LA VALUTAZIONE DEL BAMBINO CON P.C.I.: Metodologia e strumenti

Spasticità, retrazioni tendinee e deformità scheletriche

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FONDAZIONE ARIEL
CENTRO DISABILITÀ NEUROMOTORIE INFANTILI

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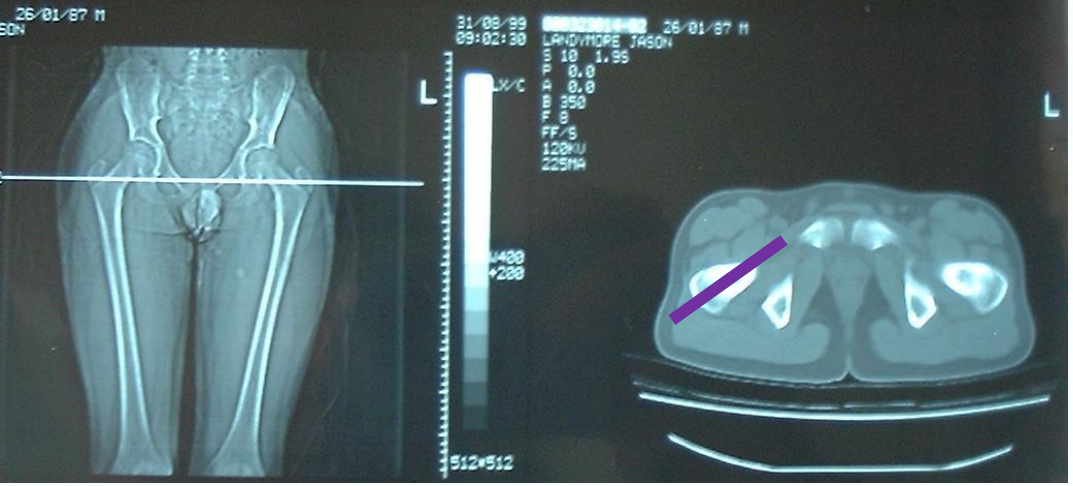
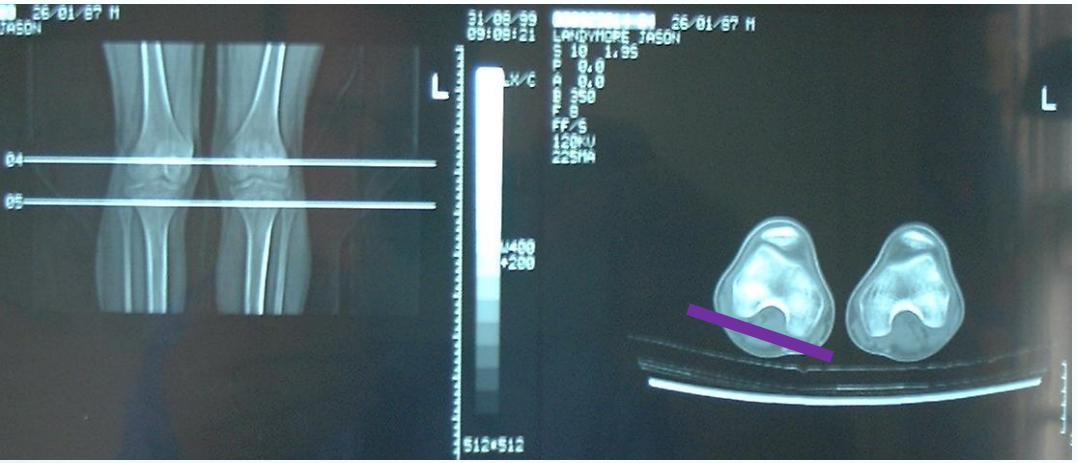
PERCHE' LA CHIRURGIA NELLA NELLA P.C.I.

- Spasticità/debolezza
- Contratture/retrazioni muscolari
- Povero controllo motorio
- Non correzione /aumento del braccio delle leve
- Diminuzione dell'equilibrio
- Alterazione delle proteine del collagene/tendini
- Sfera cognitiva!!!

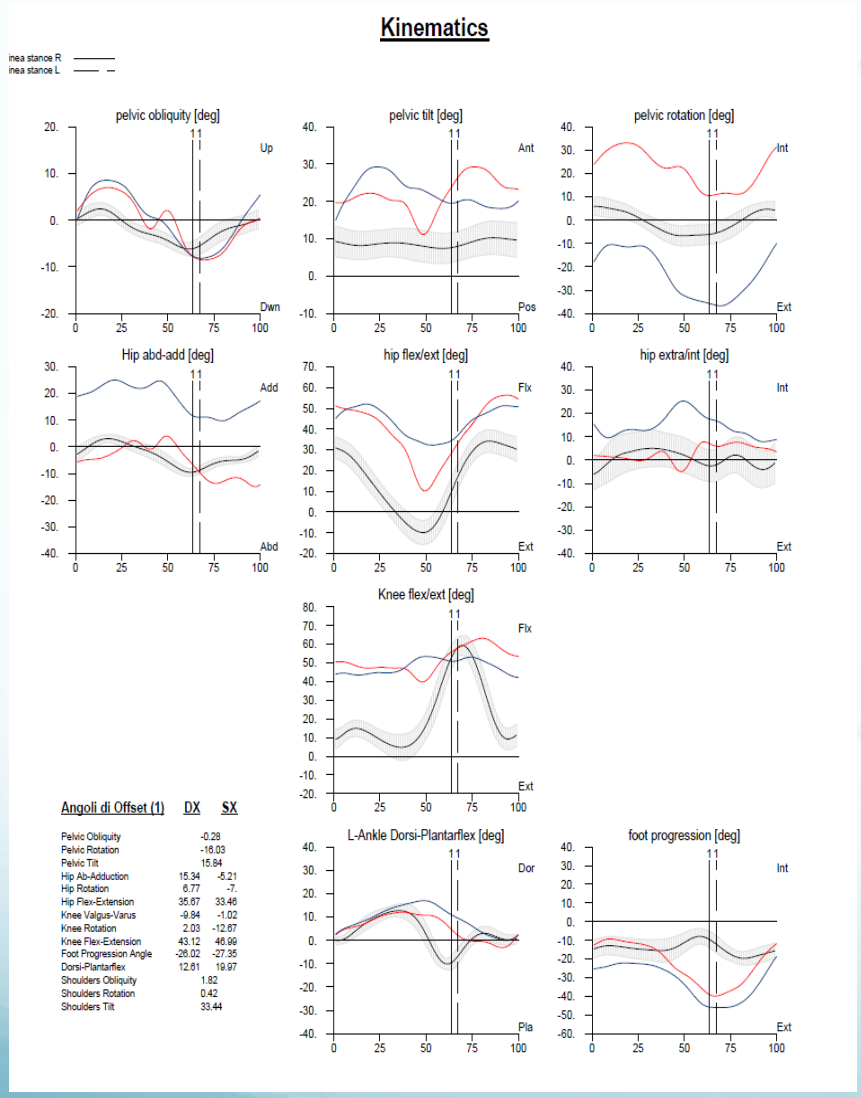
Lever-Arm -Dysfunction (LAD)

