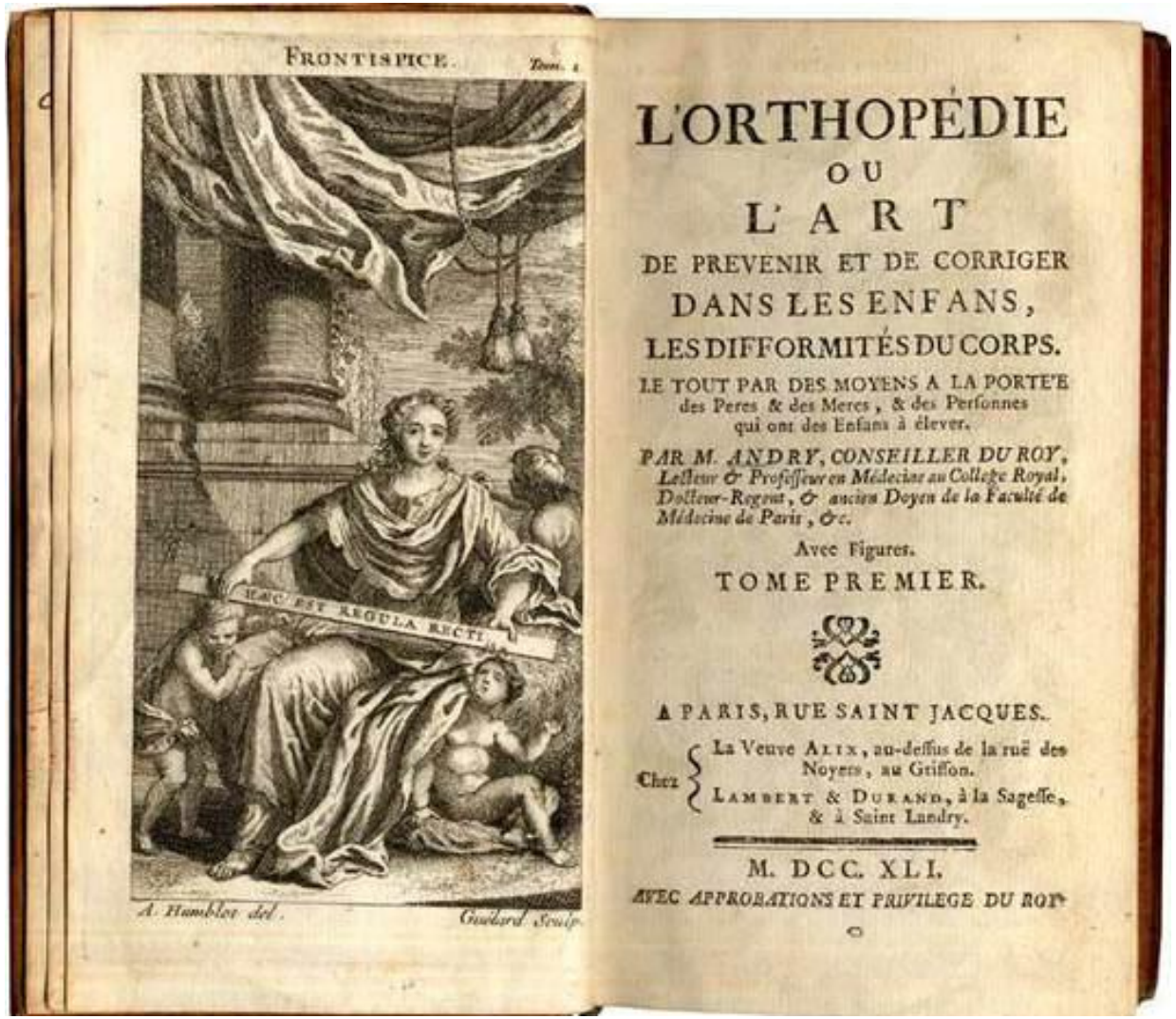
CONGRESSO NAZIONALE SIFE
Rigenerazione Ossea con tecniche di fissazione interna ed esterna.
Prevenzione e trattamento delle infezioni ossee in traumatologia

27-28 Ottobre 2023
MILANO

SIFE
SOCIETÀ ITALIANA
FISSAZIONE ESTERNA

FISSATORI ESAPODALICI IN ORTOPEDIA PEDIATRICA

GIACOMO RIVA
SS ORTOPEDIA PEDIATRICA VARESE



L'ORTHOPÉDIE
OU
L'ART
DE PREVENIR ET DE CORRIGER DANS LES ENFANS, LES DIFFORMITÉS DU CORPS.

LE TOUT PAR DES MOYENS A LA PORTE'E des Peres & des Meres, & des Perſonnes qui ont des Enfans à élever.

PAR M. ANDRY, *CONSEILLER DU ROY, Lecteur & Profeſſeur en Médecine au College Royal, Docteur-Regent, & ancien Doyen de la Faculté de Médecine de Paris, &c.*

Avec Figures.

TOME PREMIER.

A PARIS, RUE SAINT JACQUES.

Chez { La Veuve ALIX, au-deſſus de la ruë des Noyers, au Griffon. / LAMBERT & DURAND, à la Sageſſe, & à Saint Landry.

M. DCC. XLI.

AVEC APPROBATIONS ET PRIVILEGE DU ROY

Nicolas Andry, 1741

ortopedia = *lat.* ORTHOPEDÍA dal *gr.* ORTHÒS *retto* (v. *Ortodosso*) e PÀIS - *genit.* PAIDÒS - *fanciullo* (v. *Pedagogo*).

Arte di prevenire e di correggere con esercizi metodici e mezzi meccanici i vizi di conformazione, che presentano i fanciulli.

