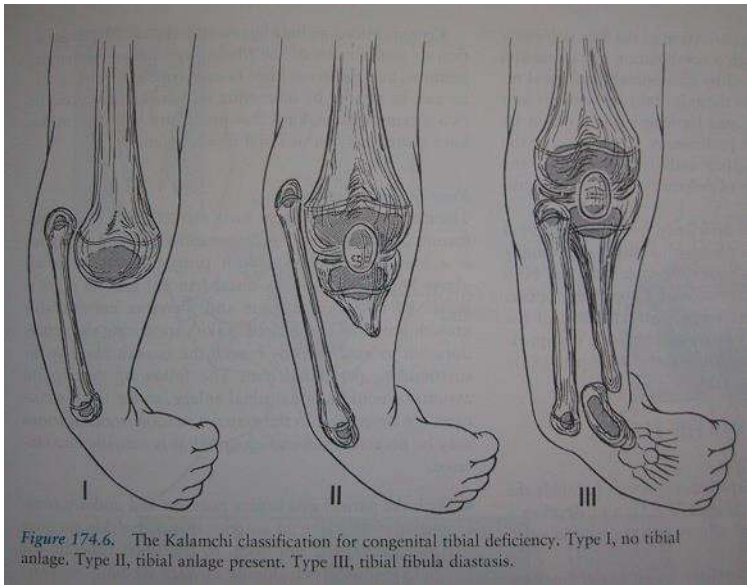


Figure 174.6. The Kalamchi classification for congenital tibial deficiency. Type I, no tibial anlage. Type II, tibial anlage present. Type III, tibial fibula diastasis.

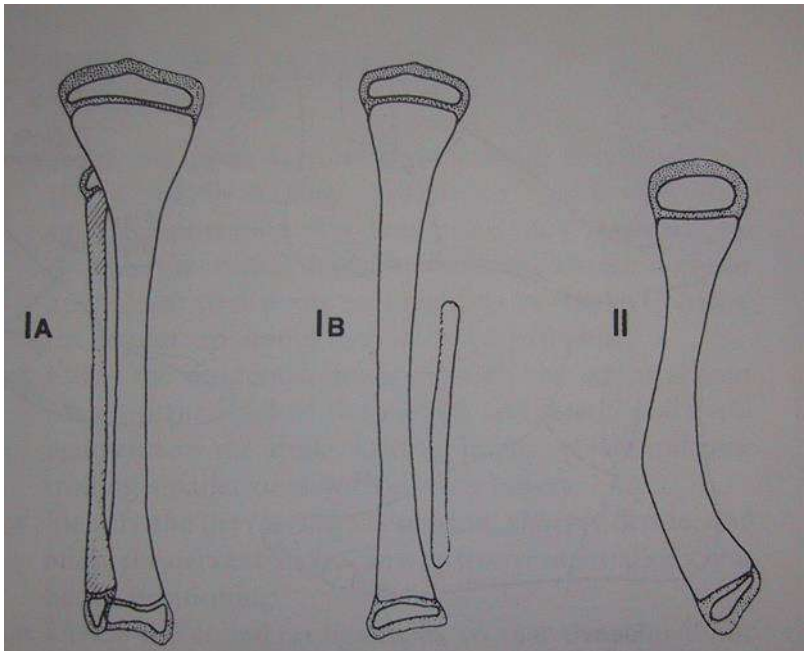
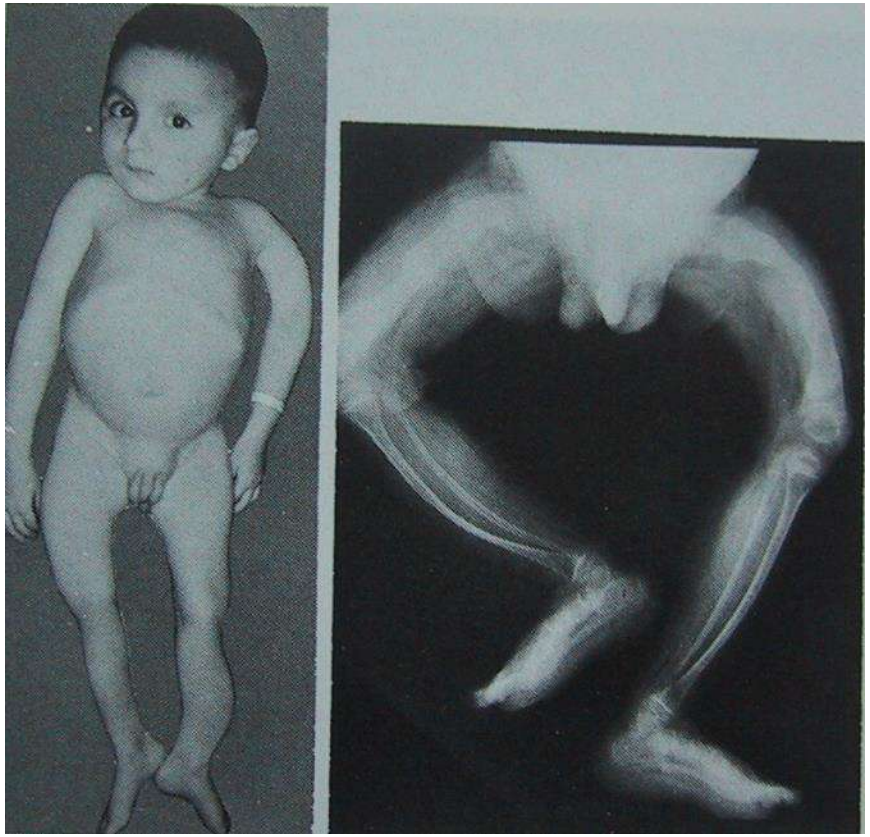


Figure 174.1. Achterman-Kalamchi classification of fibula hemimelia. See text for explanation.

Osteogenesis imperfecta

- Au Dom

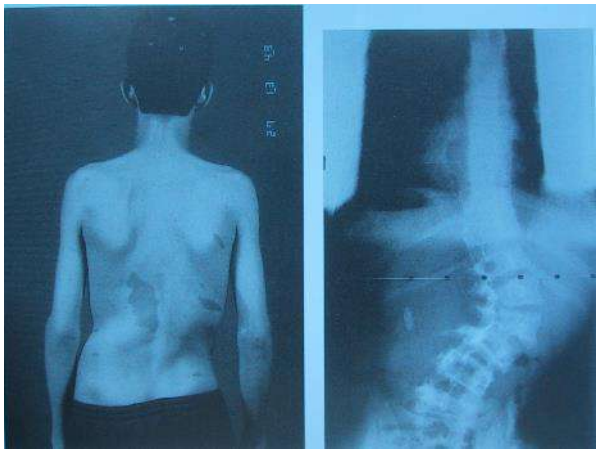


Mb. Ollier (Mozaicizem)

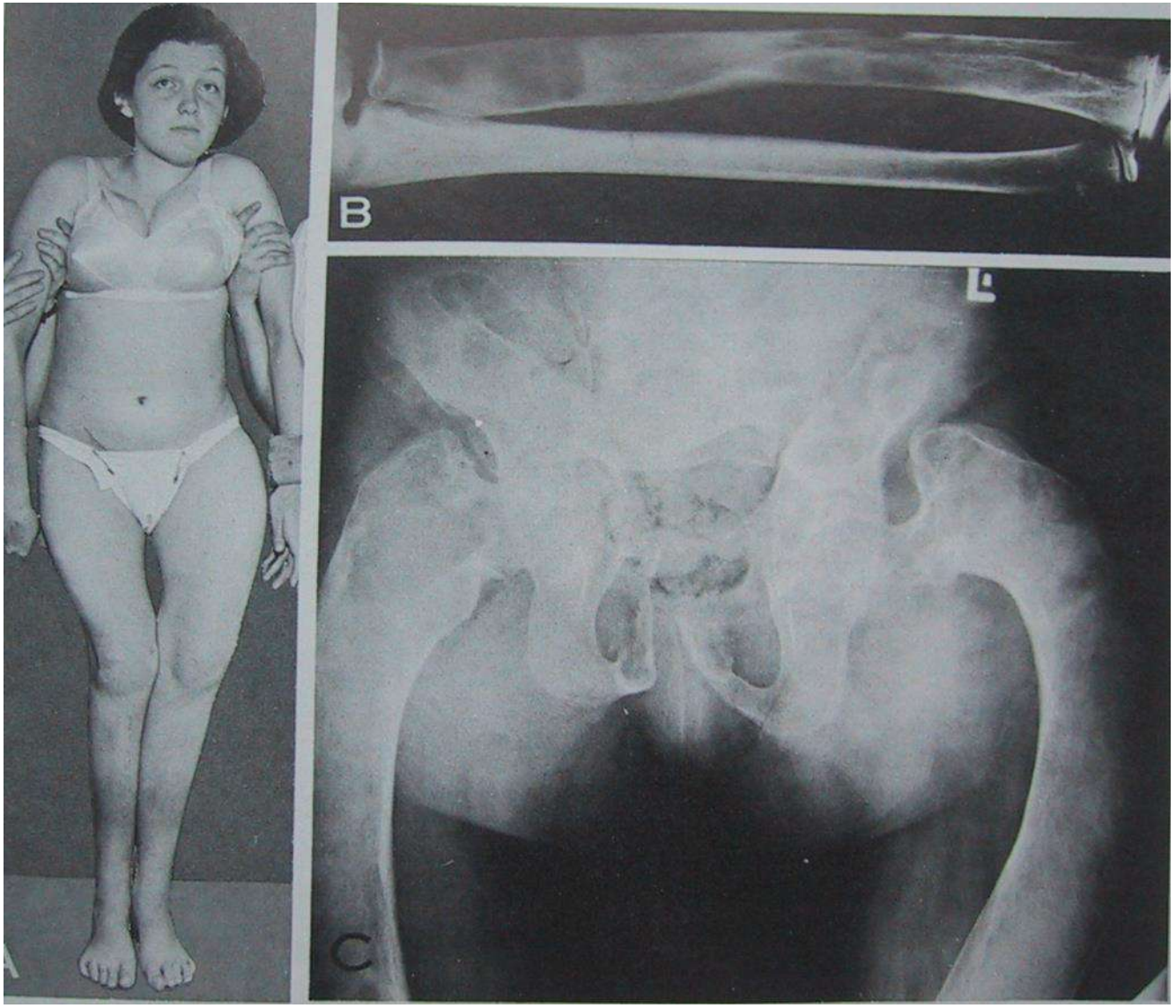
- Multipli enhondromi
- Bilateralno, ena stran več
- Angularne in dolžinske deformacije
- Nevarnost sekundarnega hondrosarkoma (25%)
- Maffuci: plus hemangiomi

Kongenitalna pseudartroza tibije

- Tip 1: von Recklinghausen, Au dom, najpogostejša enogenska okvara CŽS, 1/3000
- Več kot šest cafe au lait več kot 15 mm, nevrofibromi, skolioza, pseudartroza