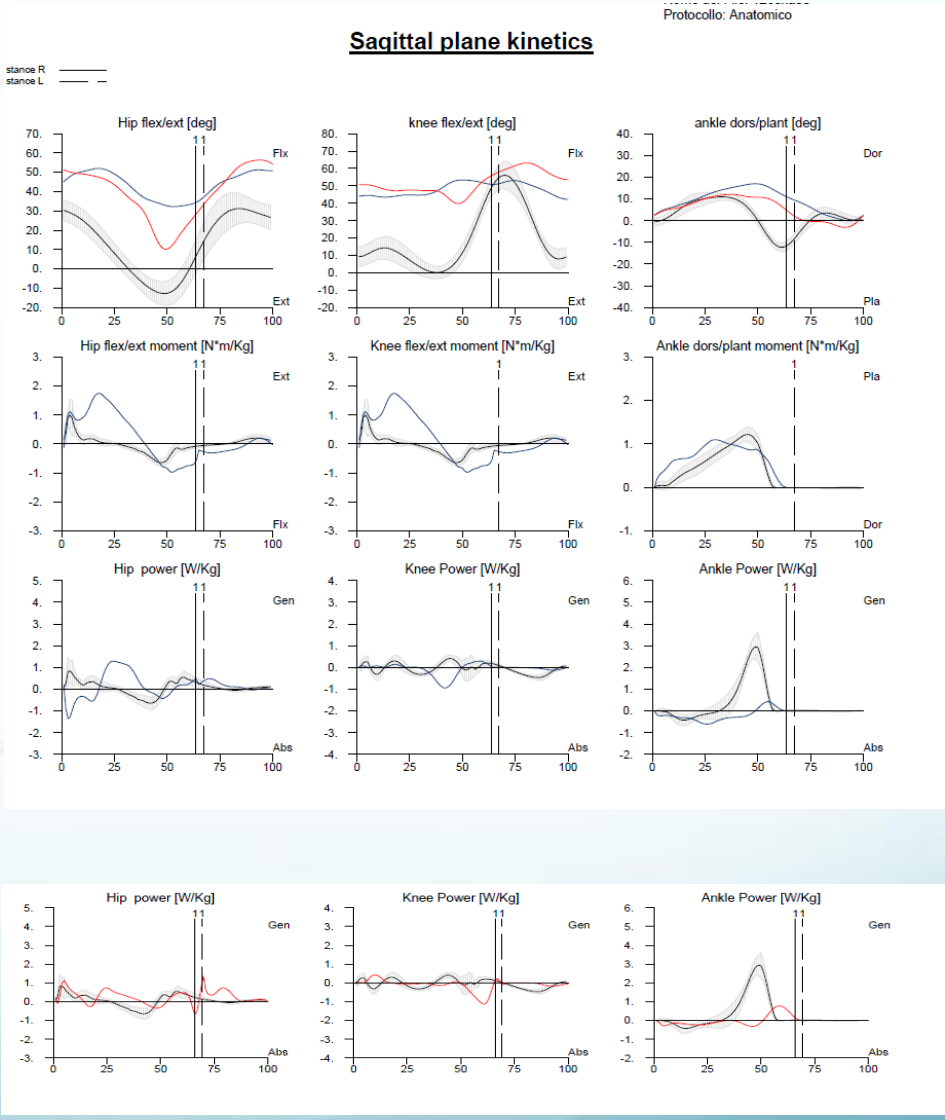




Studio dei profili torsionali

Analisi della cinetica e cinematica del passo





OBIETTIVI

RECUPERO
RESTITUZIONE
RIMEDIO

- MIGLIORARE FUNZIONE
- RIPRESTINARE LA FUNZIONE
- LIMITARE PERDIDA DELLA FUNZIONE

CREARE AMBIENTE MOTORIO PIU' IDONEO PER APPRENDERE SCHEMI PIU' ADATTI AD ESEGUIRE UN MOVIMENTO

RICREARE AMBIENTE IDONEO AFFINCHE' IL PAZIENTE POSSA UTILIZZARE NUOVAMENTE SCHEMI MOTORI IN SUO POSSESSO

CERCARE DI RICREARE AMBIENTE MOTORIO IL PIU' POSSIBILE VICINO AGLI SCHEMI MOTORI PREGRESSI

VALUTAZIONE: **CLINICA**

STRUMENTALE

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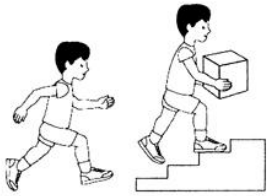
CLINICA

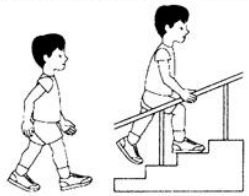
COORDINAZIONE MOTORIA
FORZA
RESISTENZA
ESAURIBILITA‘
EQUILIBRIO E PROPRIOCEZIONE
SPASTICITA’
ARTICOLARITA’

GMFCS E & R between 6th and 12th birthday: Descriptors and illustrations



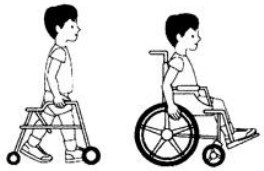
GMFCS Level I

Children walk at home, school, outdoors and in the community. They can climb stairs without the use of a railing. Children perform gross motor skills such as running and jumping, but speed, balance and coordination are limited



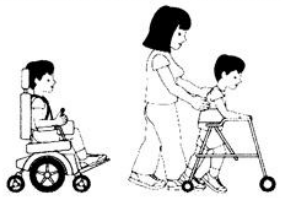
GMFCS Level II

Children walk in most settings and climb stairs holding onto a railing. They may experience difficulty walking long distances and balancing on uneven terrain, inclines, in crowded areas or confined spaces. Children may walk with physical assistance, a hand-held mobility device or used wheeled mobility over long distances. Children have only minimal ability to perform gross motor skills such as running and jumping.



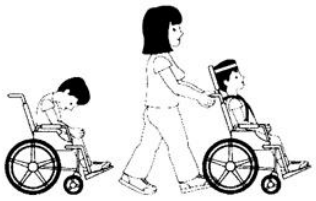
GMFCS Level III

Children walk using a hand-held mobility device in most indoor settings. They may climb stairs holding onto a railing with supervision or assistance. Children use wheeled mobility when traveling long distances and may self-propel for shorter distances.



GMFCS Level IV

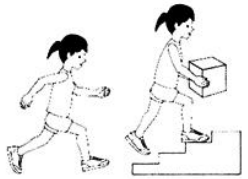
Children use methods of mobility that require physical assistance or powered mobility in most settings. They may walk for short distances at home with physical assistance or use powered mobility or a body support walker when positioned. At school, outdoors and in the community children are transported in a manual wheelchair or use powered mobility.



GMFCS Level V

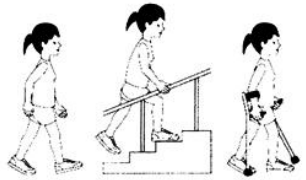
Children are transported in a manual wheelchair in all settings. Children are limited in their ability to maintain antigravity head and trunk postures and control leg and arm movements.

GMFCS E & R between 12th and 18th birthday: Descriptors and illustrations



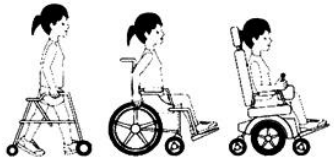
GMFCS Level I

Youth walk at home, school, outdoors and in the community. Youth are able to climb curbs and stairs without physical assistance or a railing. They perform gross motor skills such as running and jumping but speed, balance and coordination are limited.



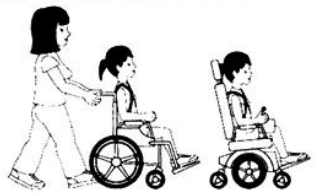
GMFCS Level II

Youth walk in most settings but environmental factors and personal choice influence mobility choices. At school or work they may require a hand held mobility device for safety and climb stairs holding onto a railing. Outdoors and in the community youth may use wheeled mobility when traveling long distances.



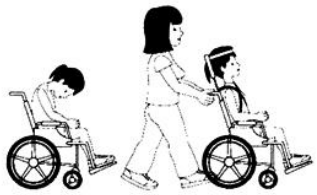
GMFCS Level III

Youth are capable of walking using a hand-held mobility device. Youth may climb stairs holding onto a railing with supervision or assistance. At school they may self-propel a manual wheelchair or use powered mobility. Outdoors and in the community youth are transported in a wheelchair or use powered mobility.