CONGRESSO NAZIONALE SIFE

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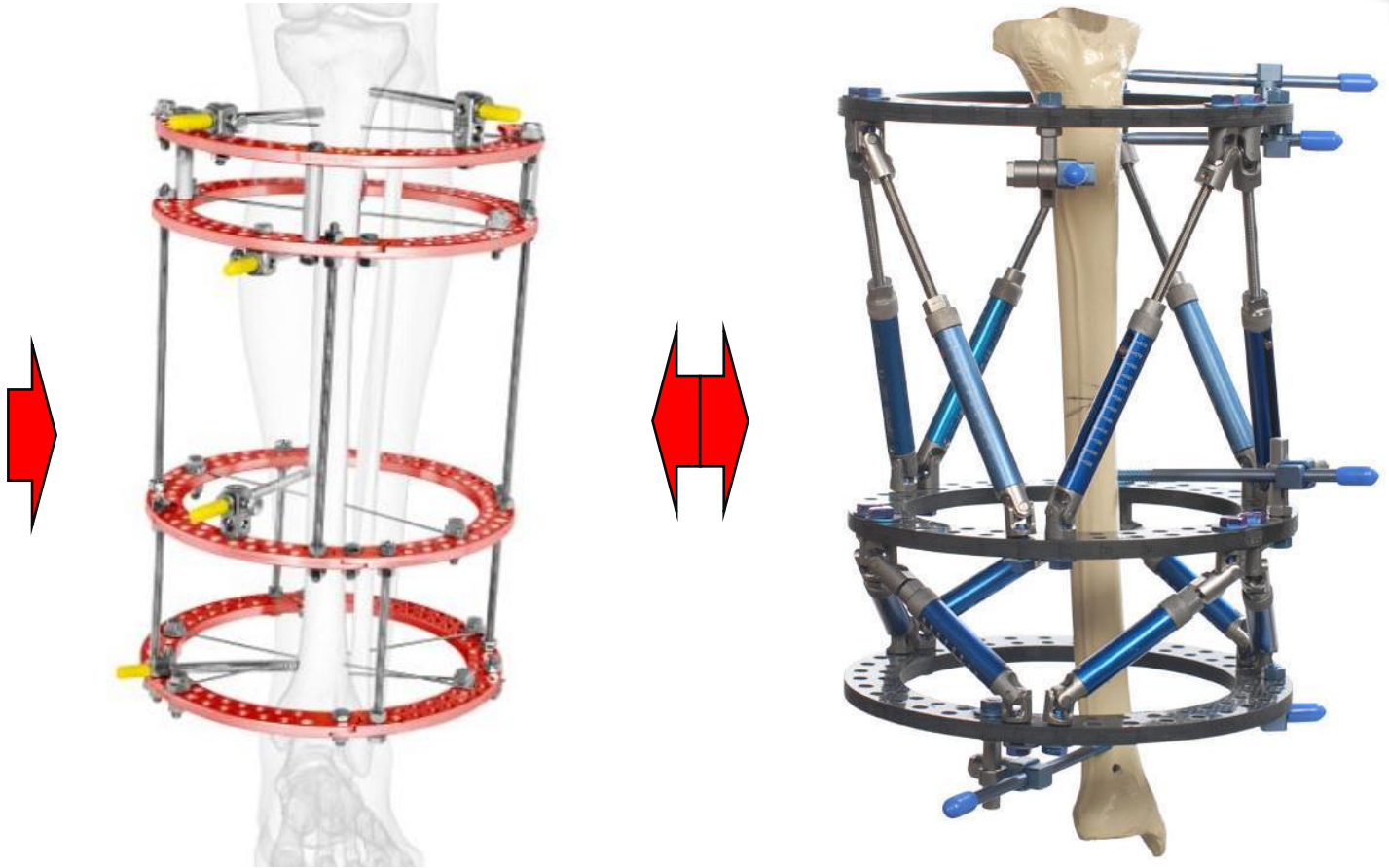

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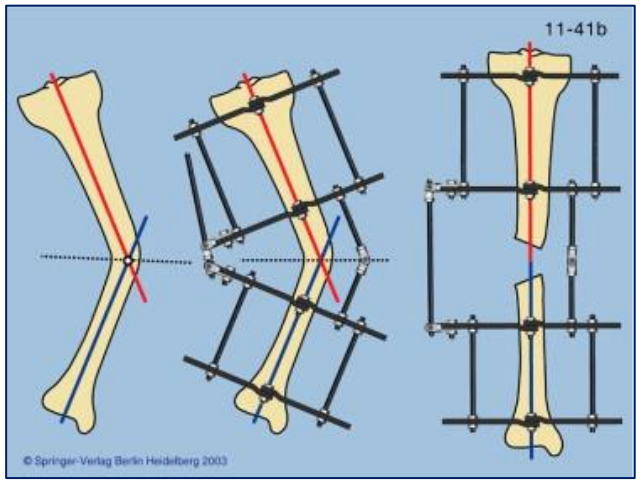
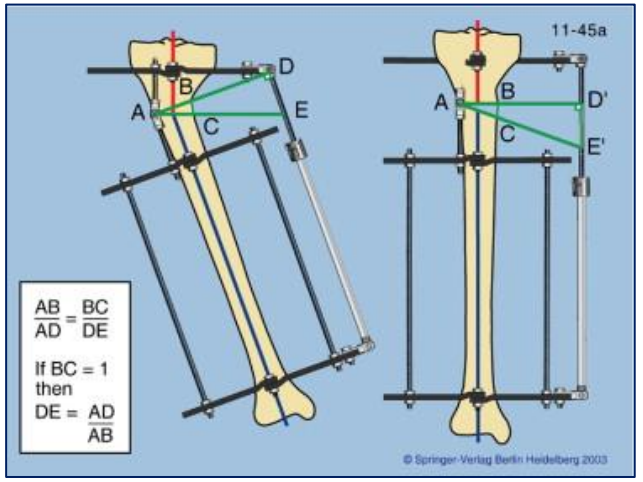
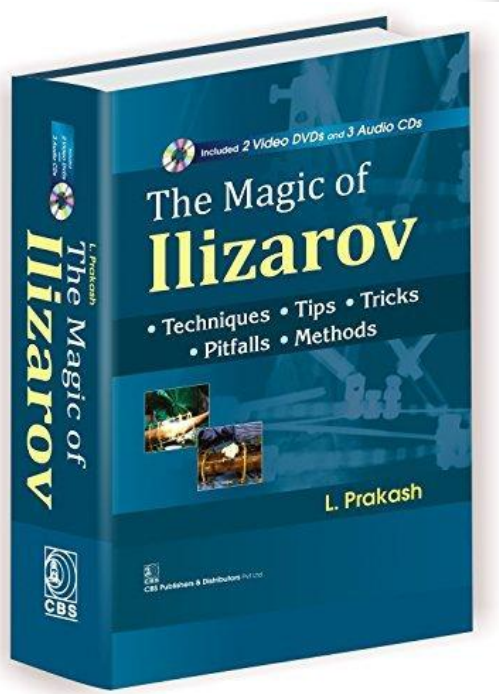