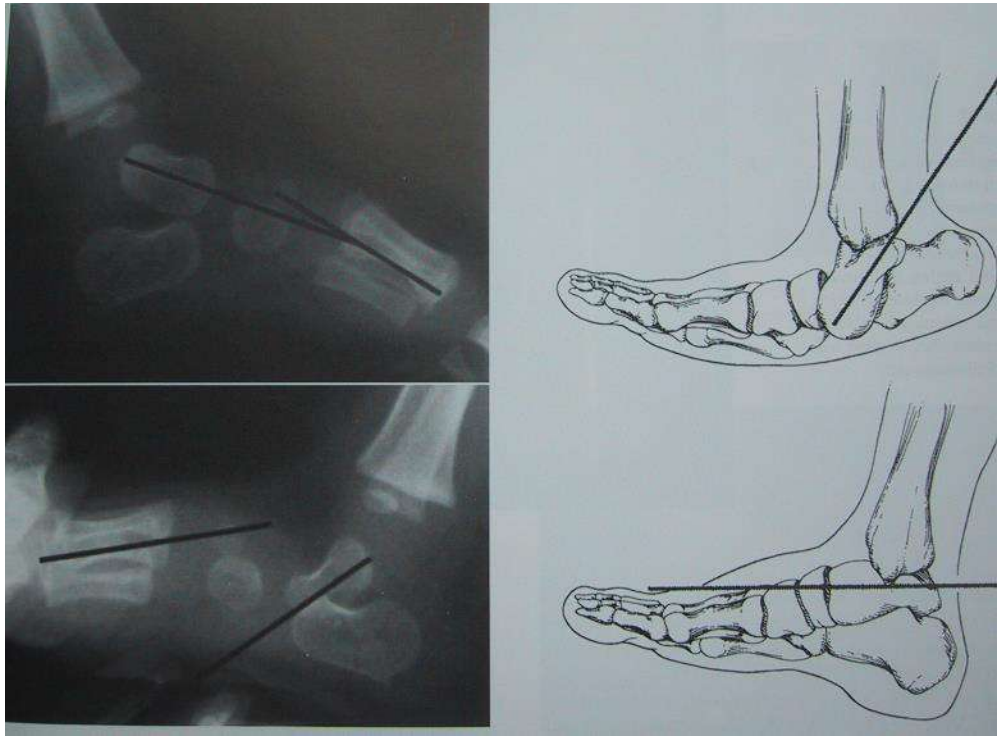


Poliostotska fibrozna displazija



Tanjši nart

- PEV, subtalarna patologija, vertikalni talus

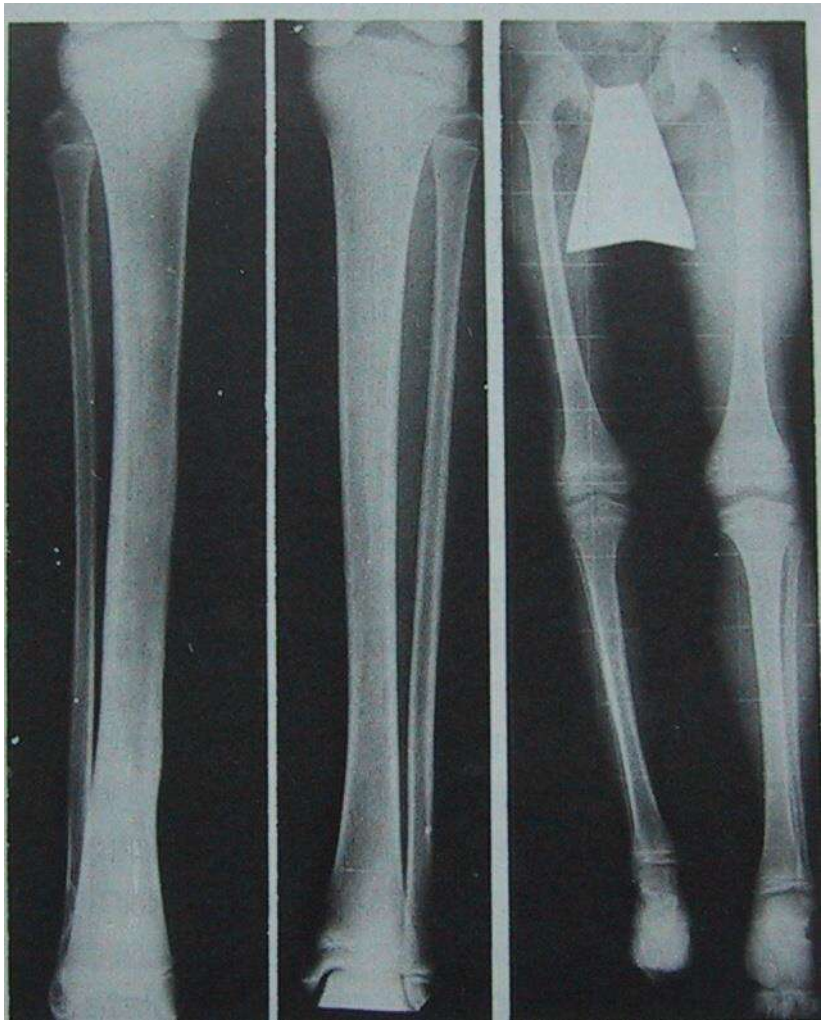


Podaljšanost enega uda

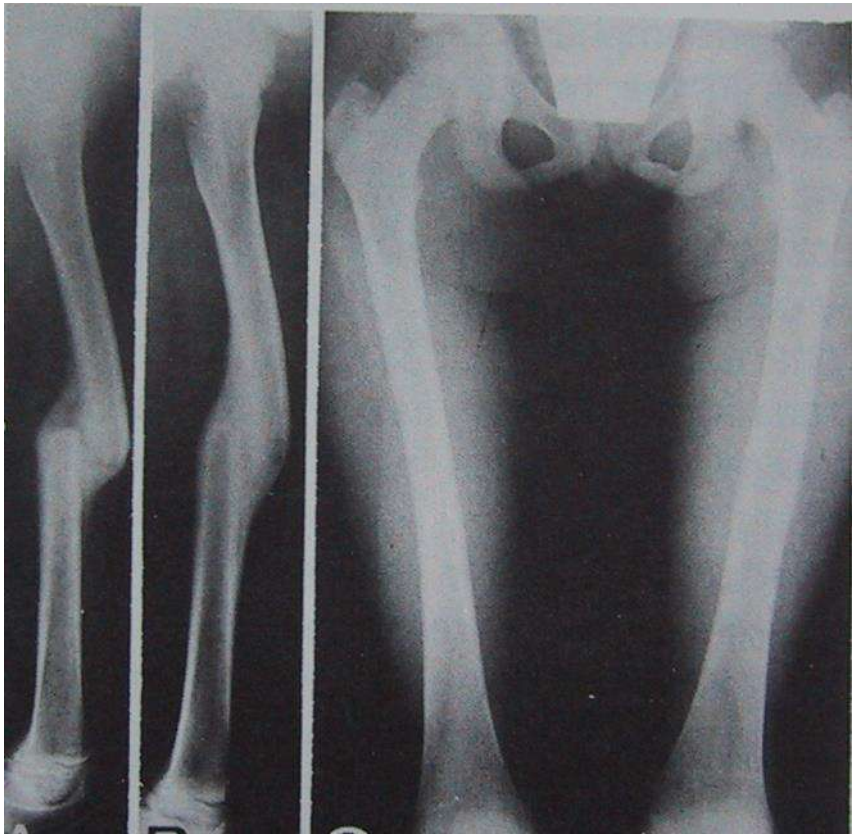
- RA, Klippel-Trenaunay, lokalni gigantizem, Ollier, OI, stanja po zlomu (osteosintezi), Perthes, kongenitalno

Idiopatska hemihipertrofija

Kronični osteomielitis



Stanja po zlomu

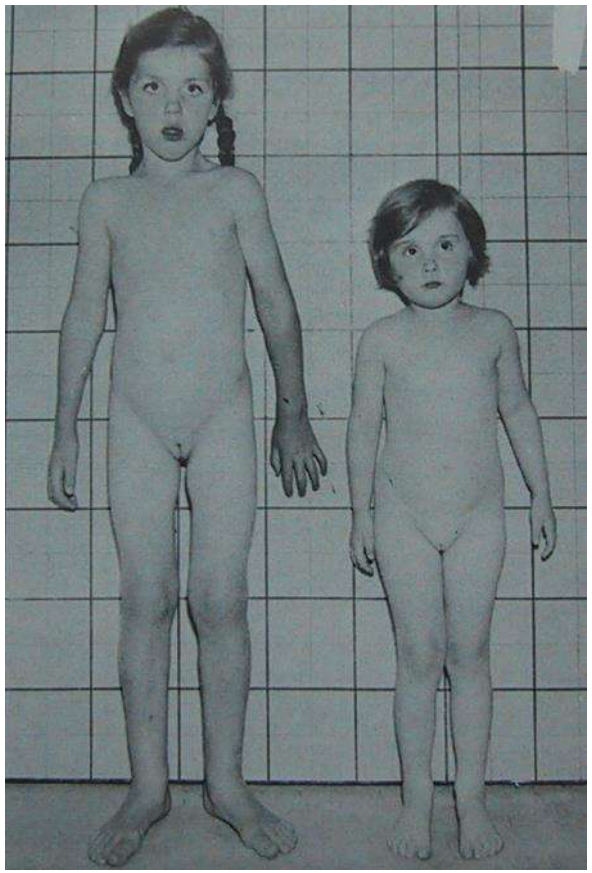


Klippel-Trenaunay

- Kožni nevusi, varikozne vene, hipertrofija mehkih tkiv in kosti, AV fistule, lokalni gigantizem, enostransko
- Negenetsko, kongenitalno

Podaljšanost obeh udov

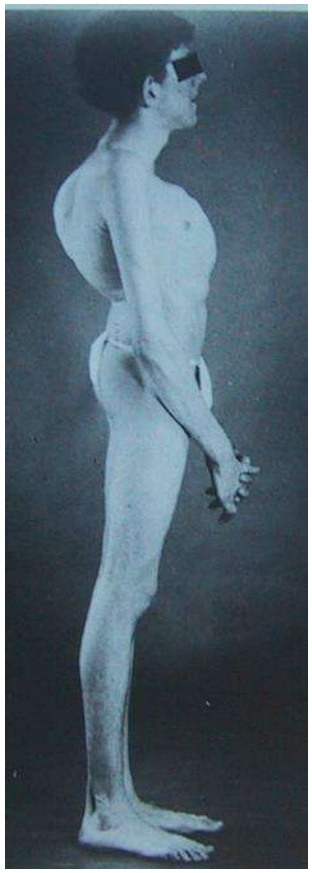
- Marfan, homocistinurija, gigantizem

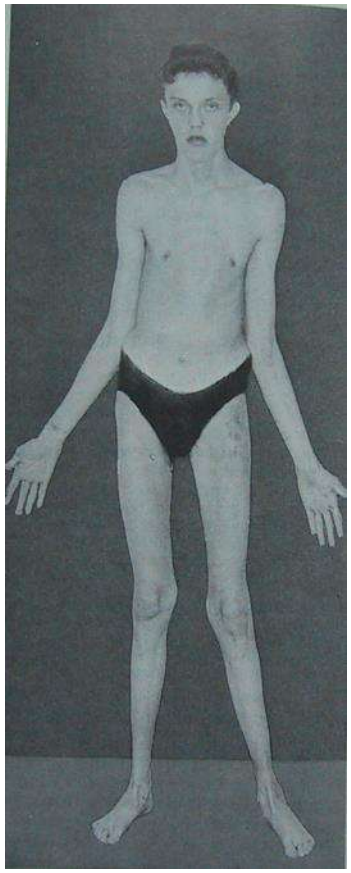


Hiperpituitarizem pri 5 letih

Sy. Marfan

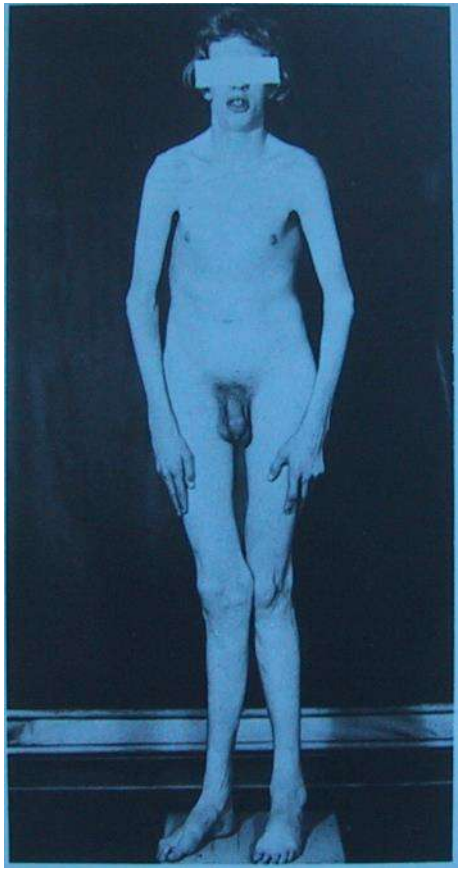
- Dolge okončine, kratek trup, izpahnjeni leči, kile, laksnost, skolioza, stopalo
- Abraham Lincoln
- Au Dom





Homocistinurija

- Podobno Marfanu, retardacija, osteoporoza in izpah leč
- Defektna cistation beta sintetaza
- Polovici pomagajo visoke doze B6