GMFCS Level IV

Youth use wheeled mobility in most settings. Physical assistance of 1-2 people is required for transfers. Indoors, youth may walk short distances with physical assistance, use wheeled mobility or a body support walker when positioned. They may operate a powered chair, otherwise are transported in a manual wheelchair.



GMFCS Level V

Youth are transported in a manual wheelchair in all settings. Youth are limited in their ability to maintain antigravity head and trunk postures and control leg and arm movements. Self-mobility is severely limited, even with the use of assistive technology.

Appendix I: *The Functional Mobility Scale.*

Rating 6

Independent on all surfaces:

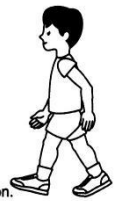
Does not use any walking aids or need any help from another person when walking over all surfaces including uneven ground, curbs etc., and in a crowded environment.

Rating 5

Independent on level surfaces:

Does not use walking aids or need help from another person. *Requires a rail for stairs.

*If uses furniture, walls, fences, shop fronts for support, please use 4 as appropriate description.



Rating 4

Uses sticks (one or two):

Without help from another person.

Walking distance	Rating: select the number (from 1–6) which best describes current function
5 metres (yards)	
50 metres (yards)	
500 metres (yards)	

Rating 3

Uses crutches:

Without help from another person.

Rating 2

Uses a walker or frame:

Without help from another person.

Rating 1

Uses wheelchair:

May stand for transfers, may do some stepping supported by another person or using a walker/frame.

Rating C

Crawling:

Child crawls for mobility at home (5m).

Rating N

N = does not apply:

For example, child does not complete the distance (500m).

PODCI Pediatric Outcomes Data Collection Instrument	
2 - 10 years of age	11 - 18 years of age

FAQ Functional Assessment Questionnaire	
First time visit	Subsequent visits

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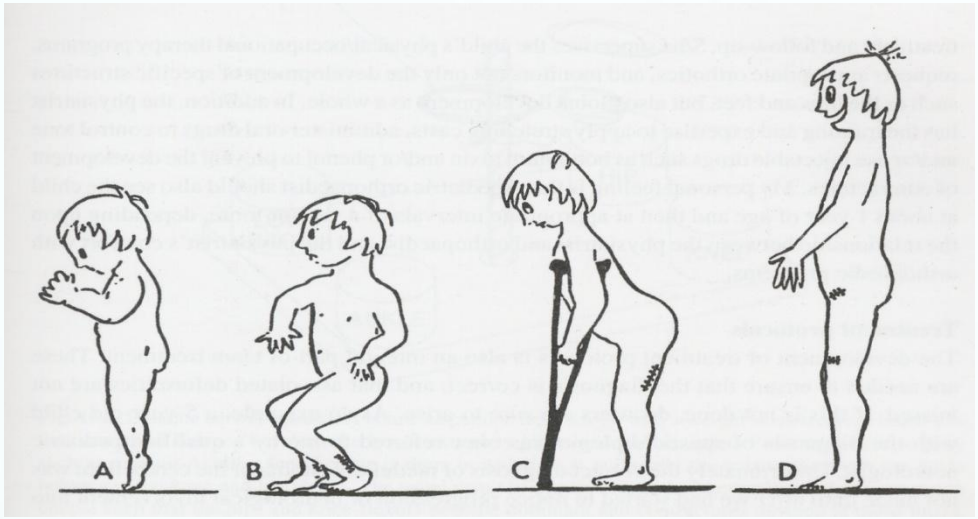
ALGORITMO GENERALE DI TRATTAMENTO

- GESTIONE DELLA SPASTICITA'
- CORREZIONE DELLE CONTRATTURE
- CORREZIONE DELLE FORZE DELLE LEVE
- CORREZIONE DEL BRACCIO DELLE LEVE

Chirurgia



Anni ’50 = **Chirurgia segmentaria**

Birthday Sindrome

Anni ‘60 :

Chirurgia dosata e polidistrettuale

Anni ’80 :**Chirurgia Multilevel:** cosa, come e quanto correggere (gait analysis)

Anni ’90: **Chirurgia Funzionale**: **cosa,** come , quanto e **quando** correggere

AACPDM
american academy for cerebral palsy and developmental medicine
61st Annual Meeting
Vancouver • BC
CANADA
OCTOBER 10-13, 2007

Tendons collagen turnover-related genes in cerebral palsy

N. Gagliano, F. Pelillo, V. Gasparroni, O. Picciolini ,
M. Gioia and N. Portinaro

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MATERIALI E METODI

pazienti:

- **normali (n=3) (1 maschi e 2 femmine, età media 14.3 ± 1.53)**
- **diplegic CP (n=6) (4 maschi e 2 femmine, età media 16.8 ± 4.66)**
- **quadriplegic CP (n= 7) (4 maschi e 3 femmine, età media 13.7 ± 4.41)**

Analisi dell'espressione genica: real time RT-PCR.

- **COL-I, LH2b, MMP-1, TIMP-1, TGF-β1, SPARC**
- **Tendini da muscolo semitendinoso (ST) e gracile (GR) prelevati durante interventi chirurgici**

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↑ COL-I
LH2b
TGF-β1

→ fenotipo piu' resistente

↓ MMP-1
↓ TIMP-1

→ ↓ Degradazione del collagene

↑ SPARC

→ turnover e rimodellamento della ECM
↑

la biochimica tendinea in relazione alla biomeccanica

Reazioni opposte dei tendini allo stimolo meccanico durante lo sviluppo del bambino con spasticità

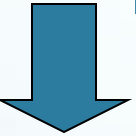
STIFFNESS

spasticita’ = aumento della richiesta metabolica - ATP

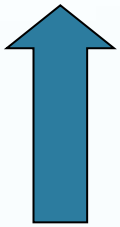
Frost 1947:

- stimolo meccanocettori extracellulari
- stimolo meccanocettori intracellulari dei fibroblasti

COLLAGENE TIPO I e III



FIBRE ELASTICHE



RESISTENZA E “DUREZZA”

DEL TENDINE

SOFTNESS
invecchiamento precoce

PRODUZIONE DI COLLAGENE IMMATURO

(non vengono assemblate le eliche)

PRODUZIONE FIBRE ELASTICHE

(molecola poco costosa)