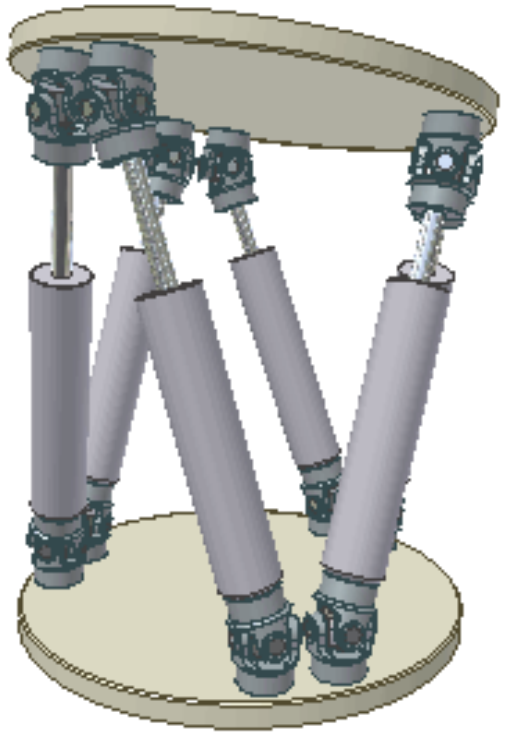




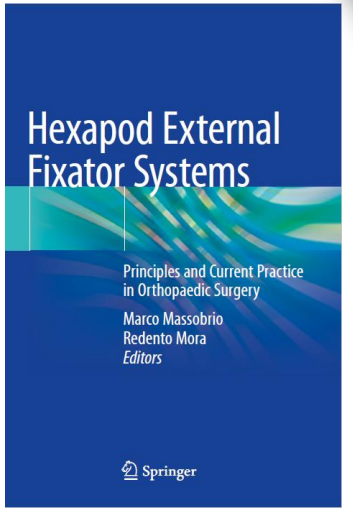
SOCIETÀ ITALIANA FISSAZIONE ESTERNA

1992

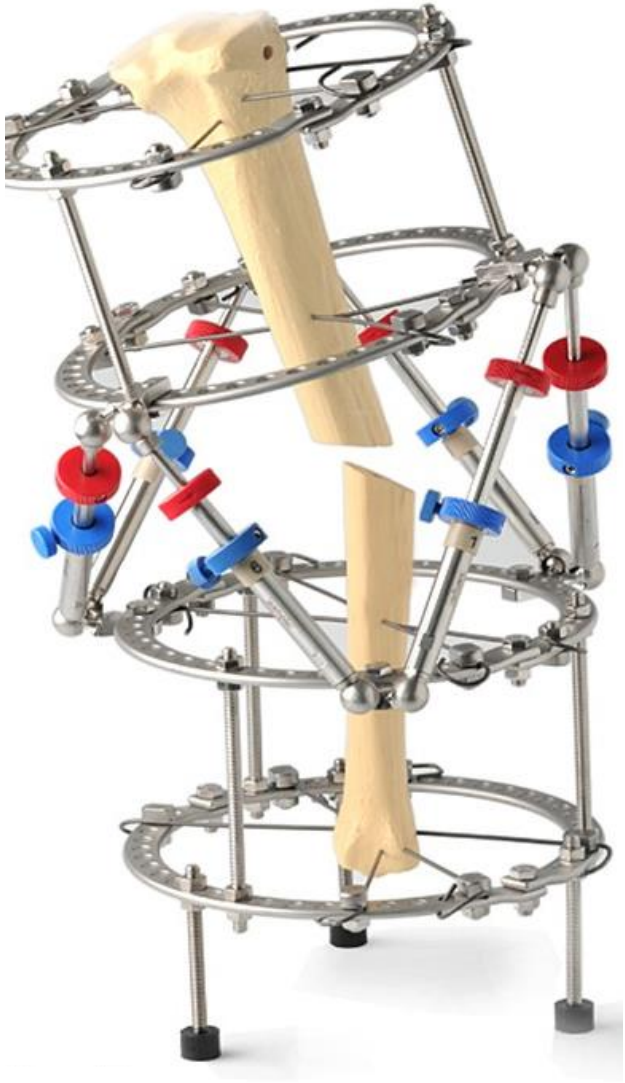
TSF

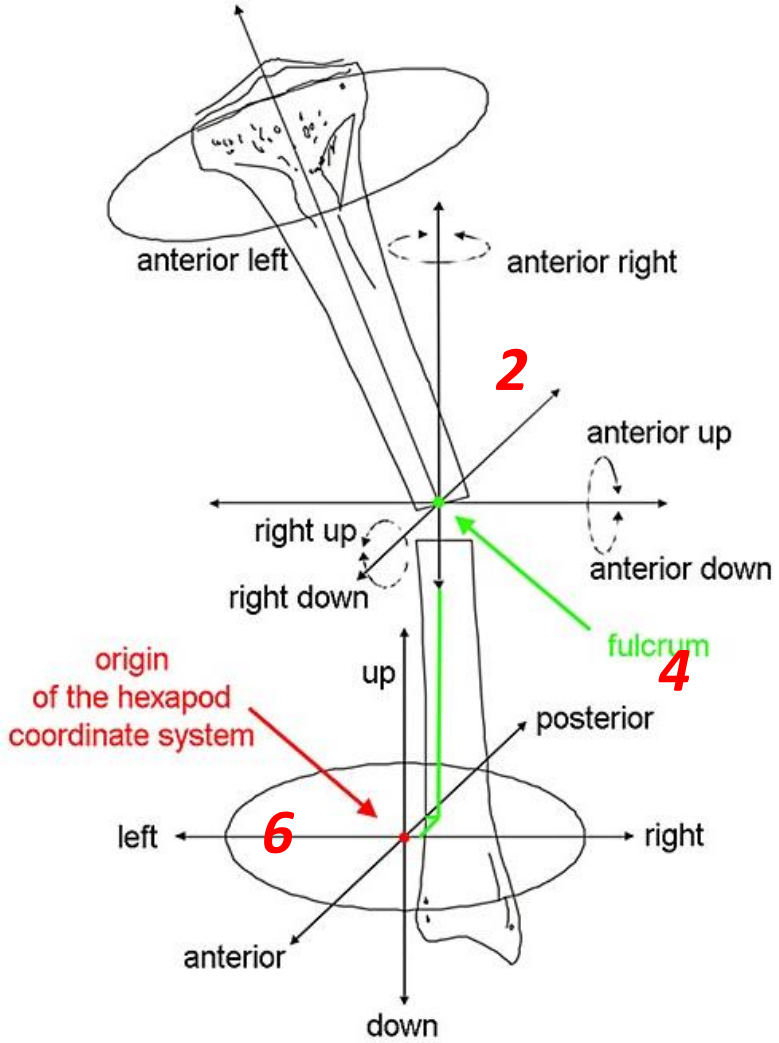


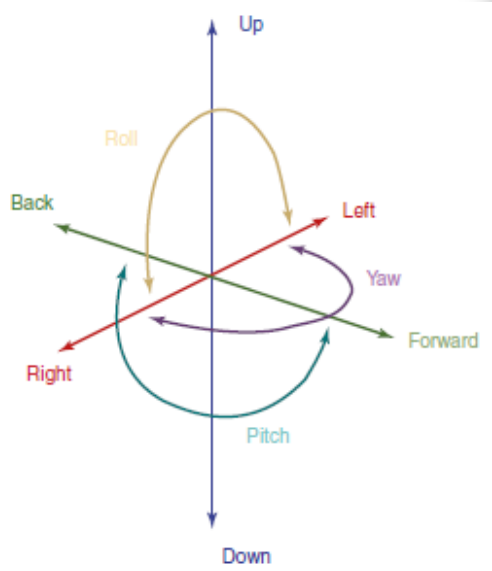
Computer Assisted Orthopaedic Surgery



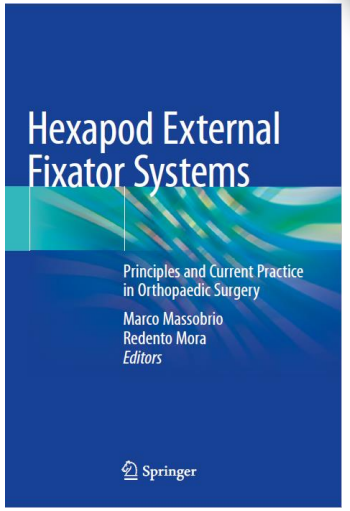
Piattaforma di Gough e Stewart







6 gradi di libertà



Vantaggi Hexapod

(Teorici)

SOCIETÀ ITALIANA FISSAZIONE ESTERNA

- **Utilizzo più agevole**
- **Correzione simultanea di più piani**
- **Maggior precisione teorica**
- **Software assisted**
- **Correzioni in acuto**
- **Proprietà meccaniche**
- **Implementazioni tecnologiche**

Perché utilizzare un Hexapod?

Maggior accuratezza

SOCIETÀ ITALIANA FISSAZIONE ESTERNA

Accuracy of complex lower-limb deformity correction with external fixation: a comparison of the Taylor Spatial Frame with the Ilizarov Ringfixator

Moreover, hexapod fixators overcome the "classic" limitations of standard external fixator systems (i.e., the Ilizarov external fixator) such as the need for frequent frame configuration changes and enhance the theoretical precision of deformity correction

Hans Michael Manner · Michael Huebl · Christof Radler · Rudolf Ganger · Gert Petje · Franz Grill

Perché utilizzare un Hexapod?