Skrajšanost obeh udov

- Pritlikavost: simetrična, asimetrična

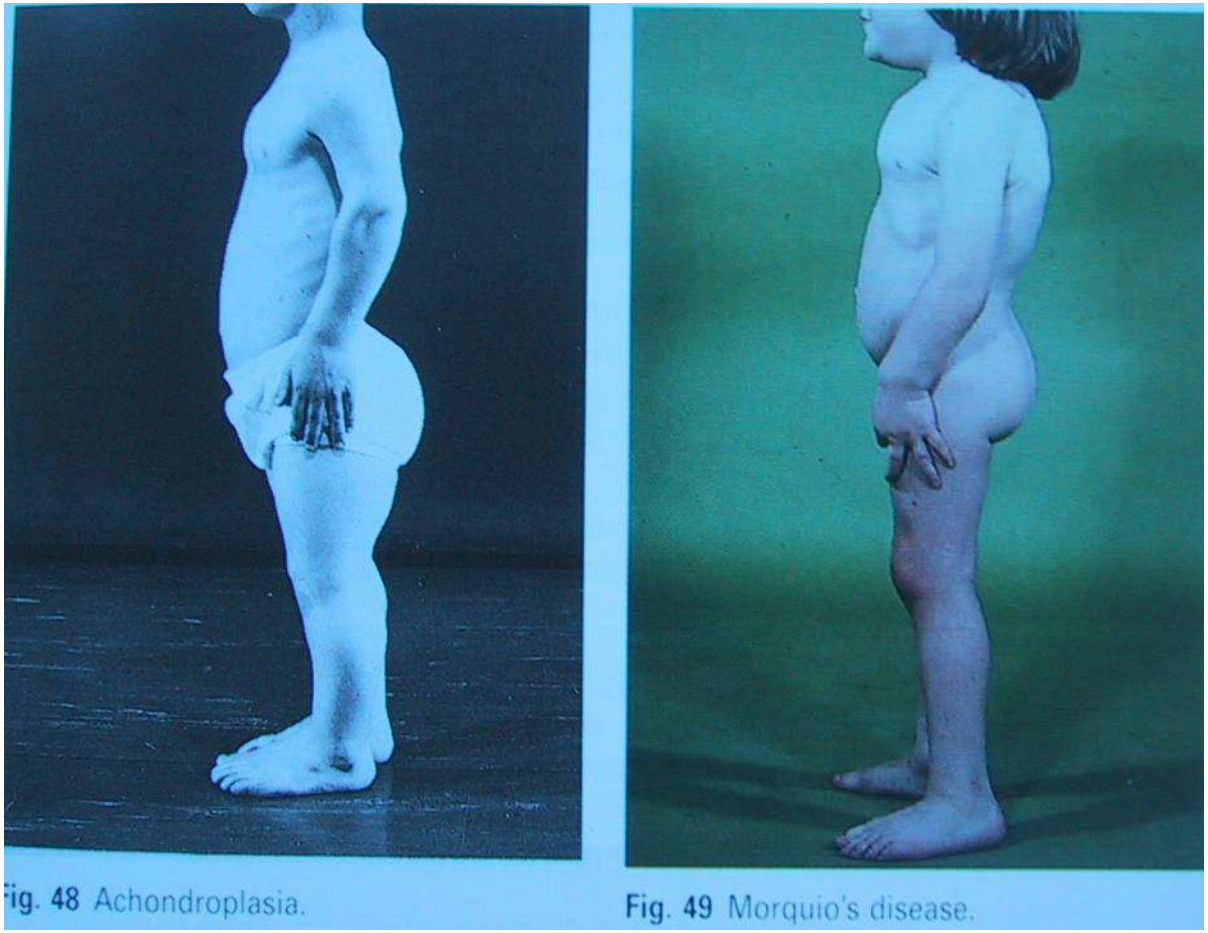


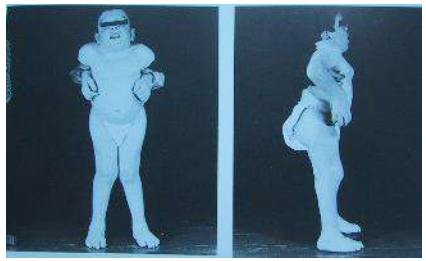
Fig. 48 Achondroplasia.

Fig. 49 Morquio's disease.

Asimetrična pritlikavost

- Kratki udi
- Kratek trup
- Kratek trup in udi

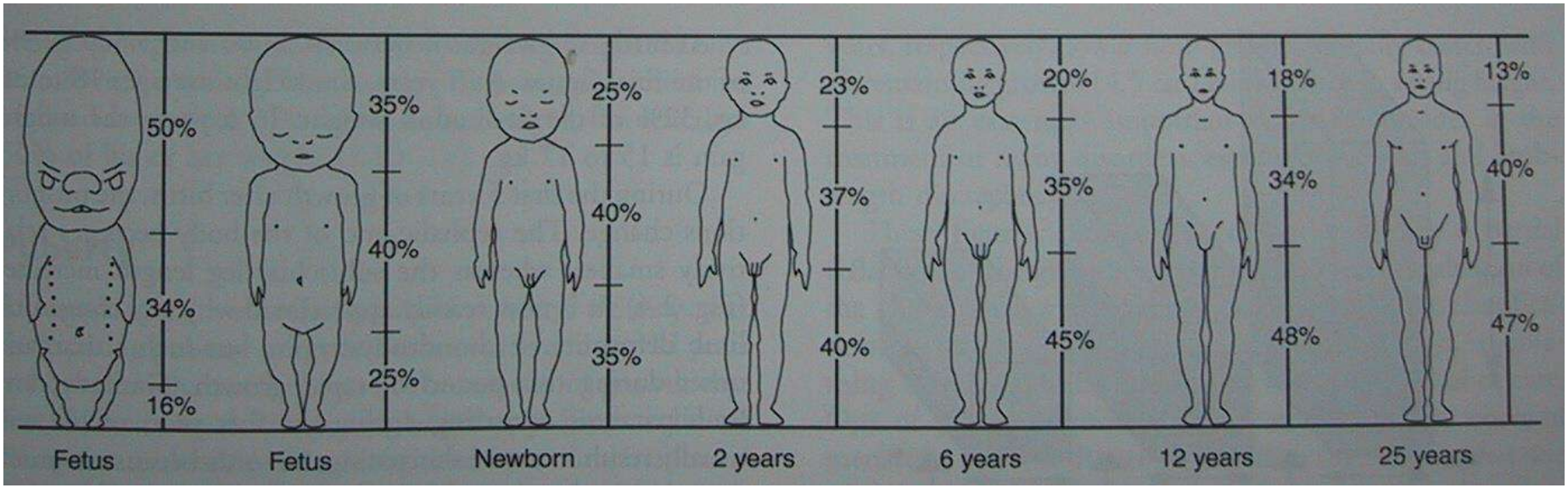
ahondro



Morquio

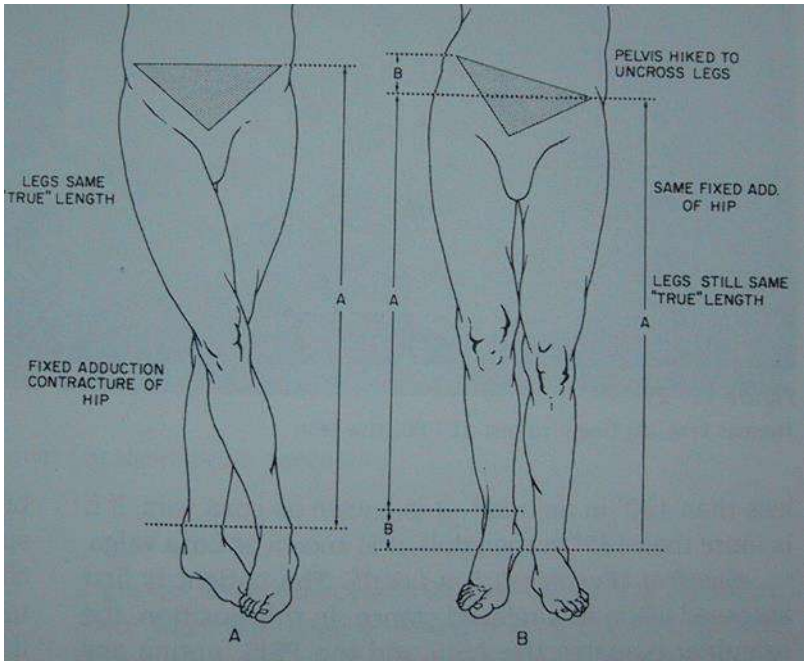
Spondiloep.

Diastrofična



Navidezna skrajšanost in podaljšanost

- Cerebralna paraliza
- Kontrakture (kolk, koleno)
- Skolioza



Asimetrija in deformacija

- Ollier
- Osteogenesis imperfecta
- Aklazija
- Displazije
- Žilne motnje
- Klippel Trenaunay

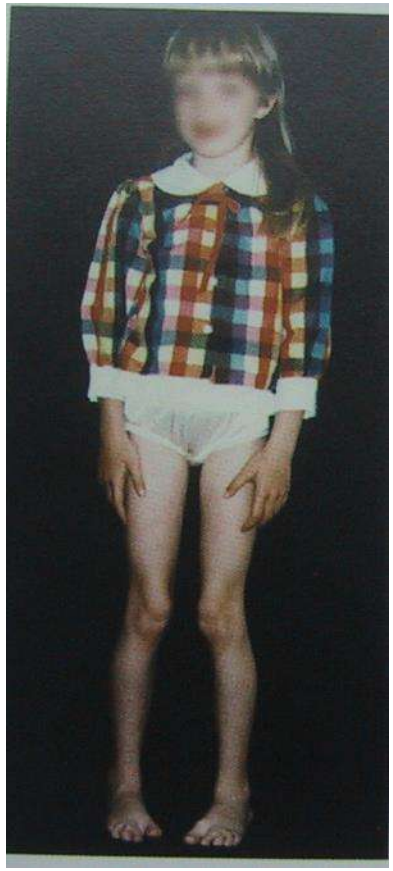
Stanje po zlomu

Angularne motnje

- Displazije
- Ollier
- Aklazija
- Osteogenesis imperfecta
- Delna epifiziodeza po poškodbi
- Blount
- Močen valgus