CEDIMENTO

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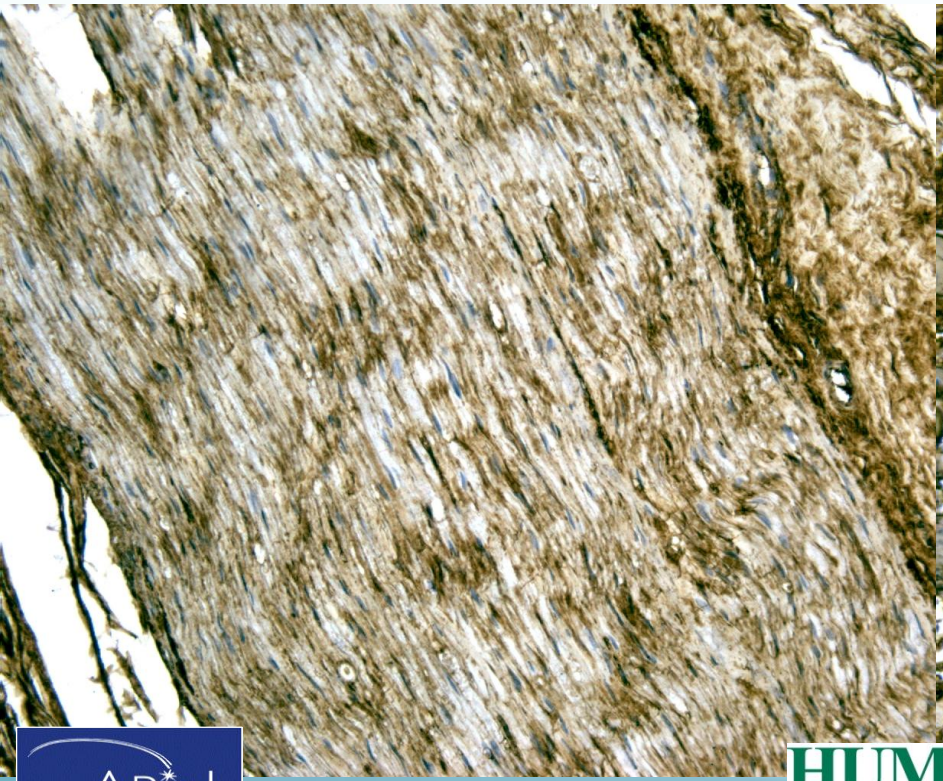
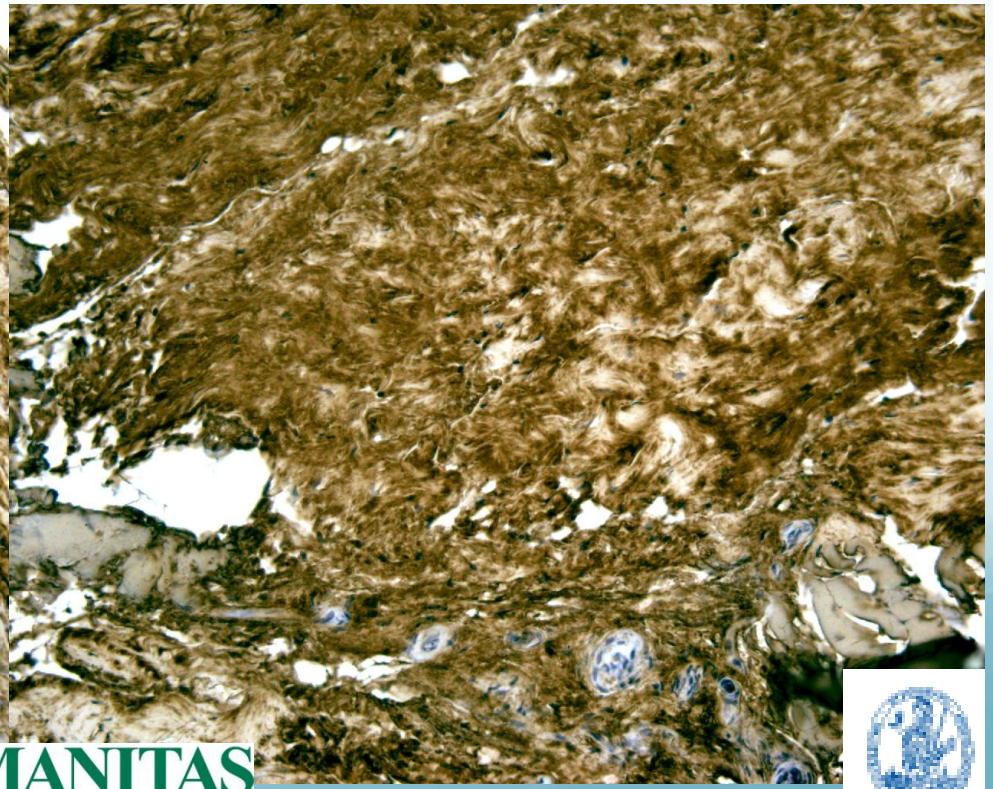
Immunoistochimica con anticorpi specifici

Collagene tipo I e III in quantità elevata in PCI

NORMALE **PCI**





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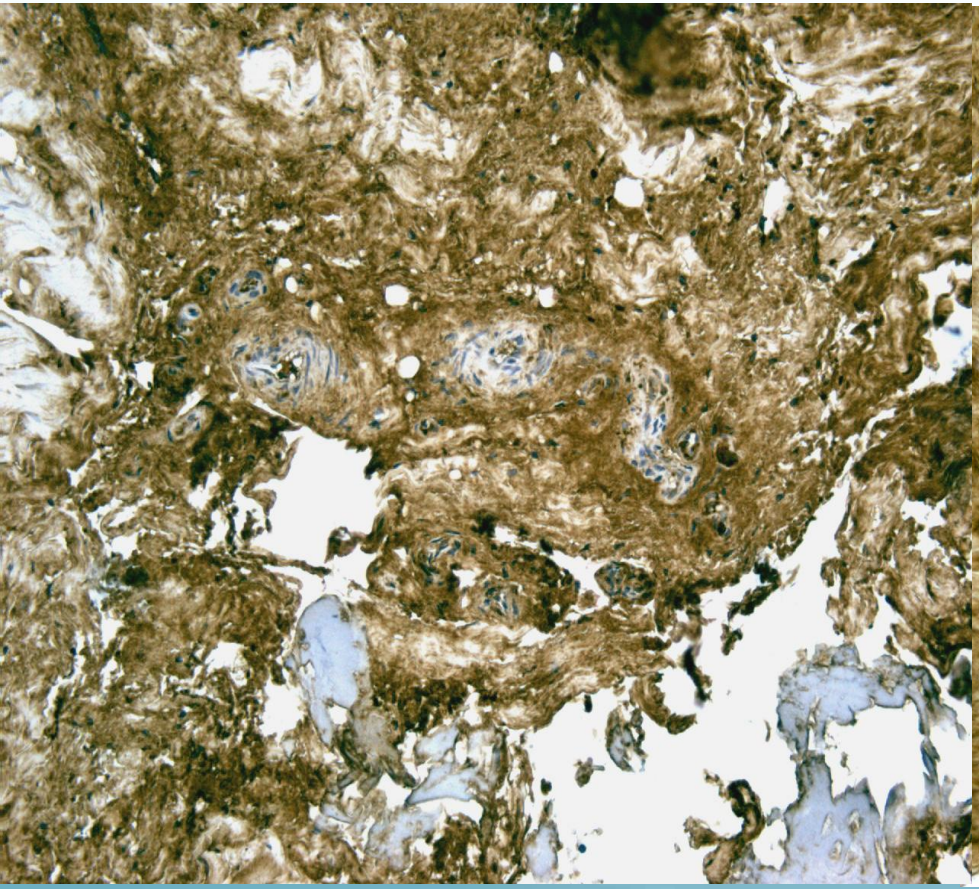
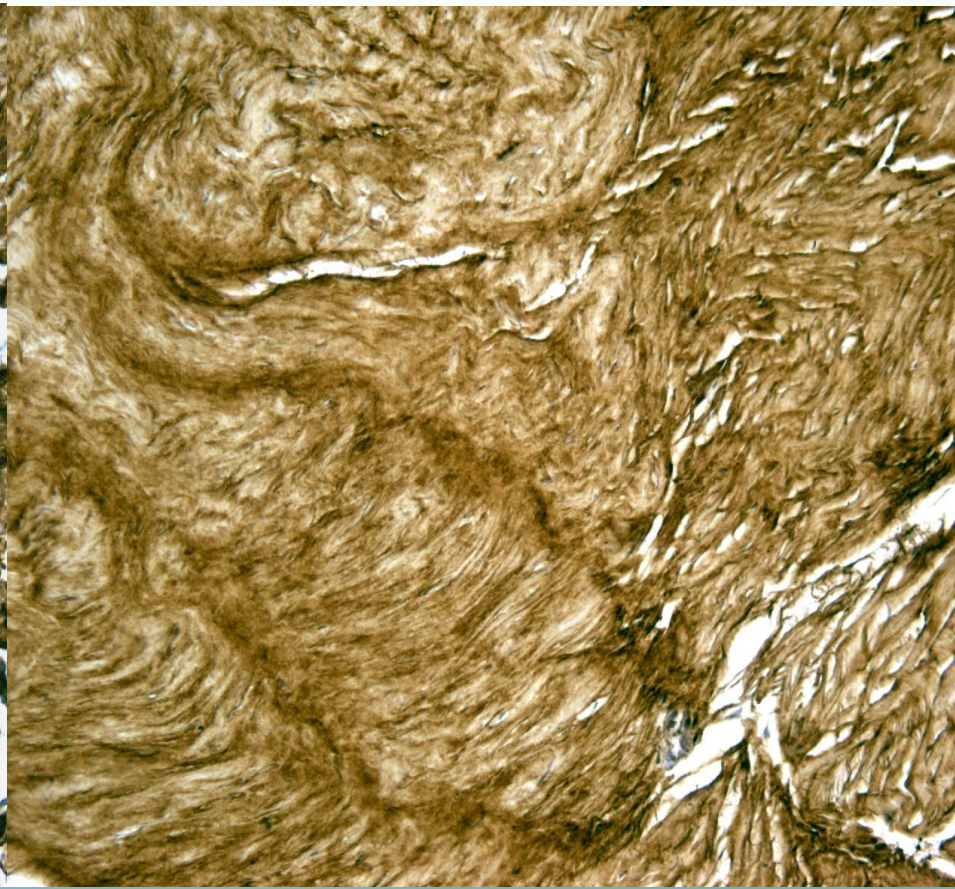
Diminuzione fibre elastiche nei tetraplegici rispetto ai diplegici -età dipendente