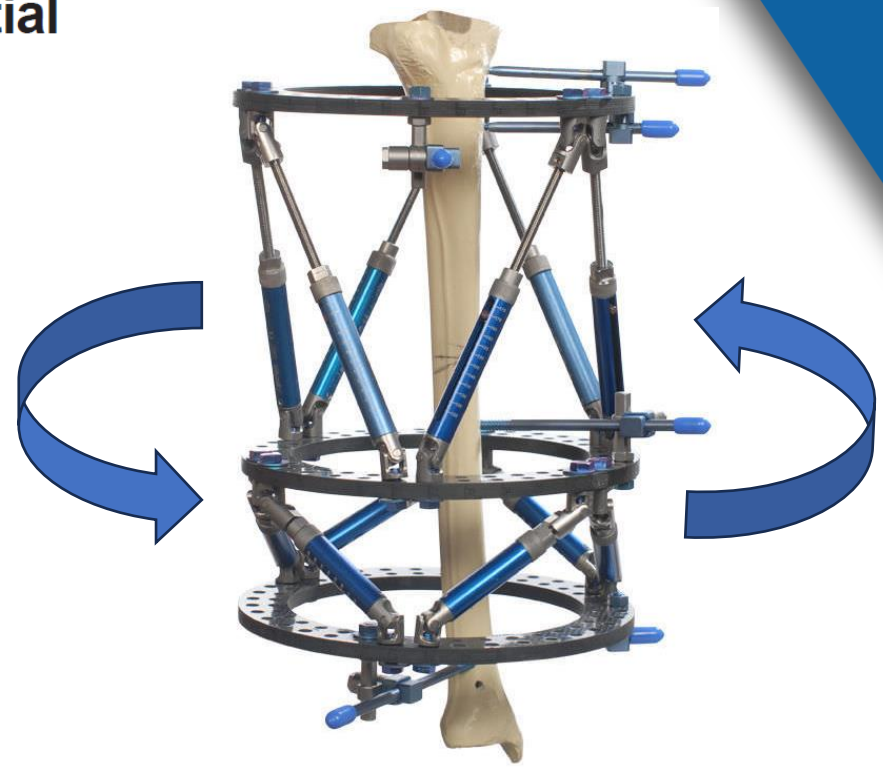
Correzioni Vizi Torsionali

SIFE
SOCIETÀ ITALIANA
FISSAZIONE ESTERNA

Malaysia Orthopaedic Journal 2014 Vol 8 No 2
http://dx.doi.org/10.5704/MOJ.1407.012

A Biomechanical Comparison between Taylor's Spatial Frame and Ilizarov External Fixator

BB Tan, MS Orth, **R Shanmugam,** MS Orth, **R Gunalan,** MS Orth,
YP Chua, MS Orth, **Hossain G,** PhD, **A Saw,** FRCS



CONCLUSION

Standard TSF with 6 oblique struts fixed on to bone model can provide comparable stiffness on axial loading and better stiffness on torsional loading to conventional IEF with 4 threaded rods. The mechanical properties are theoretically favorable for both fracture healing and new bone formation. Changing to stronger hollow connecting

Perché utilizzare un Hexapod?

SOCIETÀ ITALIANA FISSAZIONE ESTERNA

Maggior controllo di traslazioni laterali indesirate

CORA ≠ osteotomia

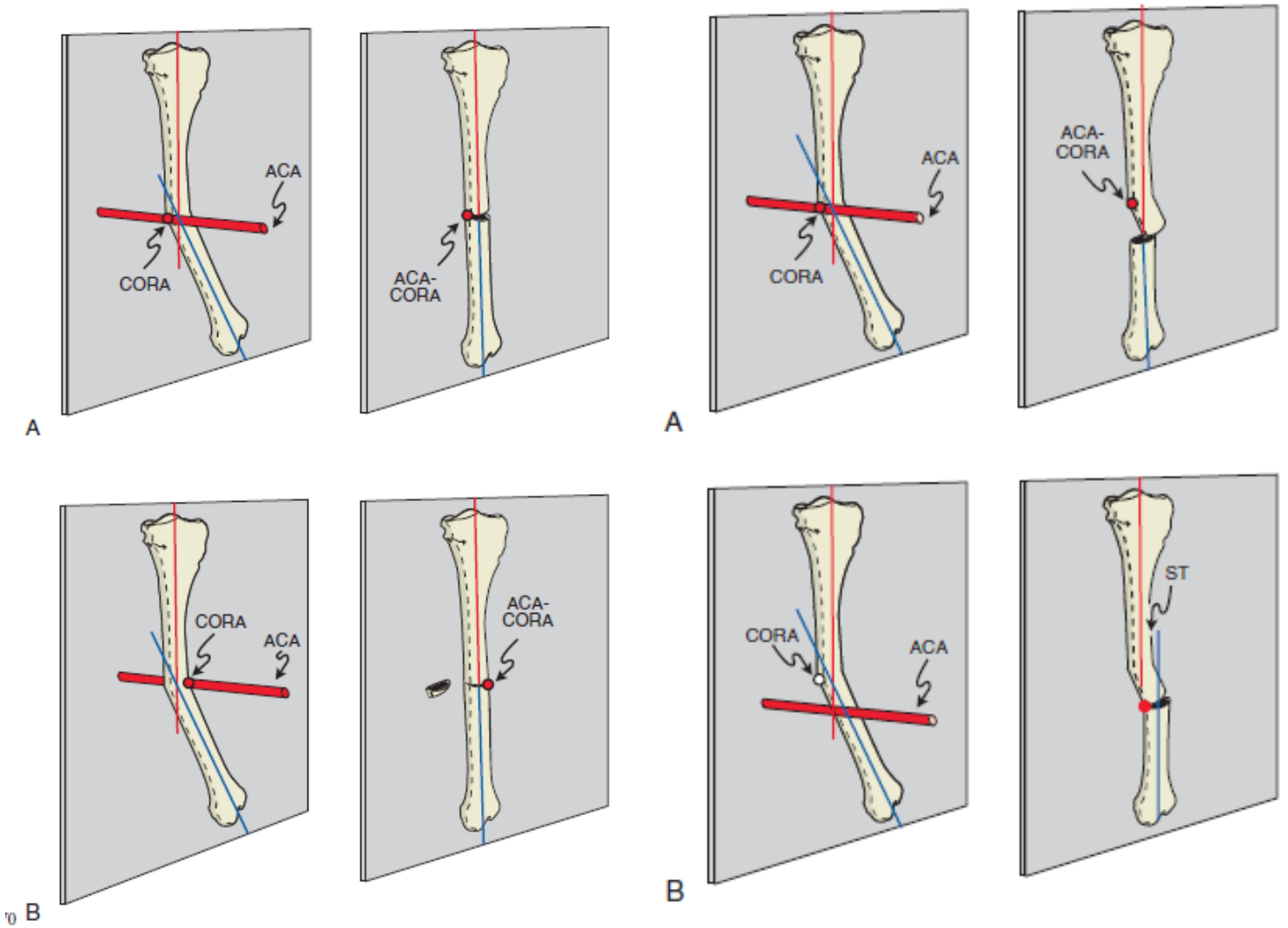
↓

TRASLAZIONI LATERALI!