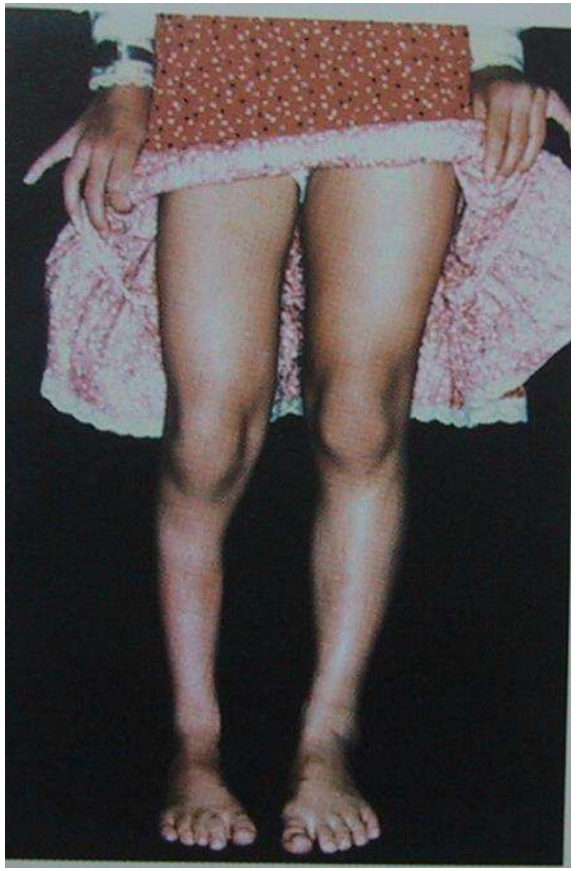
Rotatorne motnje

- Pretirana notranja rotacija gležnja
- Pretirana zunanja rotacija gležnja

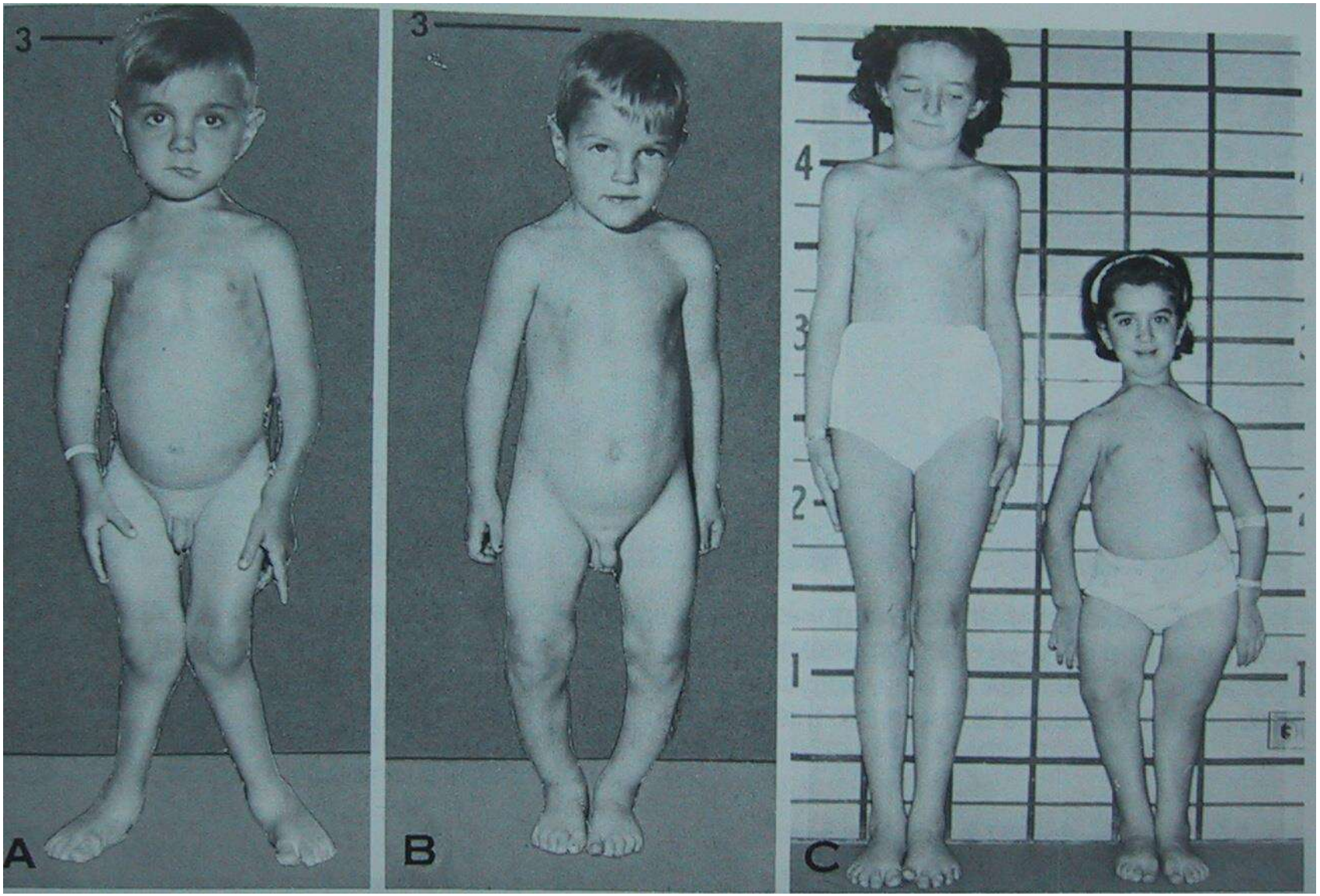


Paralitična stanja

- Mielomeningokela
- Poliomielitis

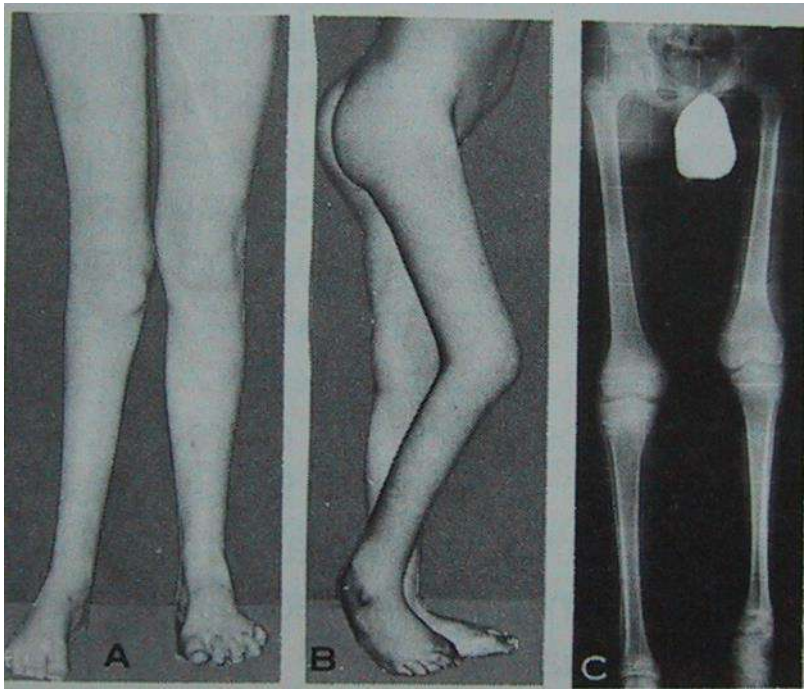


Vit D rezistenten rahitis



Kontrakture

- Artroza kolka, kolena in gležnja (ekvinus)
- Okvara zgornjega motoričnega nevrona
- artrogripoza

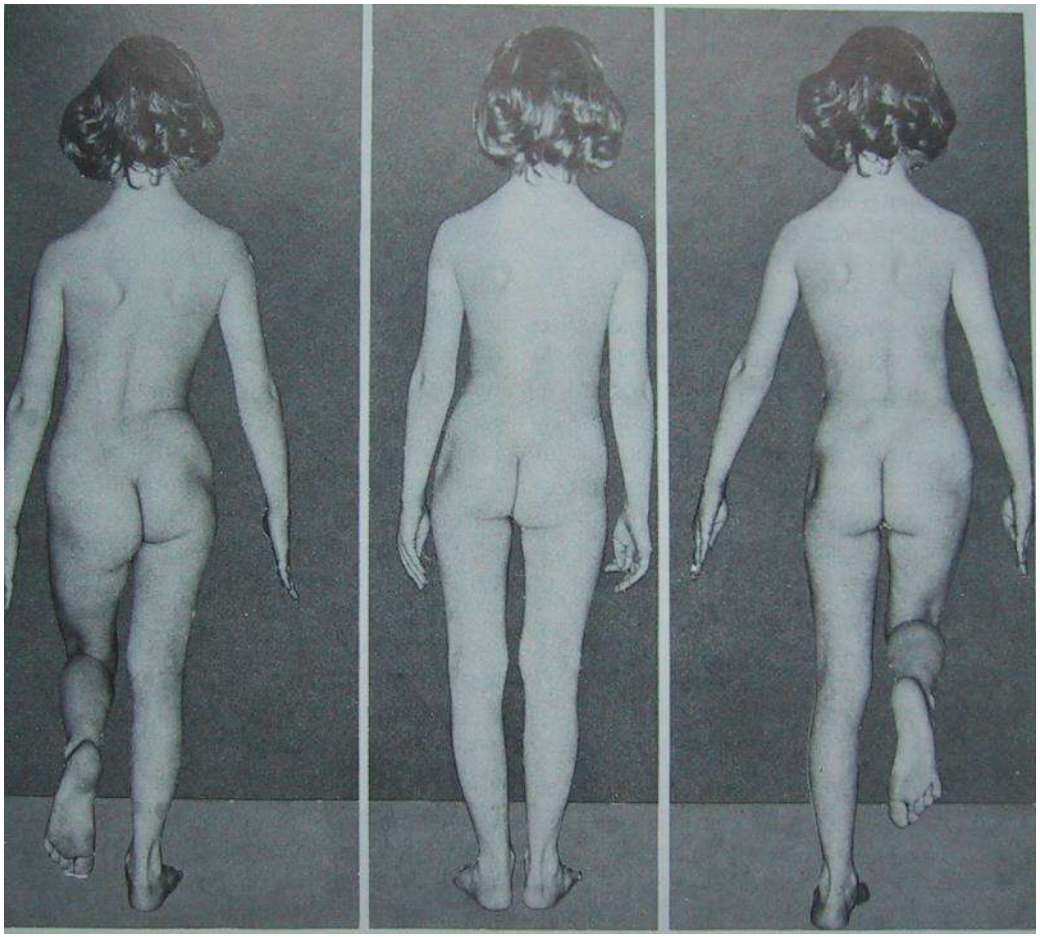


polio

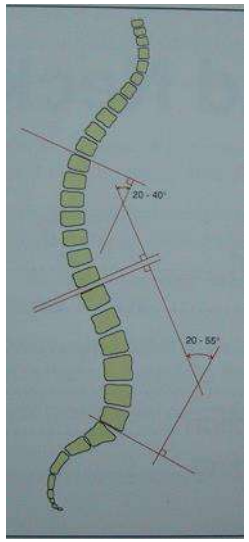
Visok izpah kolka

- Nezdravljena razvojna displazija kolka
- Mielomeningokela
- CP

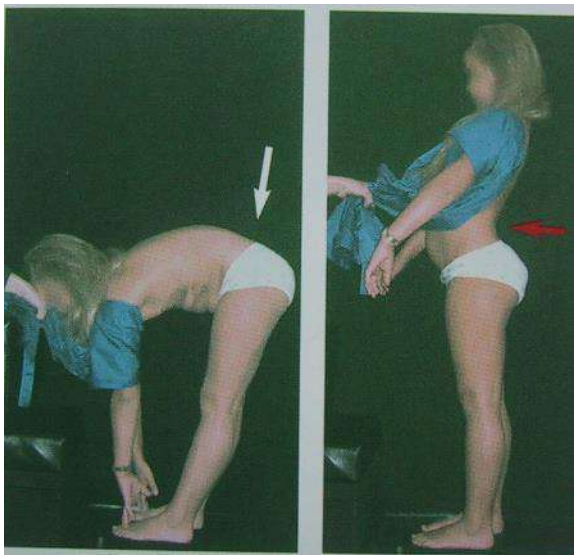
Pozitiven Trendelenburg

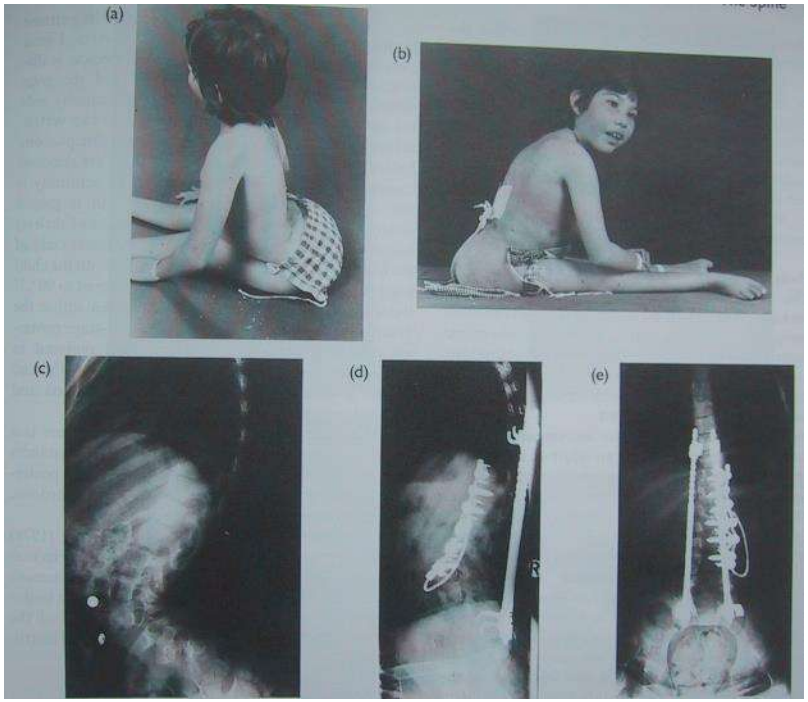


Povečana fiksna ledvena lordoza



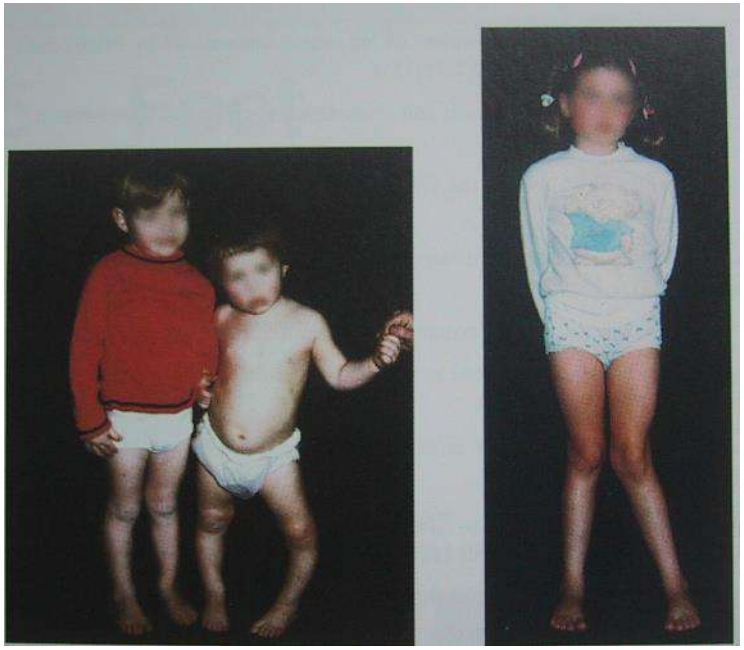
- Oboestranski izpah kolkov
- Displazije
- mielomeningokela