risultati preliminari

DIPLEGICI



TETRA



CHIRURGIA FUNZIONALE

TESSUTI MOLLI (forze delle leve)

- **Contratture**
- **Debolezza**
- **Poca selettività**
- **Attività in antifase**

- **Allungamenti**
  - **Giunzione M-T miofasciale**
- **Tendon transfers**

LAD (braccio delle leve)

- **Valgismo collo**
- **Antiversione**
  (Sublussazione anca)
- **Flessione del ginocchio**
- **Torsione tibiale**
- **Piede valgo/varo**

Mal Alignement → **Osteotomie multiple**

"...It is easier to correct abnormal levers than abnormal forces..."

(J.Gage)

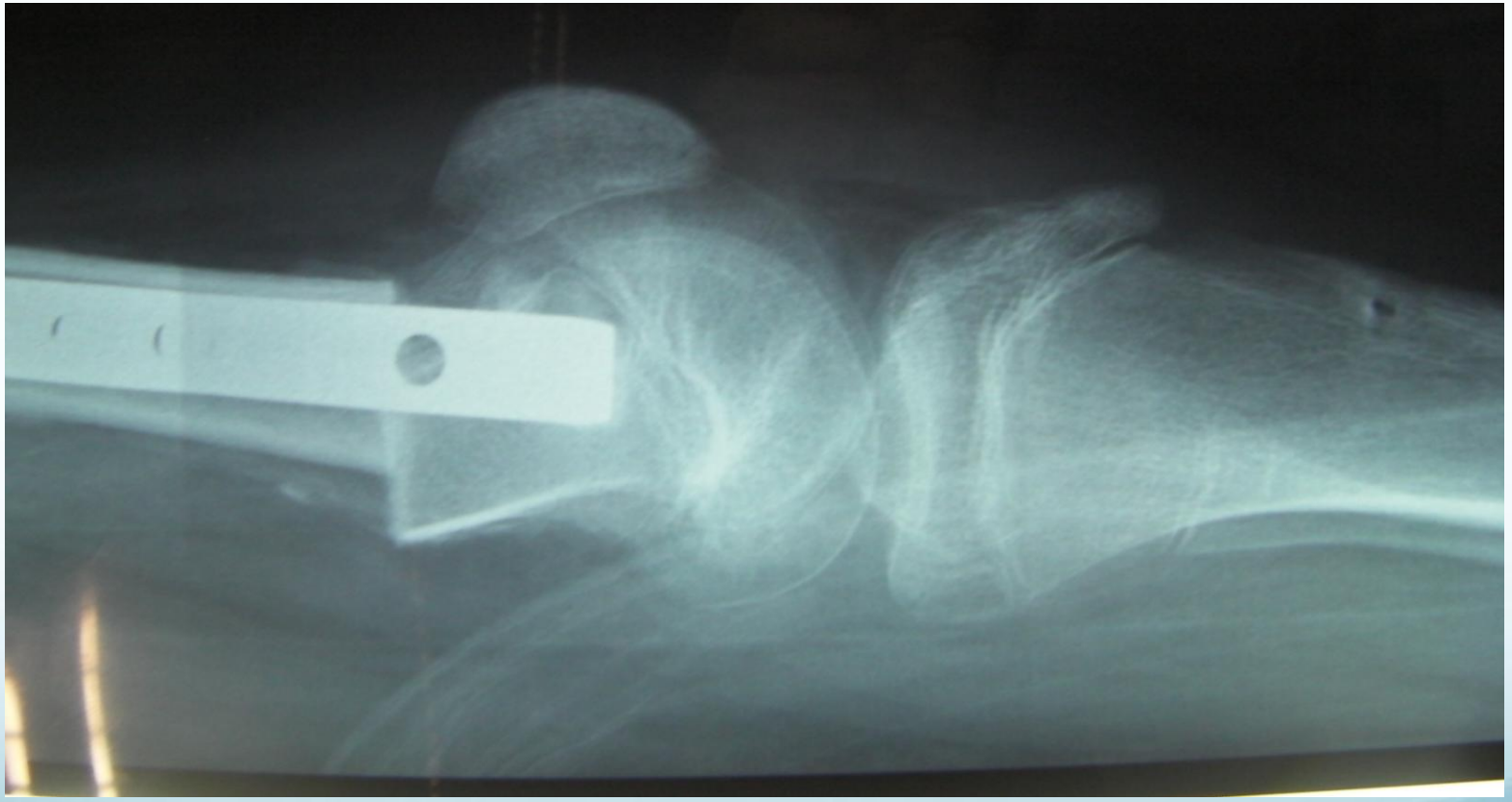
Timing

- Precoce: rischio di recidive

- Tardiva: a volte troppo tardi

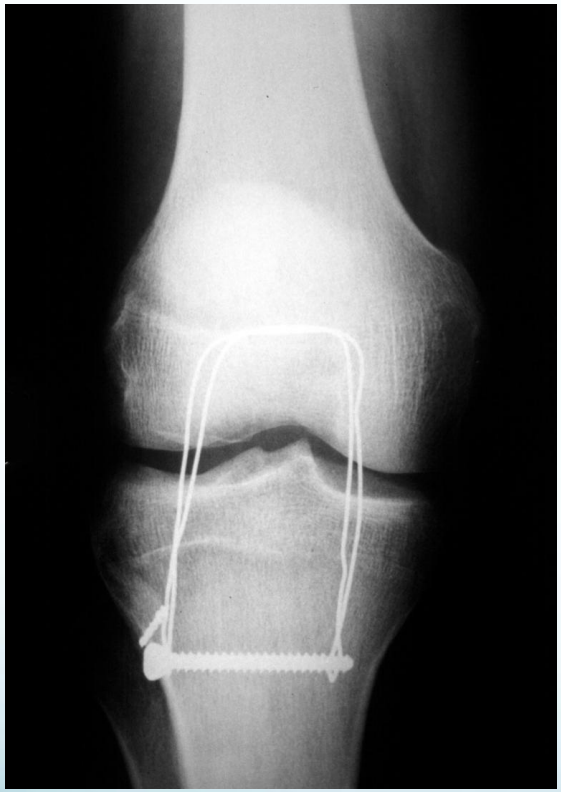
TARDIVO