↓

Possibilità di correzione successive

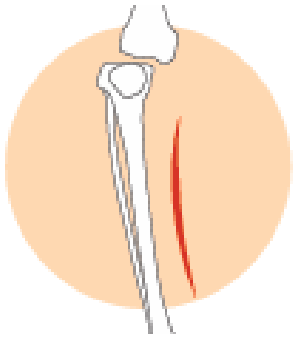
(es. Total Residual)



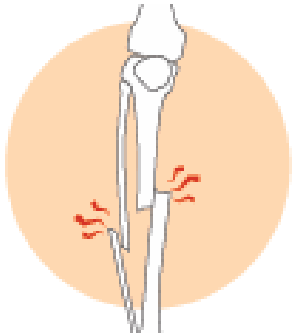
Indicazioni ortopedia pediatrica

SOCIETÀ ITALIANA FISSAZIONE ESTERNA

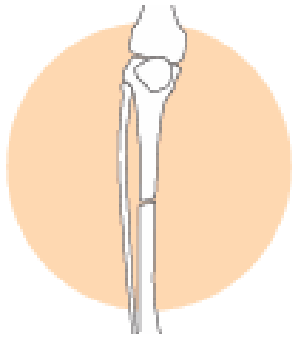
- Correzione deformità multiplanari delle ossa lunghe
- Correzione delle deformità del piede e della mano
- Rigidità articolare
- Fratture
- Osteomieliti