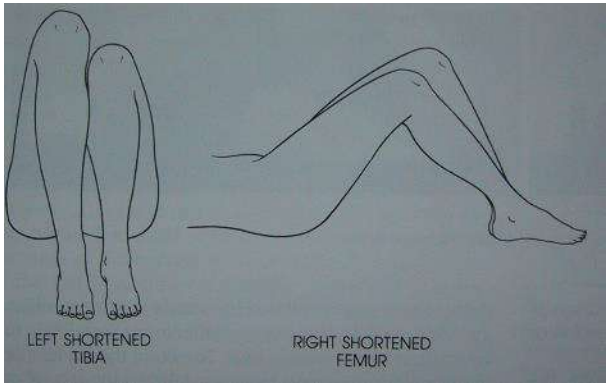




Najpogostejši klinični problem

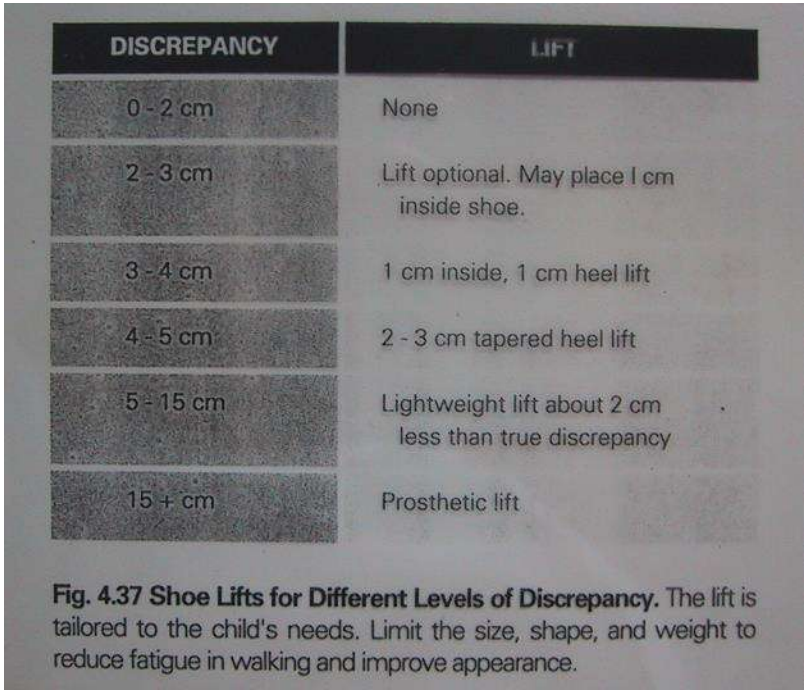
- Manjša razlika v dolžini pred koncem rasti
- Varus-valgus kolen, simetričen, asimetričen
- Redkeje, večji problem: dismelije, pseudartroza, displazije





Zdravljenje

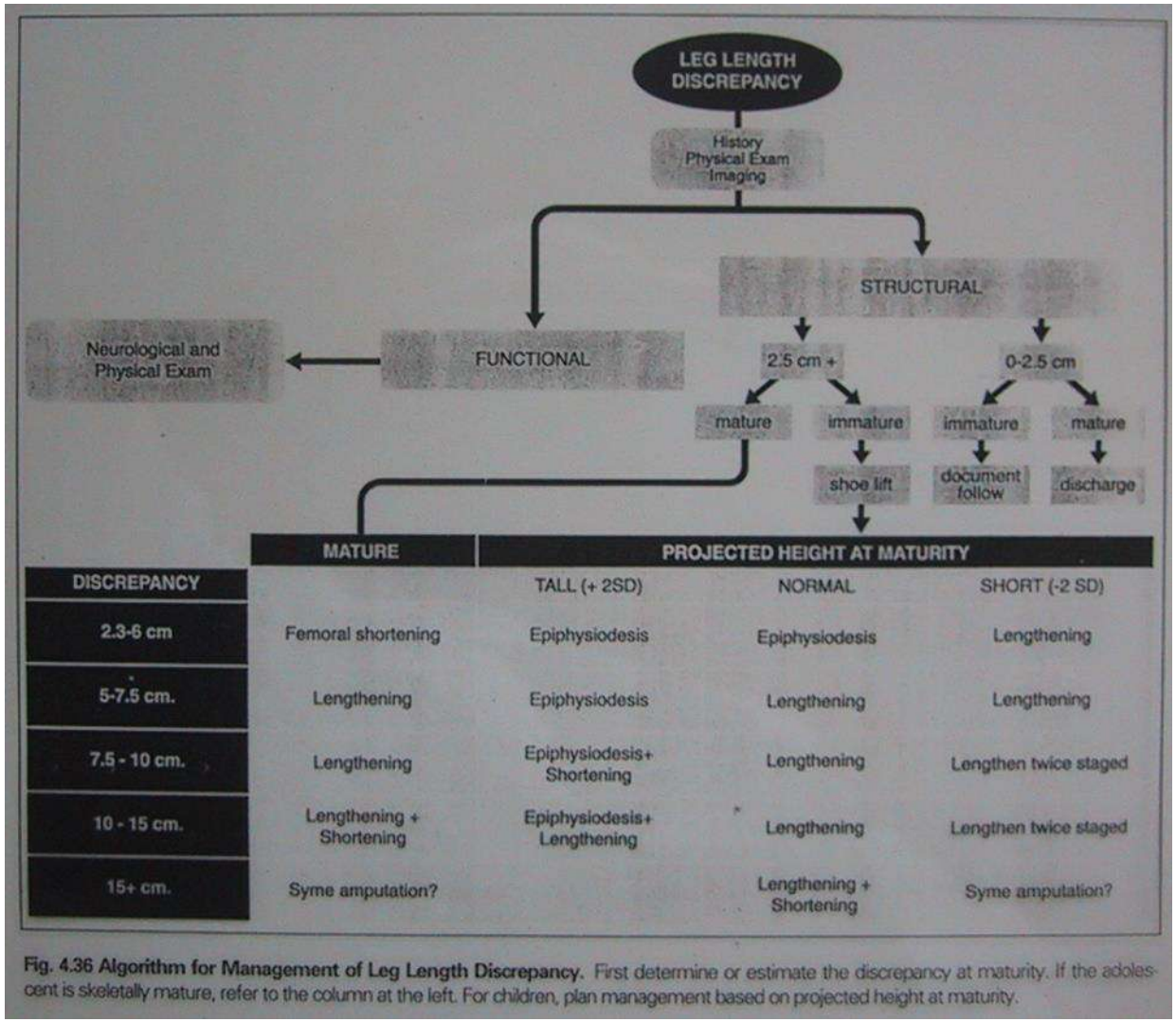
- Nič
- Vložek
- Epifiziodeza
- Skrajšava
- Podaljšava
- Ortopedski čevlji
- Specialne ortoze



DISCREPANCY	LIFT
0 - 2 cm	None
2 - 3 cm	Lift optional. May place I cm inside shoe.
3 - 4 cm	1 cm inside, 1 cm heel lift
4 - 5 cm	2 - 3 cm tapered heel lift
5 - 15 cm	Lightweight lift about 2 cm less than true discrepancy
15 + cm	Prosthetic lift

Fig. 4.37 Shoe Lifts for Different Levels of Discrepancy. The lift is tailored to the child's needs. Limit the size, shape, and weight to reduce fatigue in walking and improve appearance.

Razlika v dolžini- shema

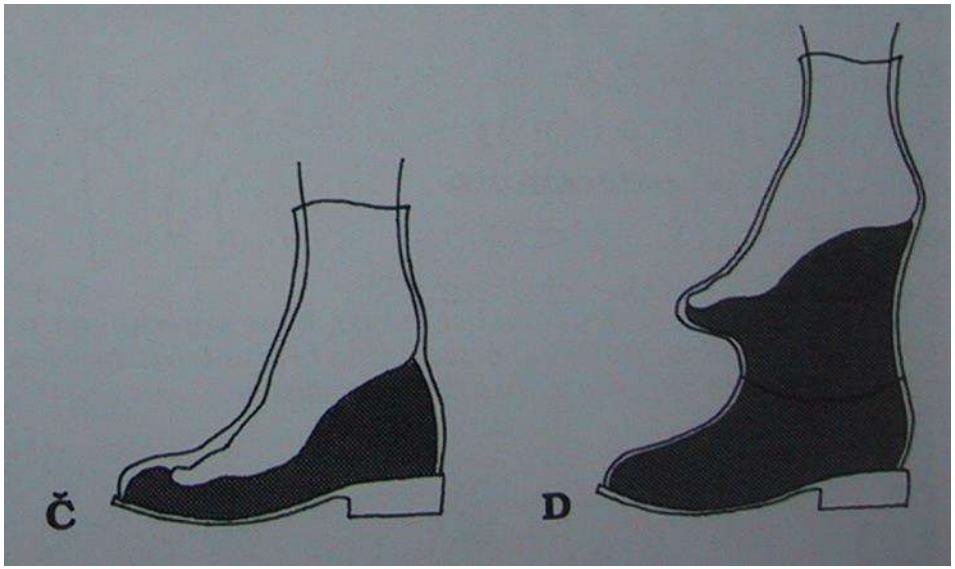


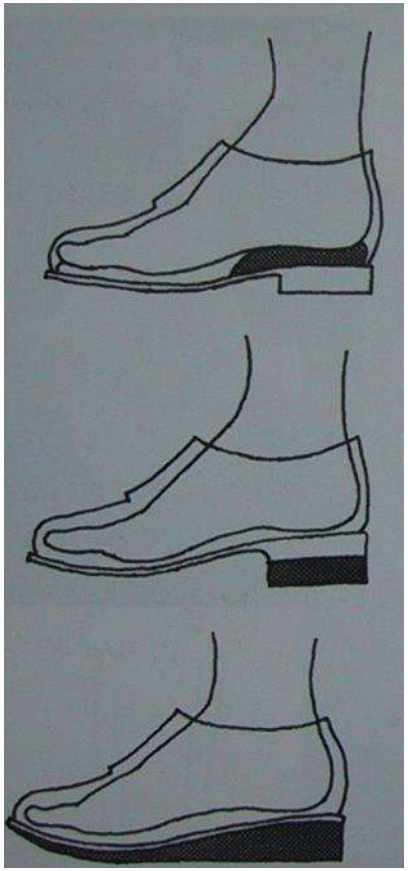
DISCREPANCY	MATURE	PROJECTED HEIGHT AT MATURITY		
		TALL (+ 2SD)	NORMAL	SHORT (-2 SD)
2.3-6 cm	Femoral shortening	Epiphysiodesis	Epiphysiodesis	Lengthening
5-7.5 cm.	Lengthening	Epiphysiodesis	Lengthening	Lengthening
7.5 - 10 cm.	Lengthening	Epiphysiodesis+ Shortening	Lengthening	Lengthen twice staged
10 - 15 cm.	Lengthening + Shortening	Epiphysiodesis+ Lengthening	Lengthening	Lengthen twice staged
15+ cm.	Syme amputation?		Lengthening + Shortening	Syme amputation?

Fig. 4.36 Algorithm for Management of Leg Length Discrepancy. First determine or estimate the discrepancy at maturity. If the adolescent is skeletally mature, refer to the column at the left. For children, plan management based on projected height at maturity.