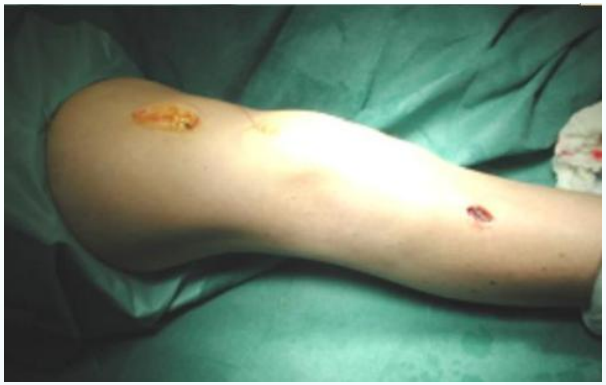
Osteotomia estensione sovracondiloidea



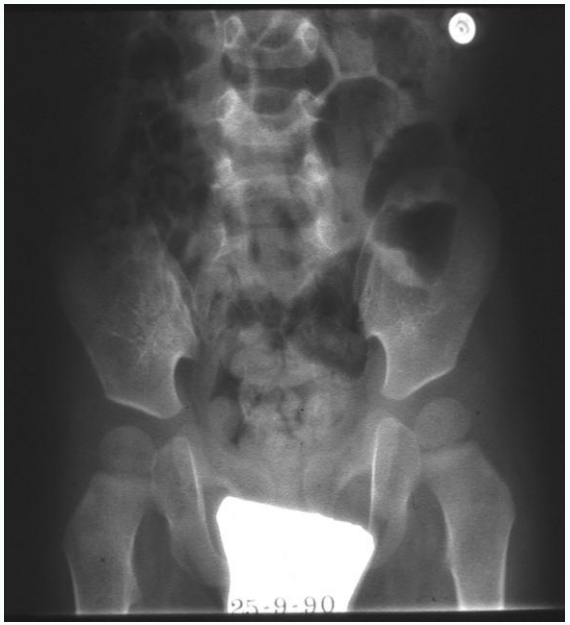
PRECOCE

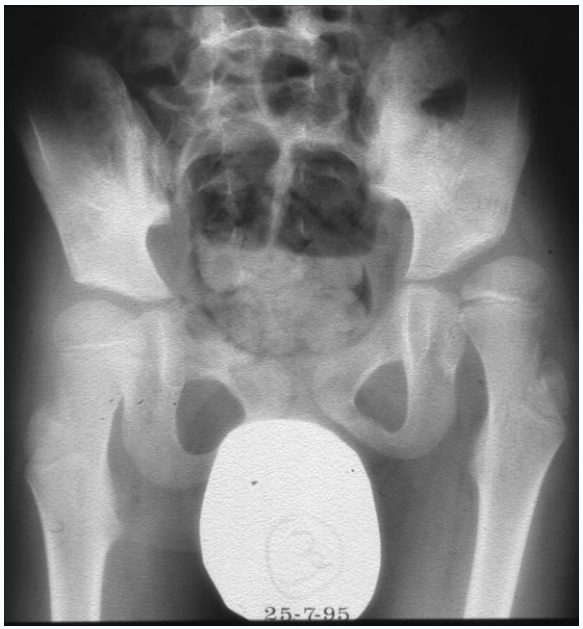
TARDIVO

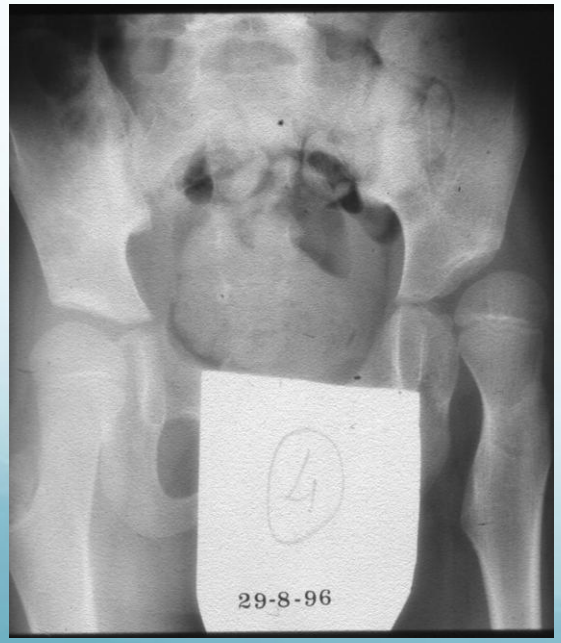




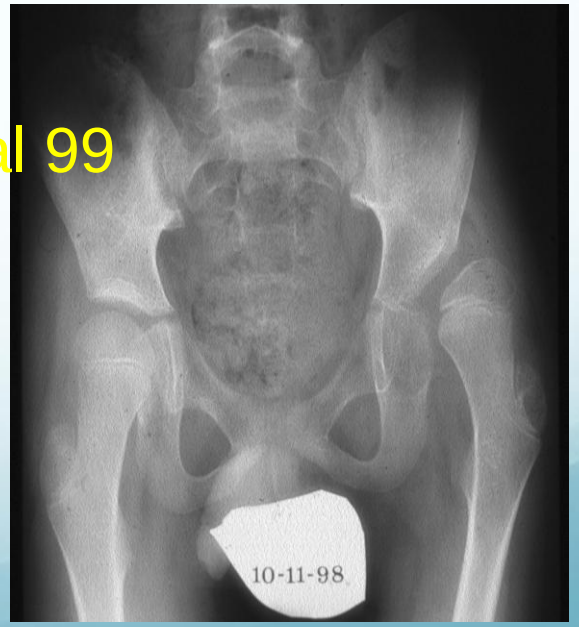
PRECOCE



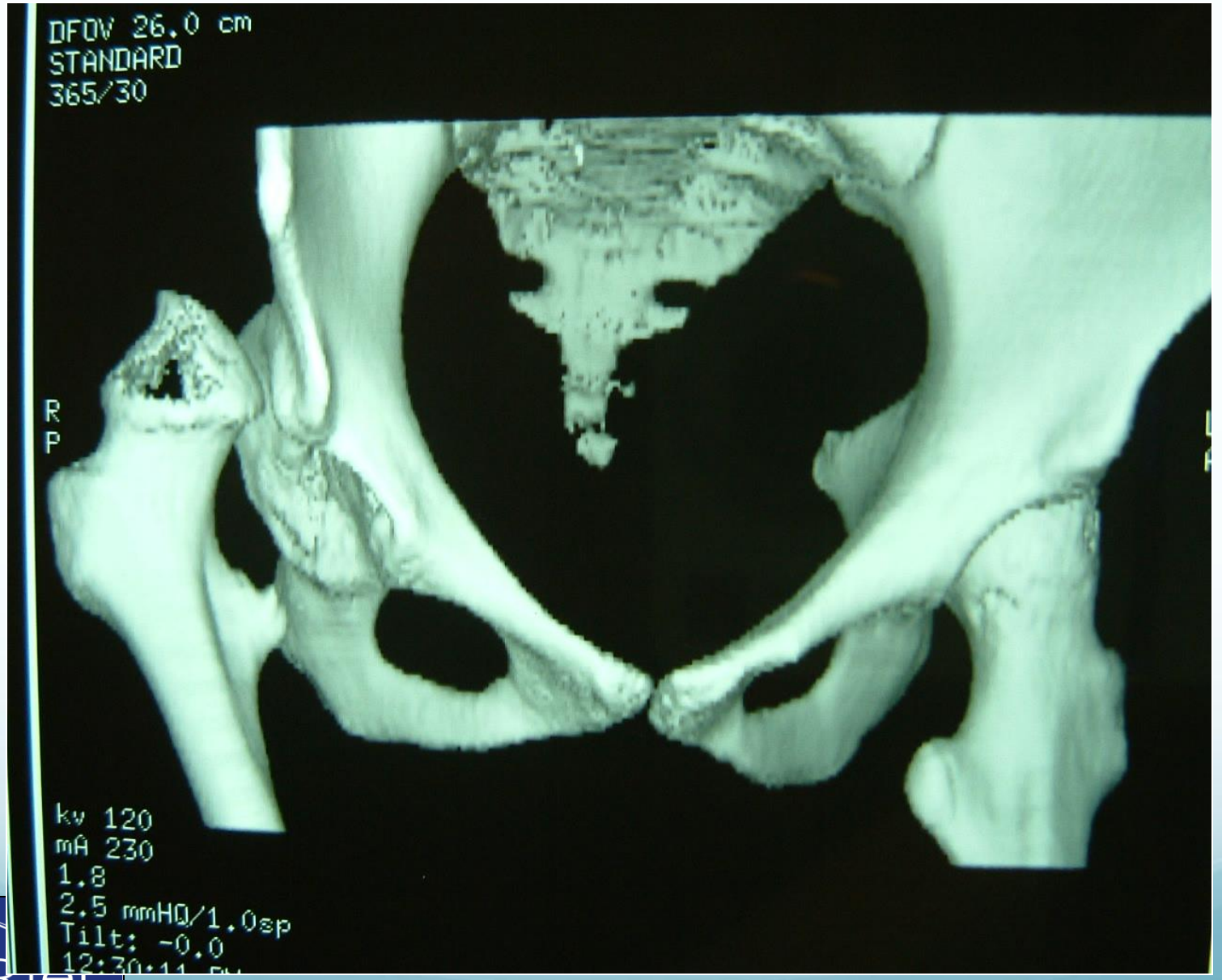


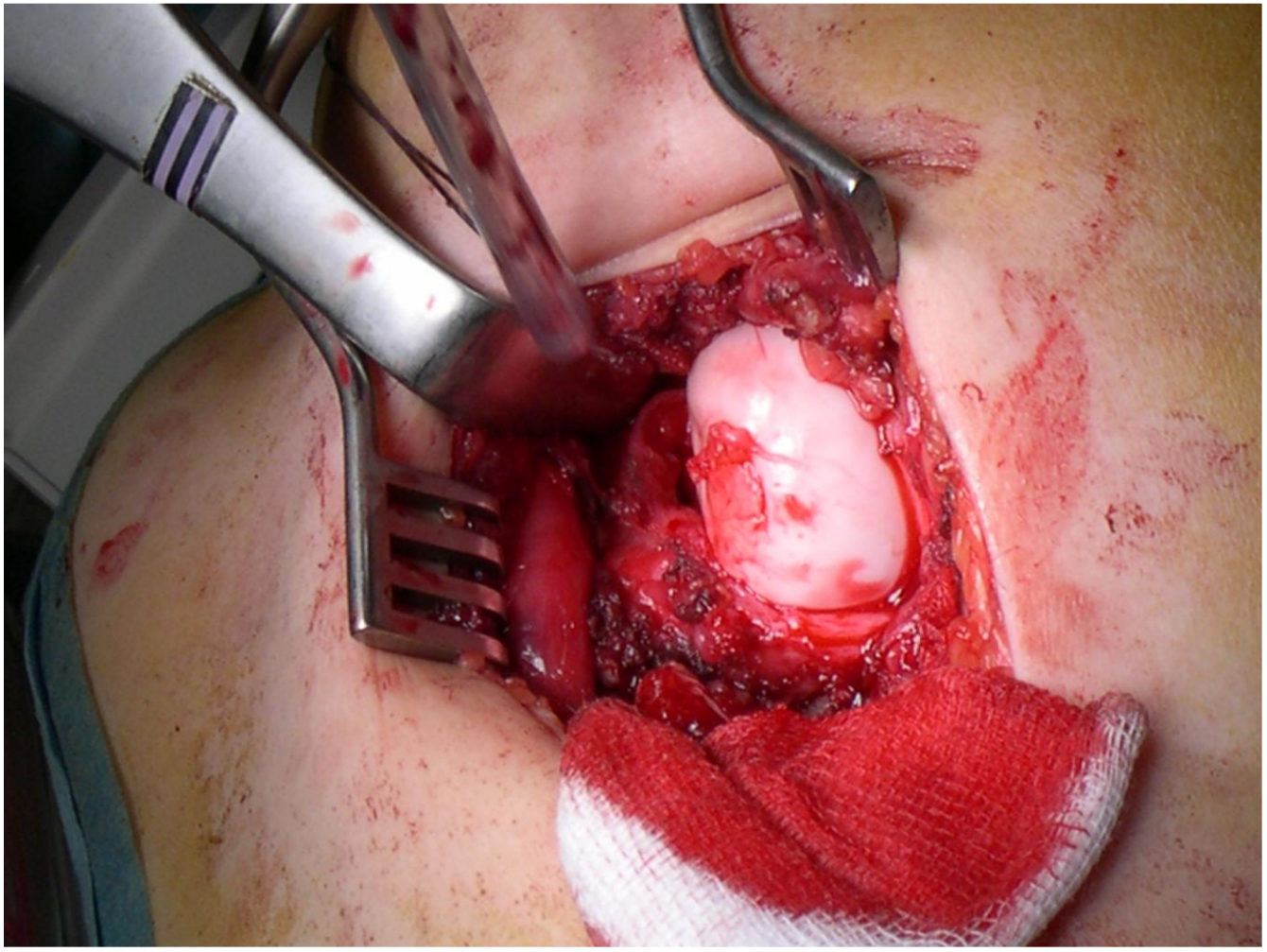


Progressione dal 90 al 99