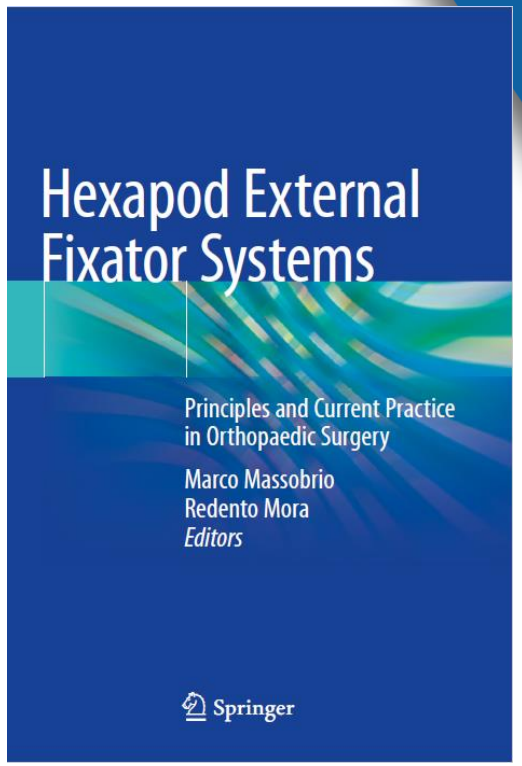
Deformity correction

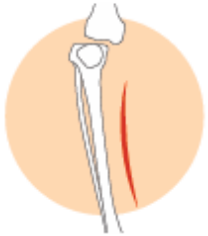


Acute trauma



Non-unions/mal-unions

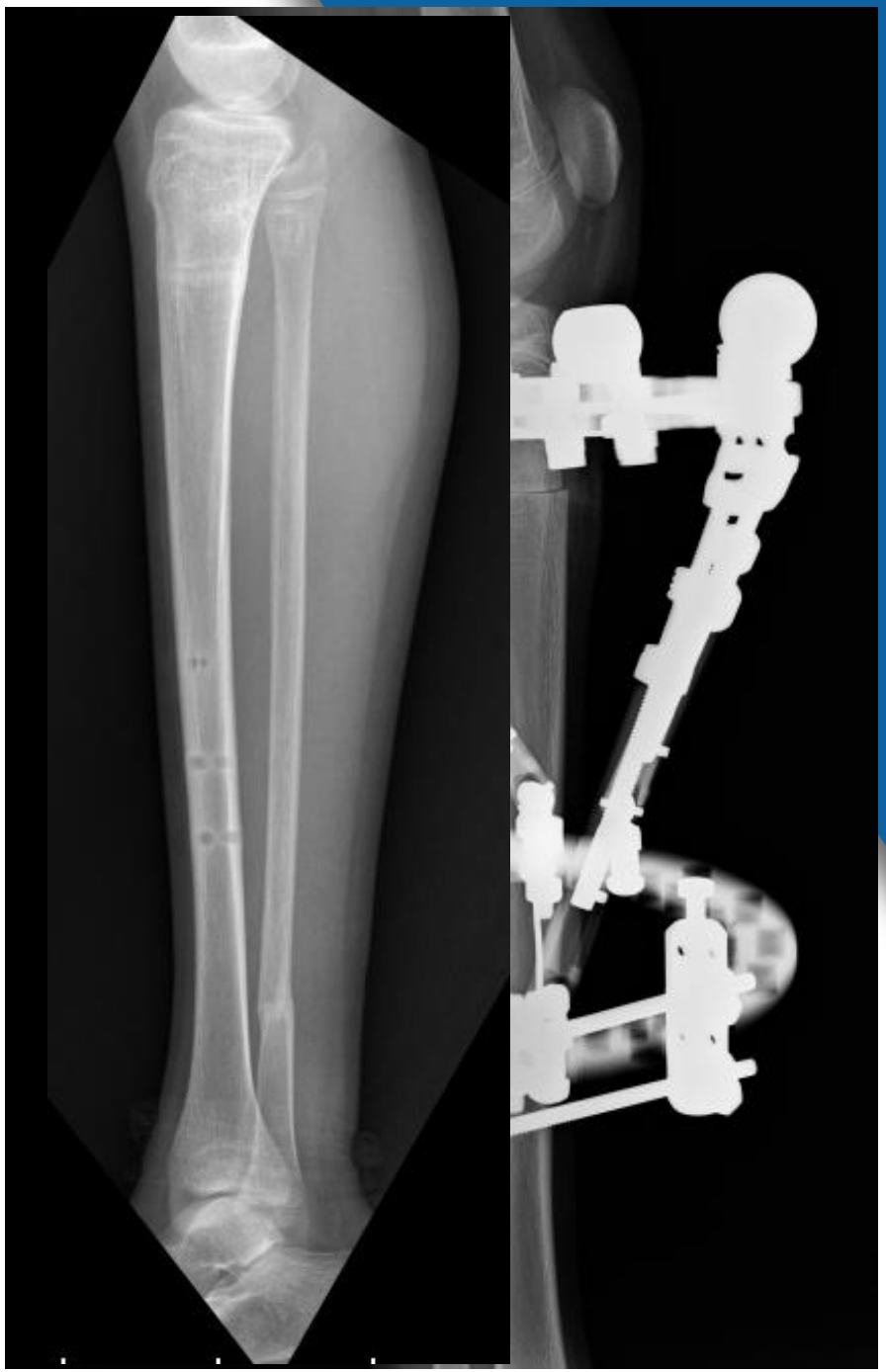


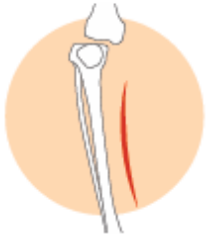


Bambina di origini indiane, 12 anni, verosimile malattia di Blount monolaterale

Correzione con hexapod

Risultato finale



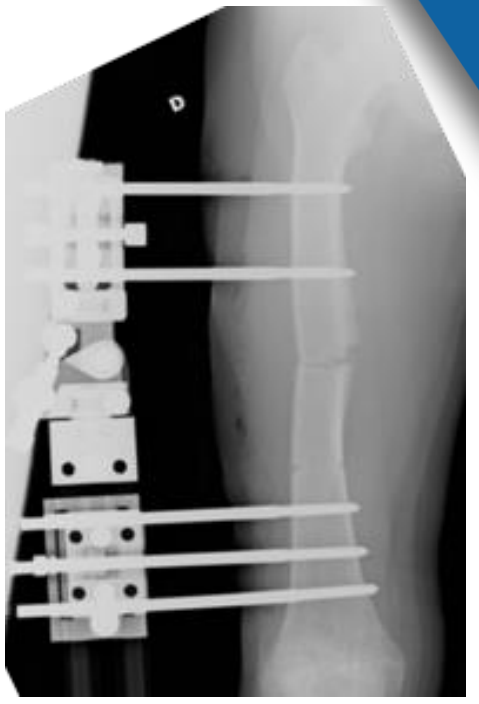


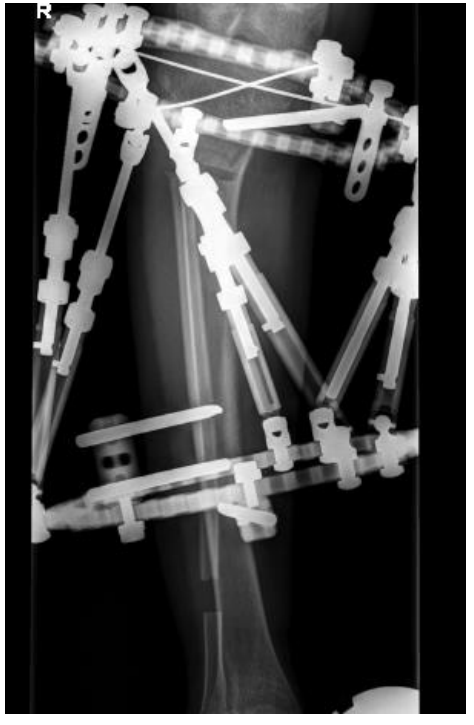
Deformity correction

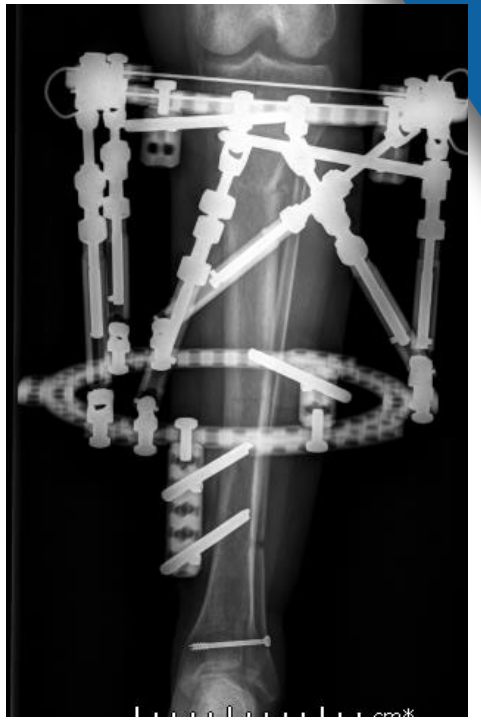
Bambina, 10 anni, XLHR

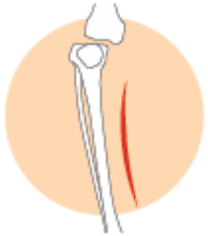
Correzione in 2 tempi
(destra, quindi sinistra)