Vložek

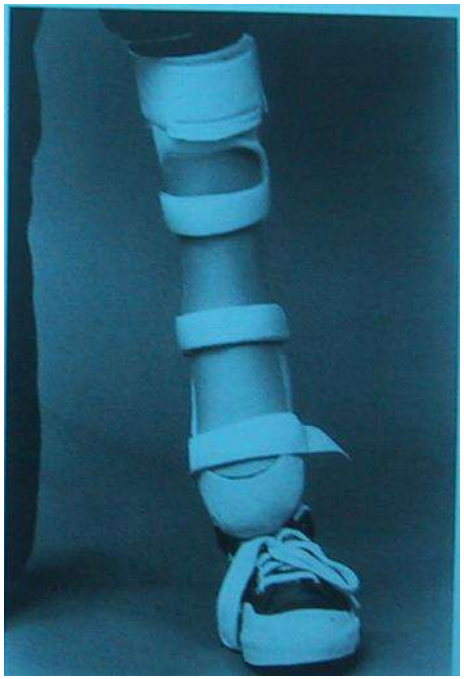
- 1cm ostane nekorigiran



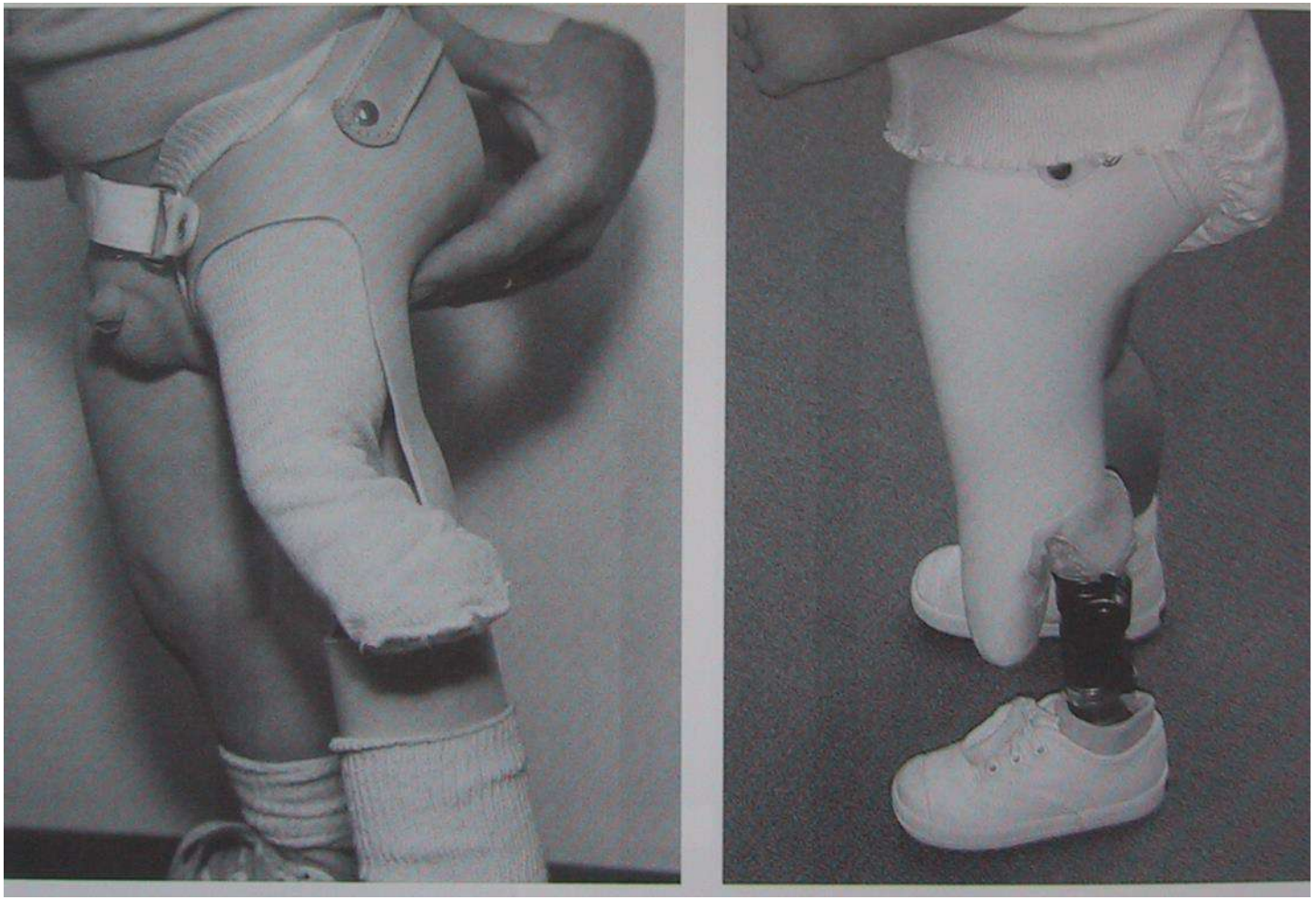


Ortopedski čevlji in specialne ortoze

- Dismelije

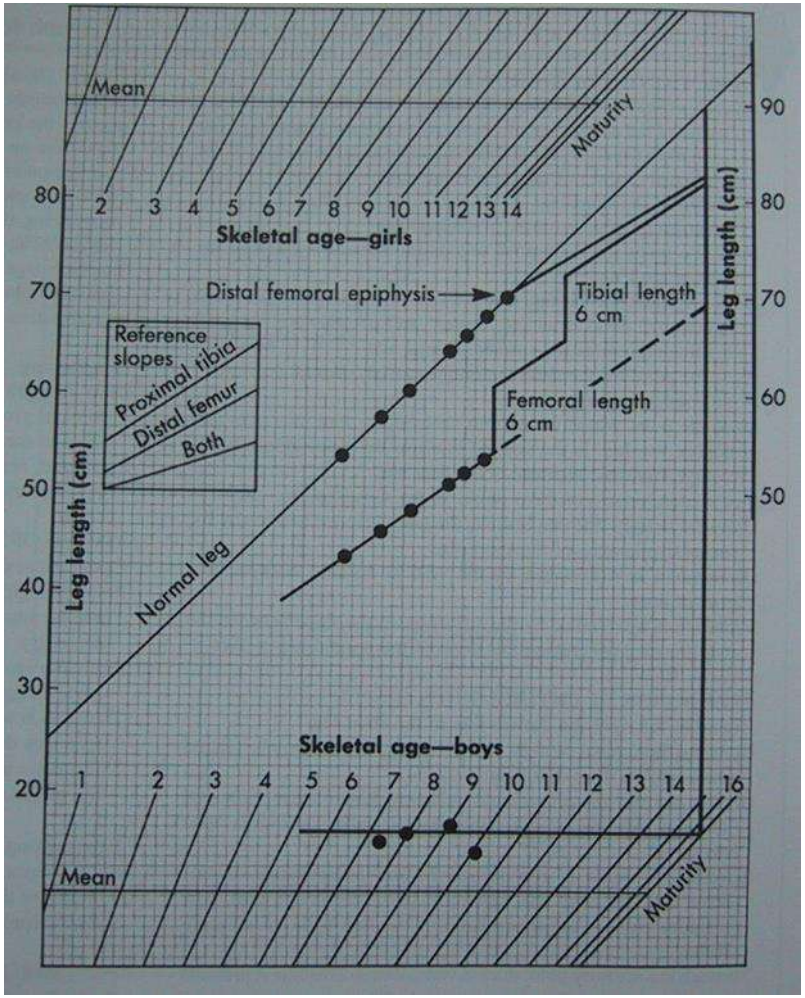


Ortopedski čevlji in specialne ortoze



Predoperativno planiranje

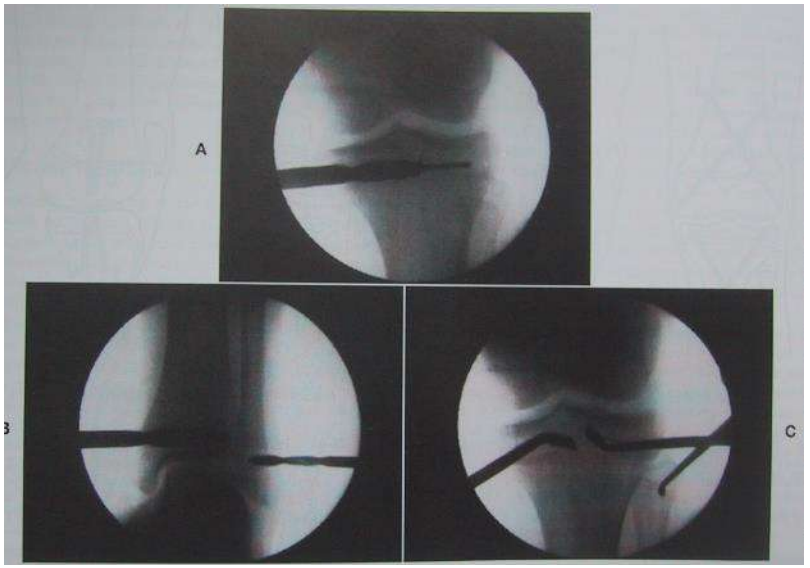
- Kostna starost
- Preostala rast
- Kdaj epifiziodeza?



Simetričen valgus kolen

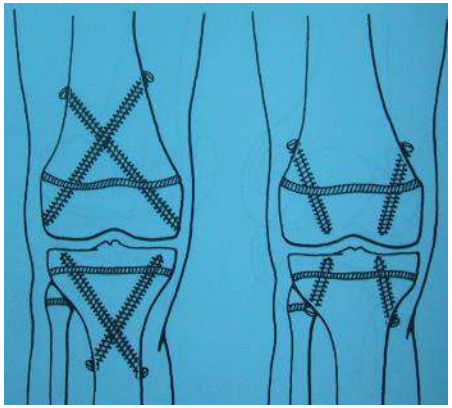
Delna epifiziodeza

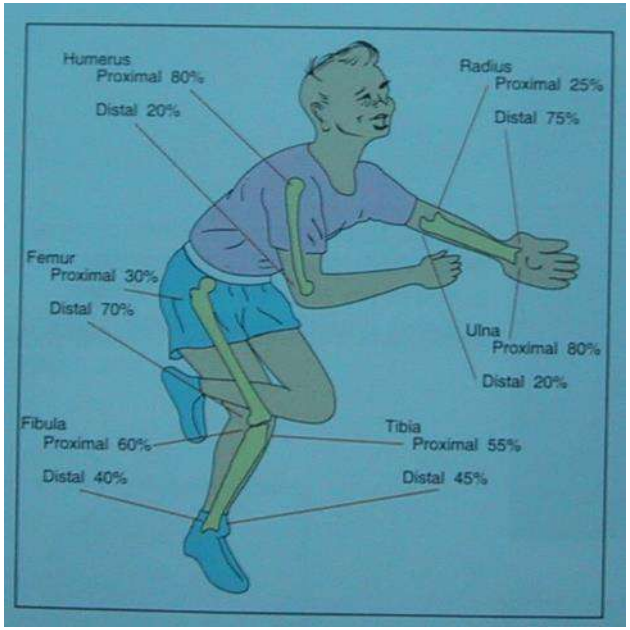
- Dokončna-povrtavanje
- Začasna: vijaki
- Perkutana kirurgija
- Angularne motnje: varus-valgus