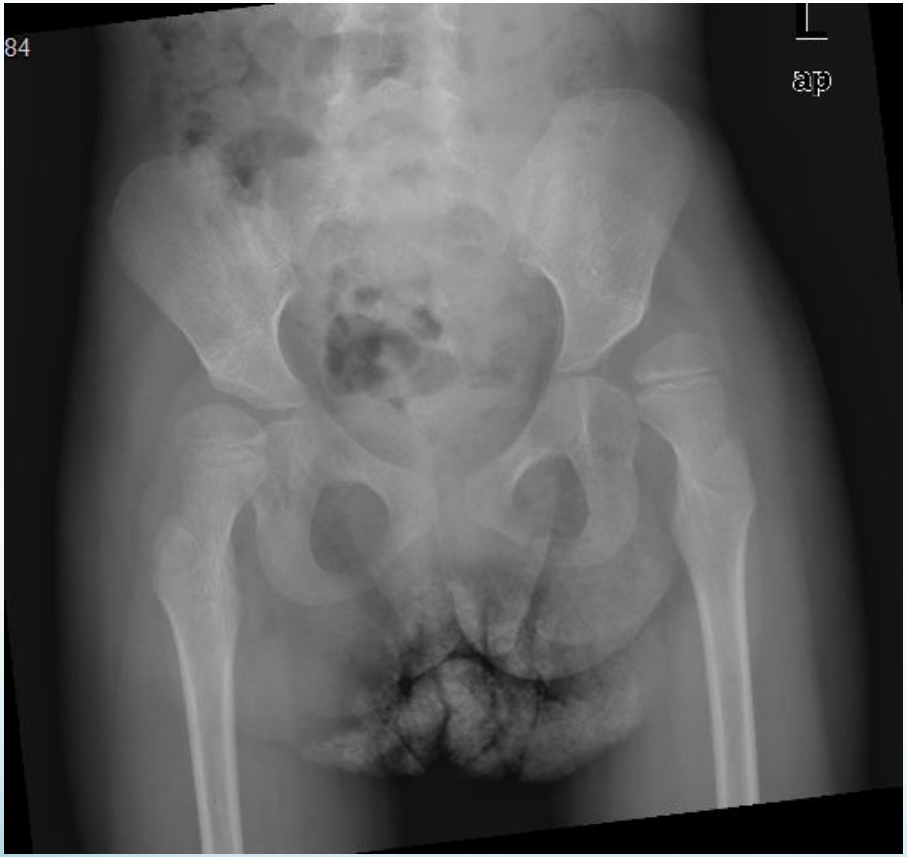


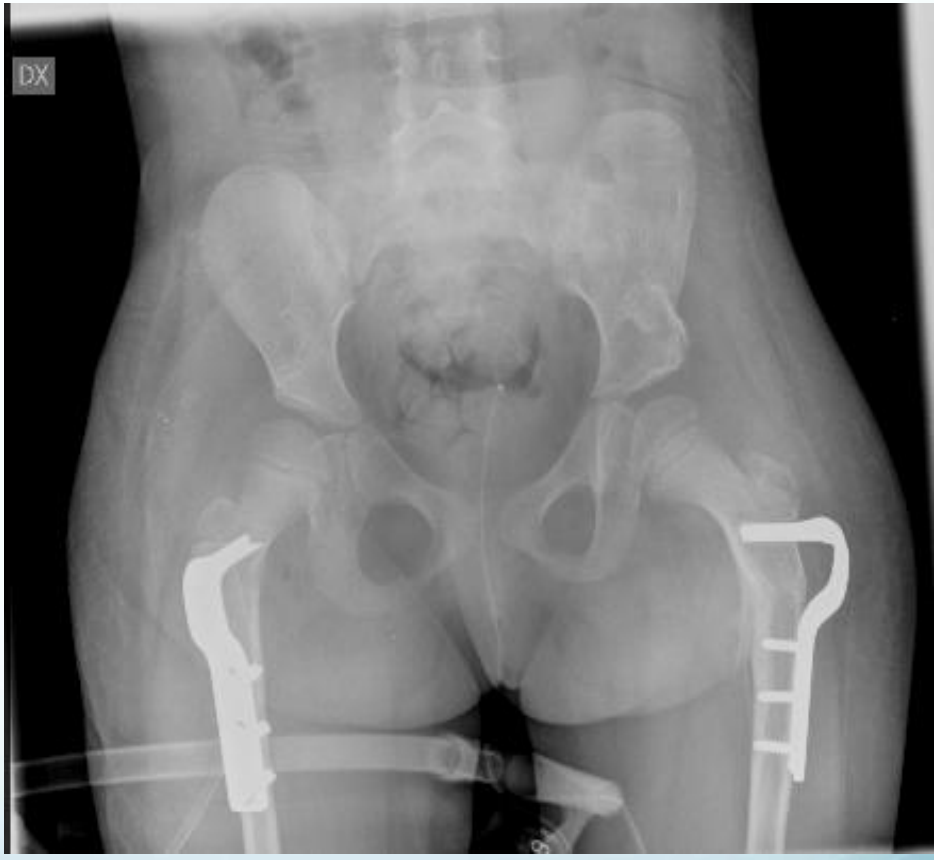
Too late!!!!!!


DFOV 26.0 cm
STANDARD
365/30
R
P
kv 120
mA 230
1.8
2.5 mmHG/1.0sp
Tilt: -0.0



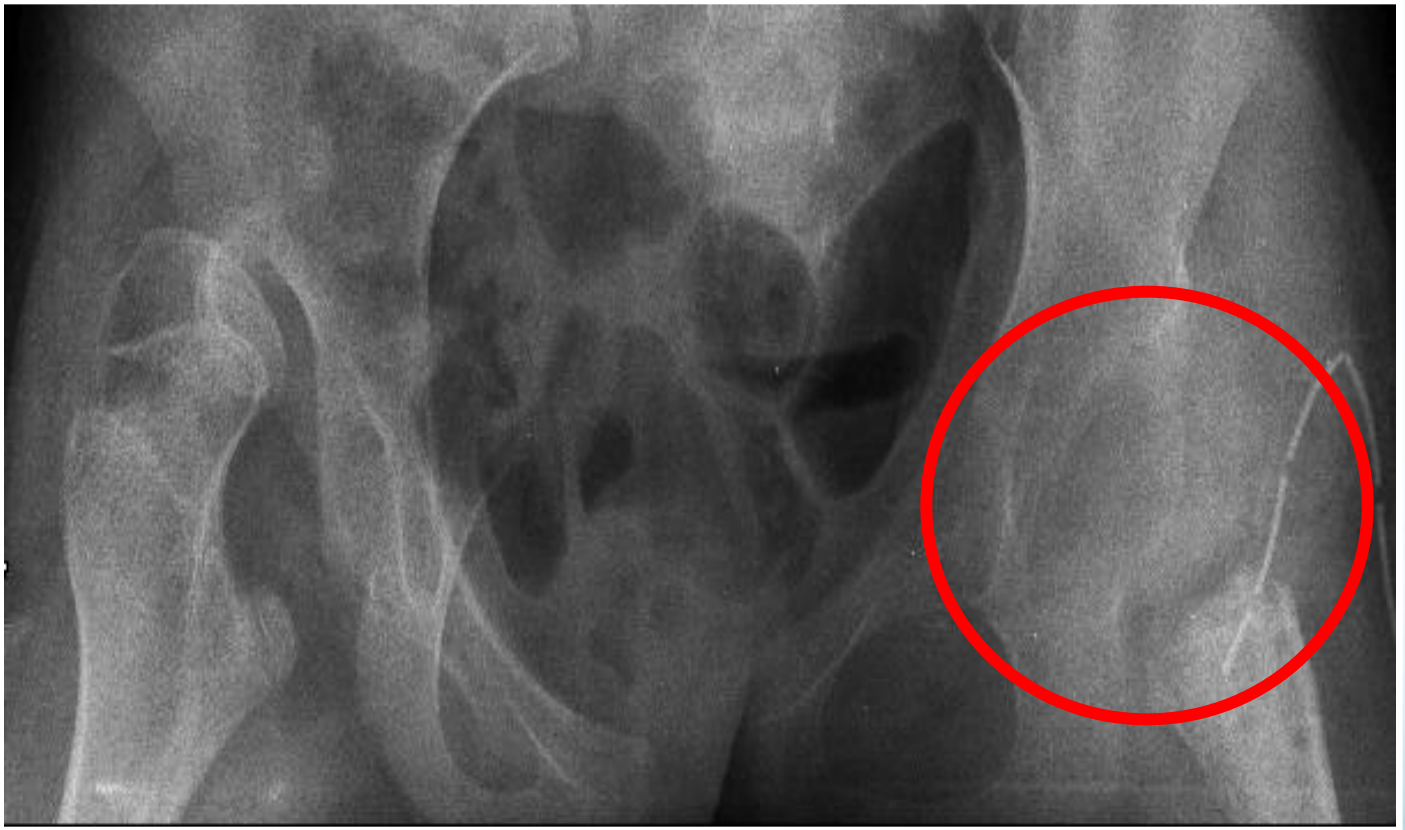
TARDIVO





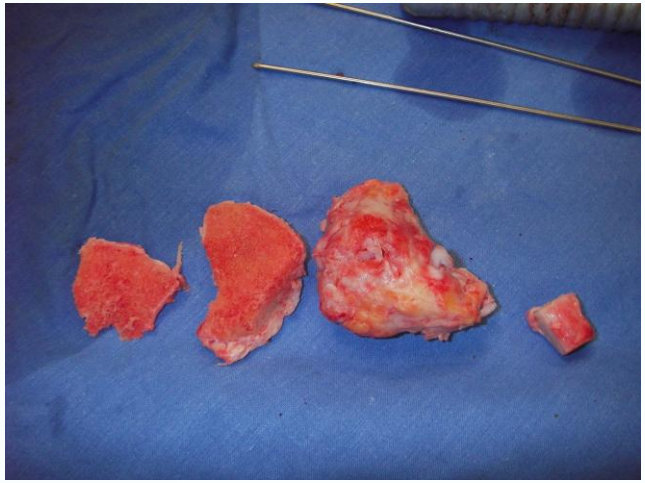
PRECOCE

E’ CHIRURGIA FUNZIONALE ANCHE QUESTA?



O QUESTA?

14a



Un anno dopo