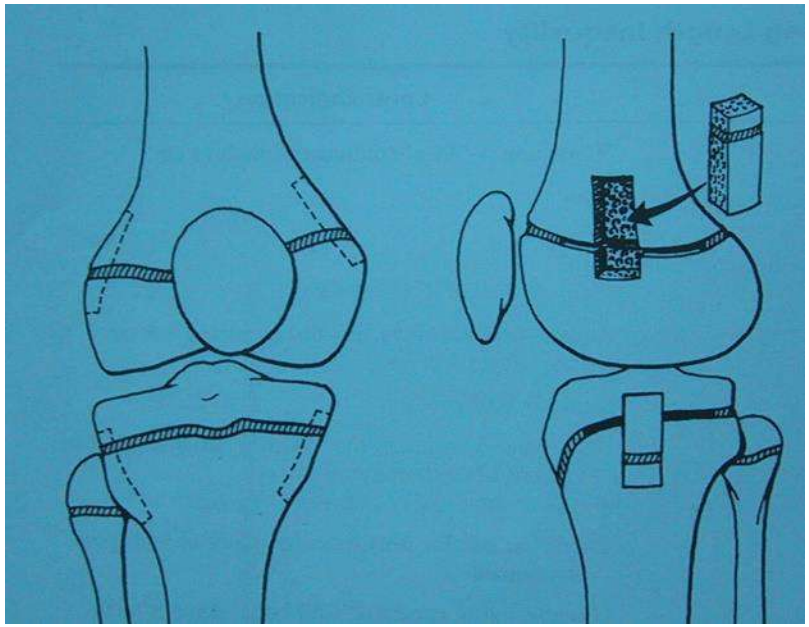


Celotna epifiziodeza

- Ustavitev cele rasti na določeni fizi

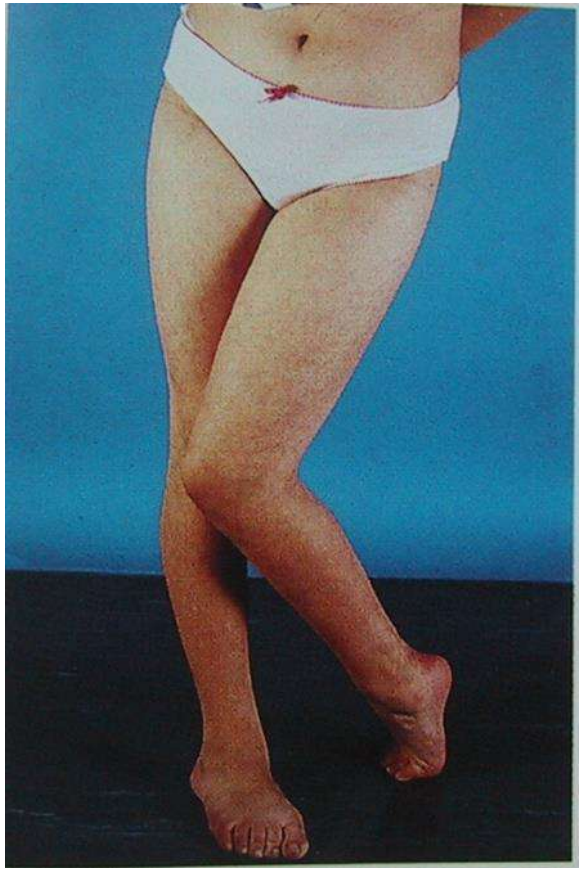




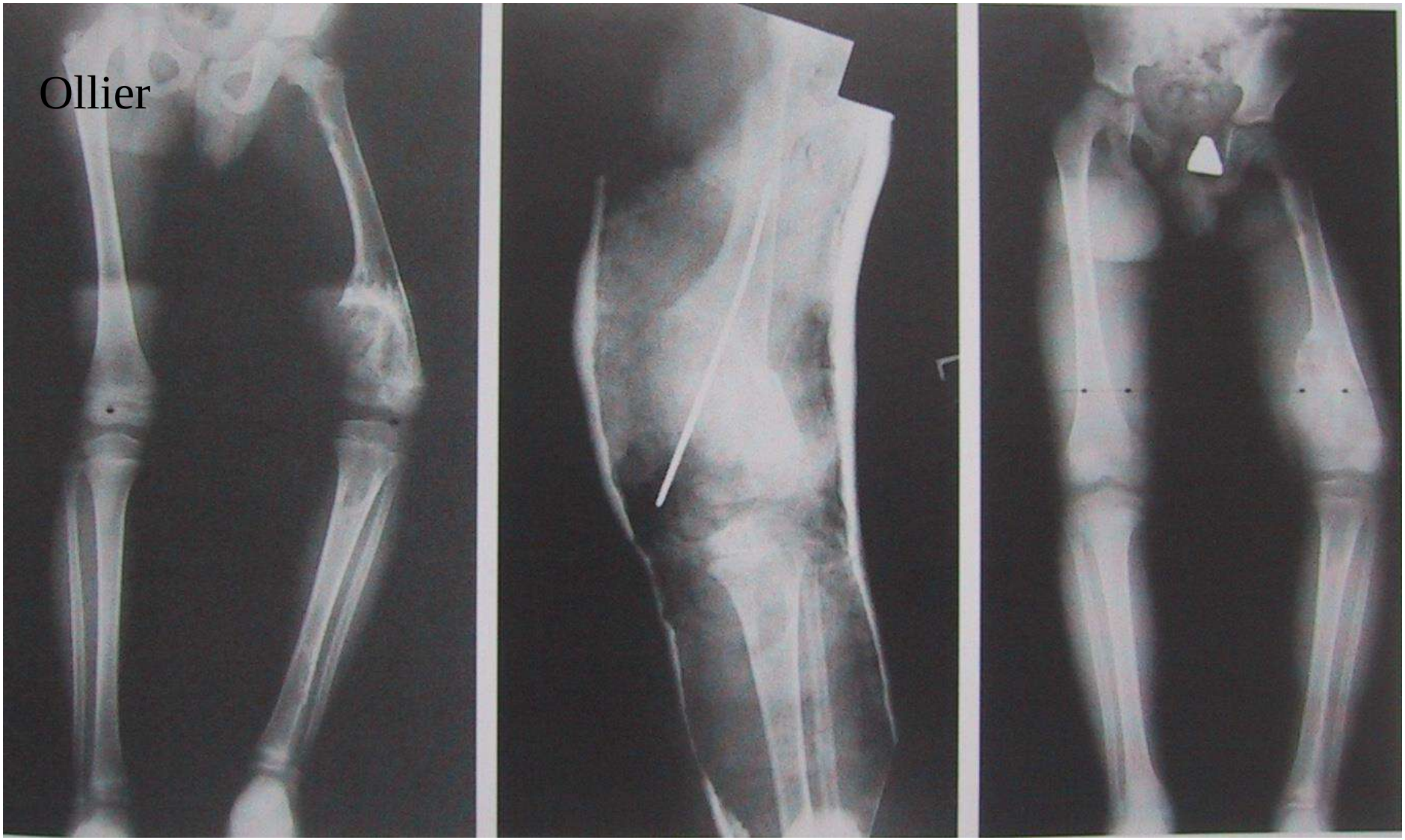


Posegi na mehkih tkivih zaradi kontraktur

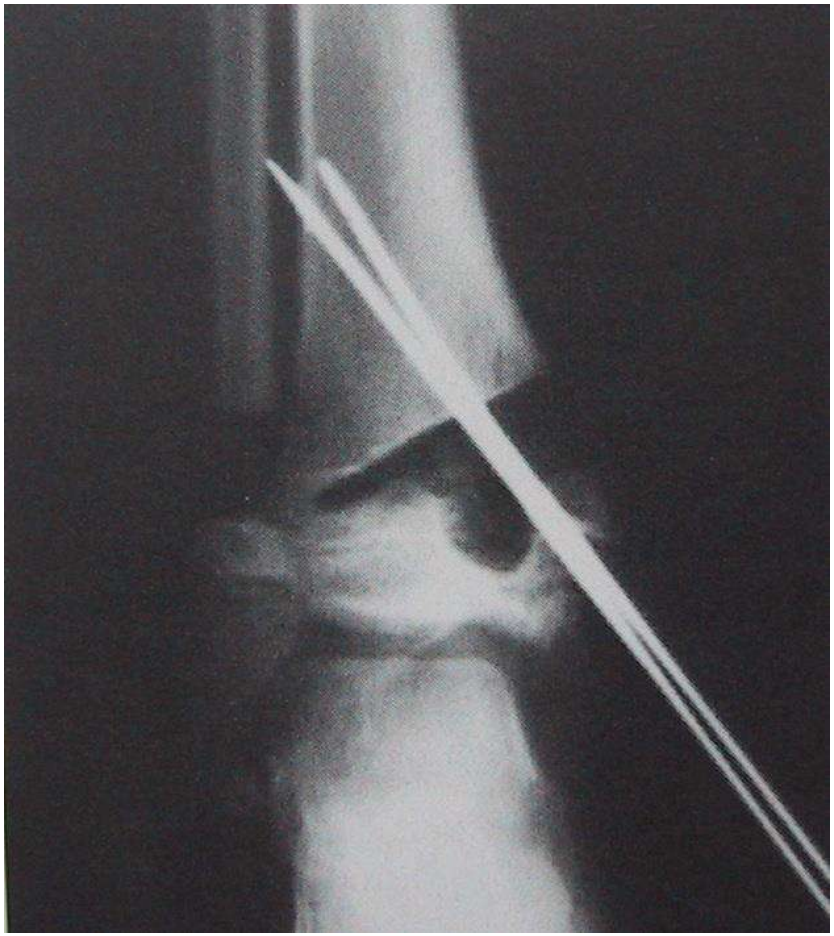
- CP
- Mielomeningokela
- Mišične distrofije
- Paraplegiki
- Dismelije
- Artrogripoza



Osteotomija

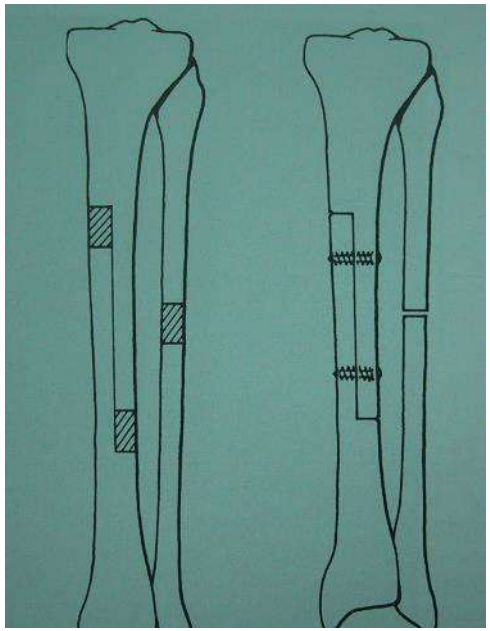


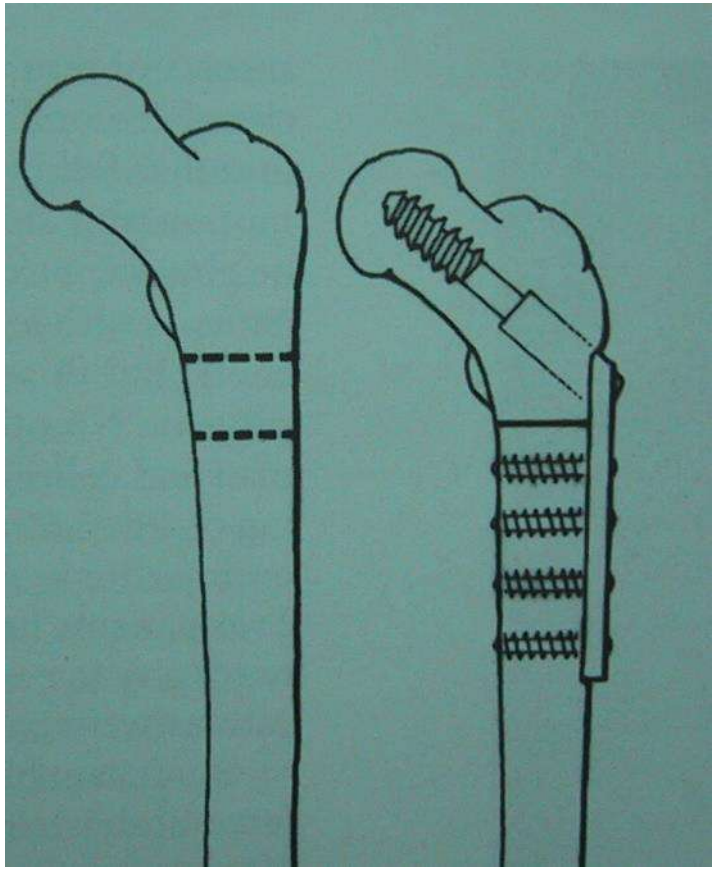
Osteotomija



Skrajšava- abreviacija

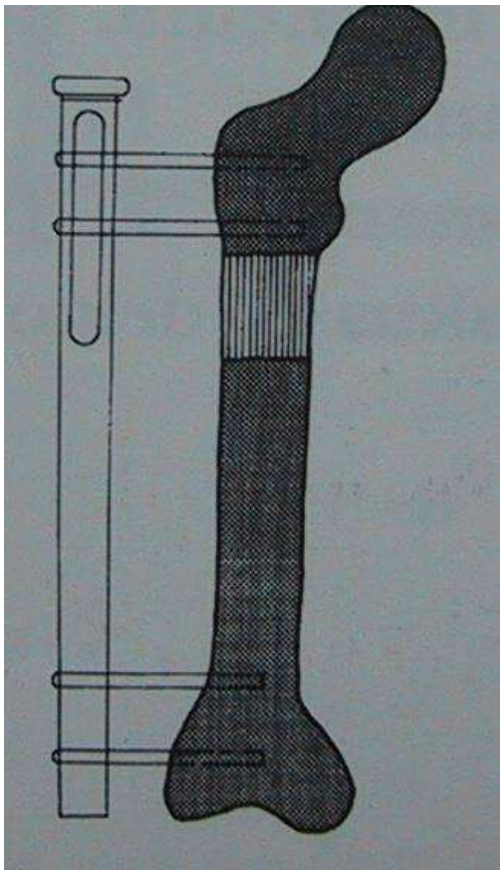
- Za bolnika lažji poseg
- Telesna višina?





Podaljšava- elongacija

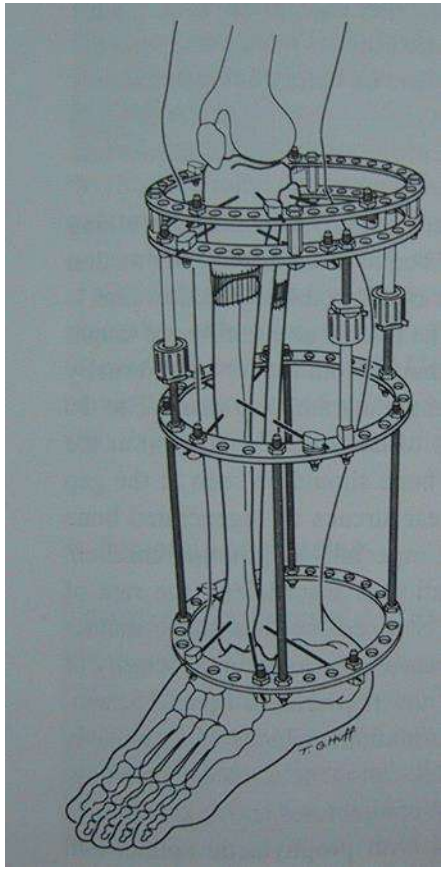
- Montaža fiksaterja
- Osteotomija
- Začetek podaljševanja čez en teden
- 1mm na dan (po ¼)



Podaljšava

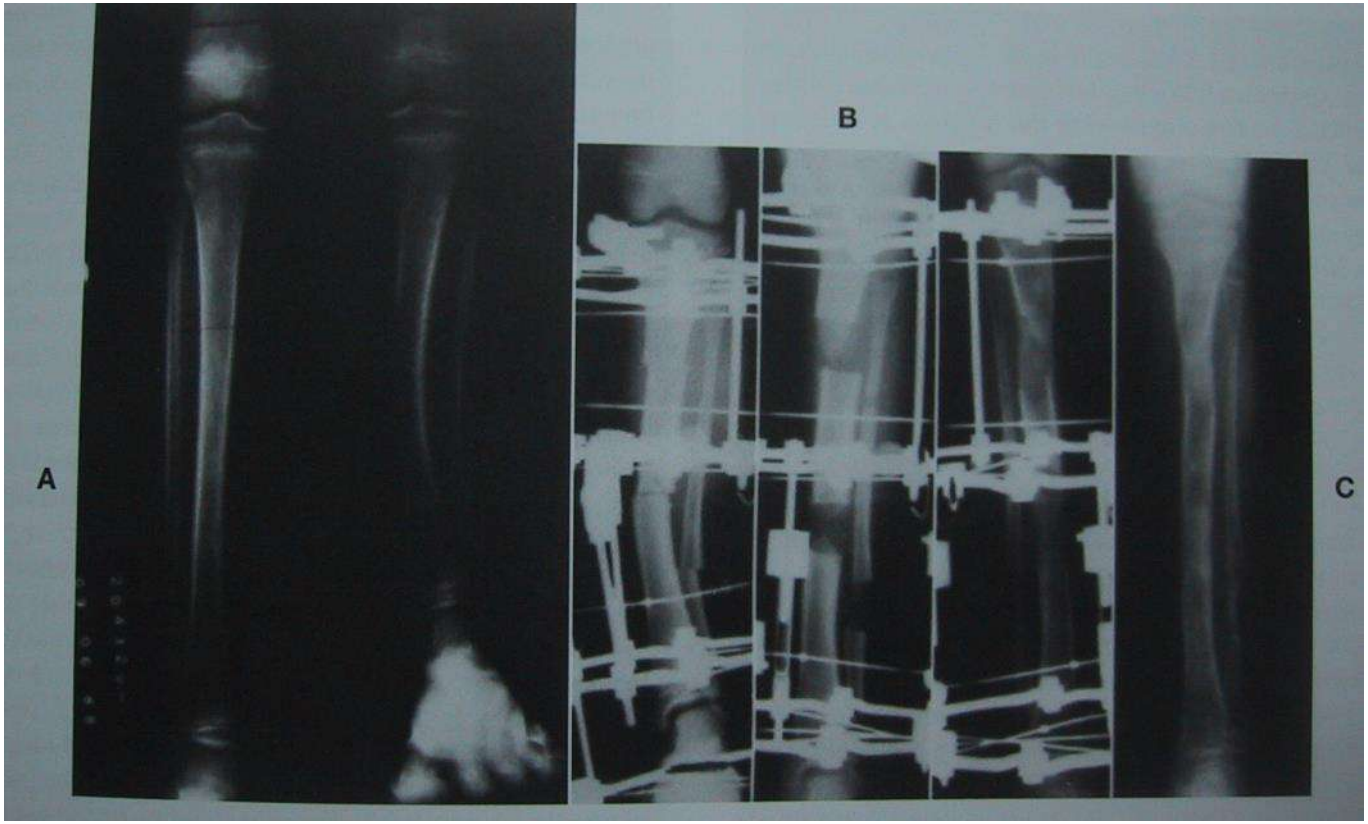
- Pričakovani problemi:

  os, zamik, frakture, pin tract infection, brazgotine, kontrakture, bolečina?



Podaljšava- healing index

- 30 dni na cm podaljšave



Kongenitalna pseudartroza tibije

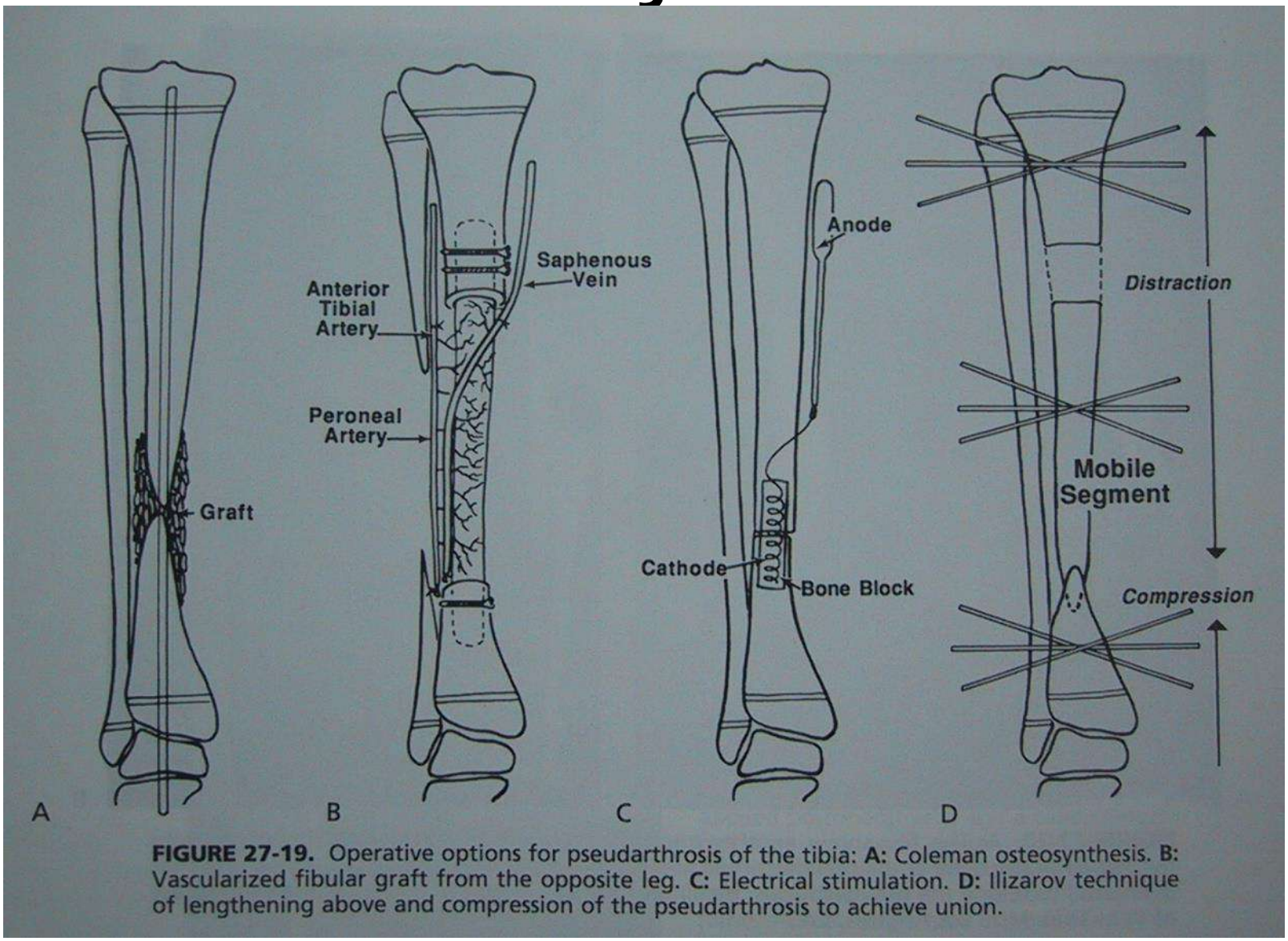


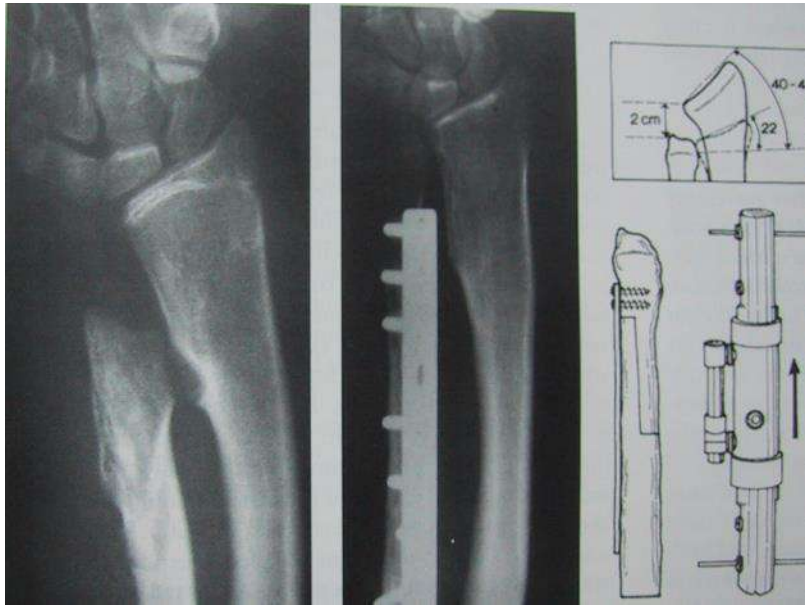
FIGURE 27-19. Operative options for pseudarthrosis of the tibia: **A:** Coleman osteosynthesis. **B:** Vascularized fibular graft from the opposite leg. **C:** Electrical stimulation. **D:** Ilizarov technique of lengthening above and compression of the pseudarthrosis to achieve union.

Intramedularna osteosinteza

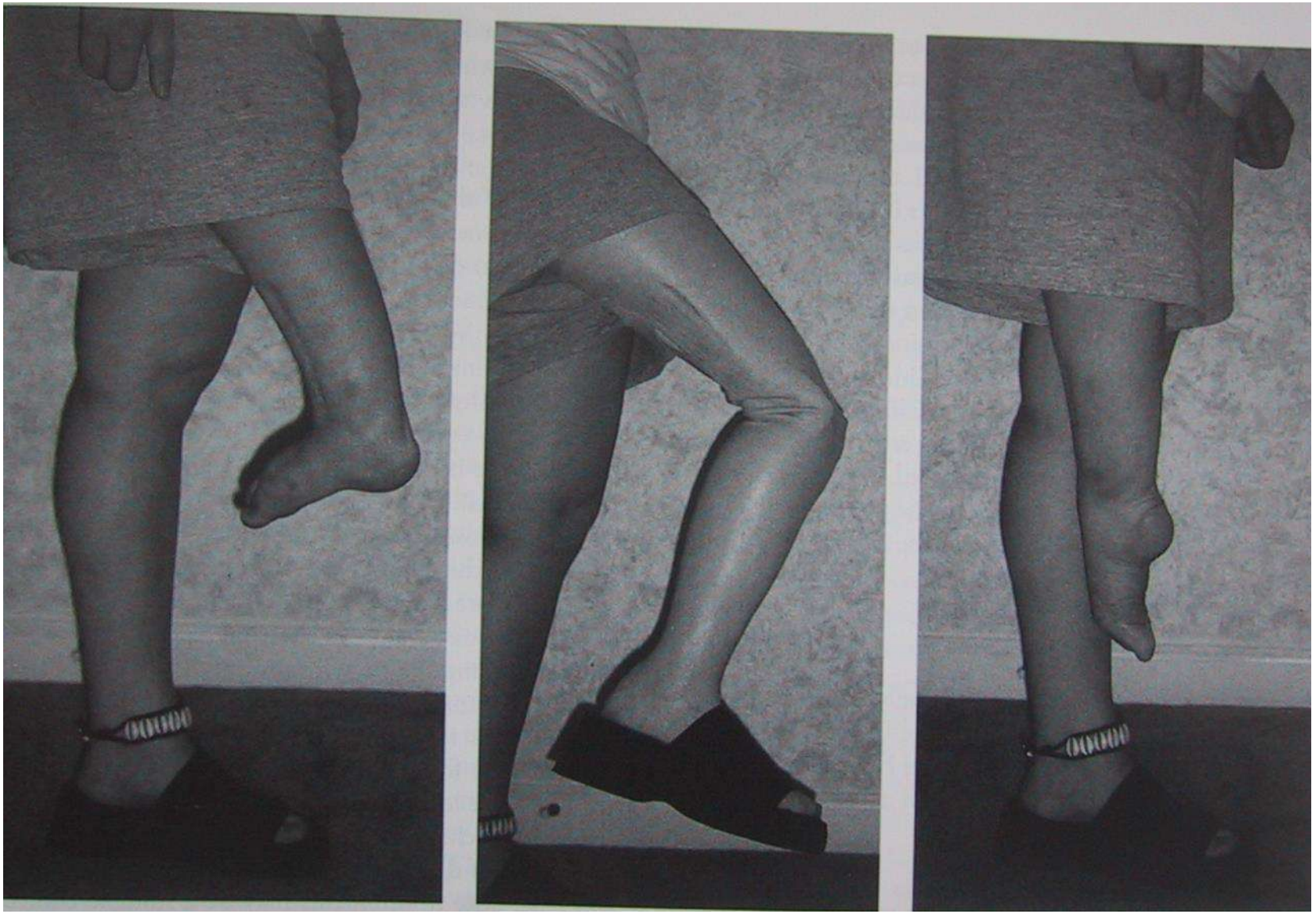
- Osteogenesis imperfecta, nevrofibromatoza, zlomi

Elongacija pri aklaziji

- Radius, ulna



Van Ness



Totalna endoproteza kolka, kolena