Risultato finale





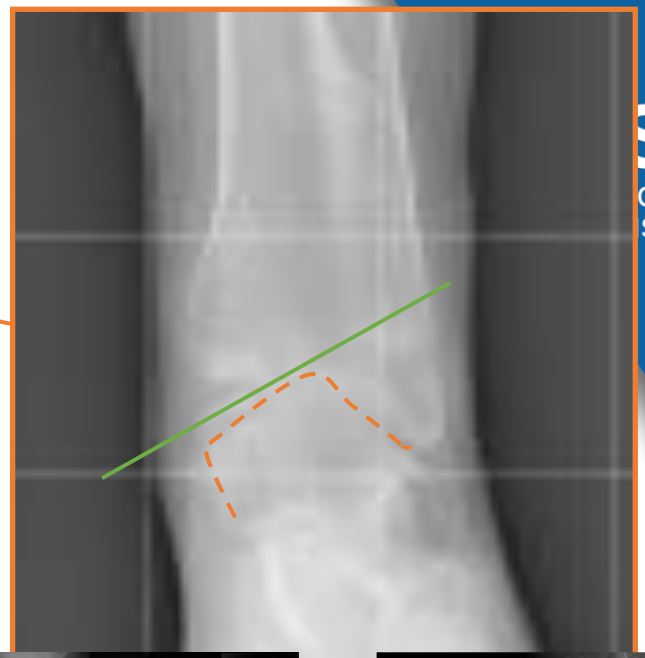




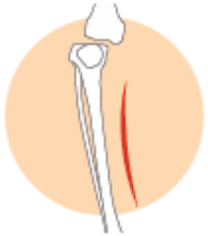
Maschio, 13 anni
Malattia esostosante

Valgismo tibia in esiti rimozione negli anni di molteplici esostosi e a seguito di Guided Growth

Correzione con fissatore esterno esapodalico



SOFE
OCIETÀ ITALIANA
SSAZIONE ESTERNA



Deformity correction

Risultato finale

SOCIETÀ ITALIANA
FISSAZIONE ESTERNA

Acute trauma

Fratture, *bone loss* e trasporti

SOCIETÀ ITALIANA FISSAZIONE ESTERNA

Hexapod External Fixation of Tibia Fractures in Children

Christopher A. Iobst, MD

(*J Pediatr Orthop* 2016;36:S24–S28)

In conclusion, hexapod external fixators provide another tool in the surgeon's tool belt for dealing with pediatric tibia fractures. Although this technique may not be necessary for most tibia fractures, it provides an excellent method of managing challenging pediatric fracture patterns. These devices have additional unique features that can be utilized to help solve difficult injuries. When applied using proper technique, hexapod external fixators have demonstrated excellent outcomes in pediatric tibia fractures.

…Although this technique may not be necessary for most tibia fractures, it provides an excellent method of managing challenging pediatric fracture patterns…

JOURNAL OF PEDIATRIC ORTHOPAEDICS

Fratture, *bone loss* e trasporti

Maschio, 16 anni
Trauma della Strada con subamputazione gamba (Gustilo 3c)

1° Step

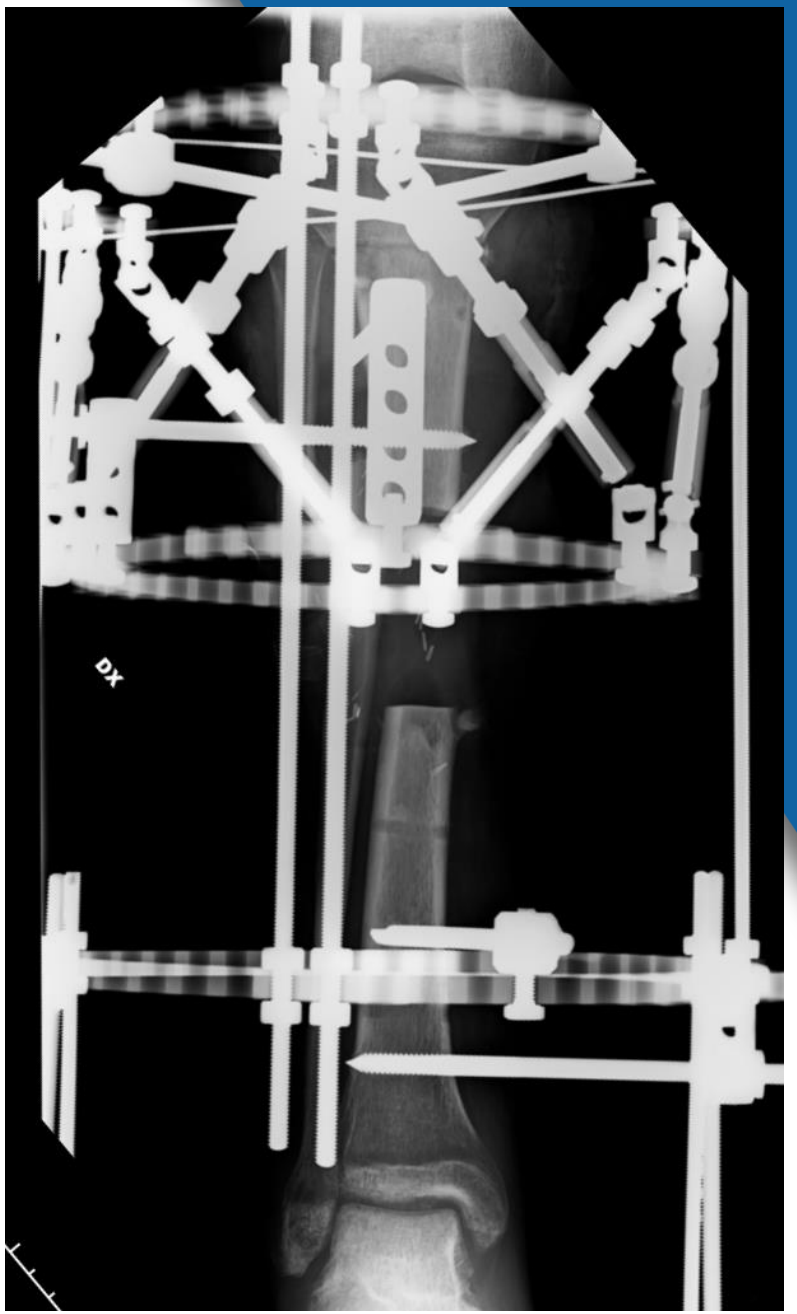
Debridment, rivascolarizzazione e stabilizzazione di minima (Damage Controll)

2° Step

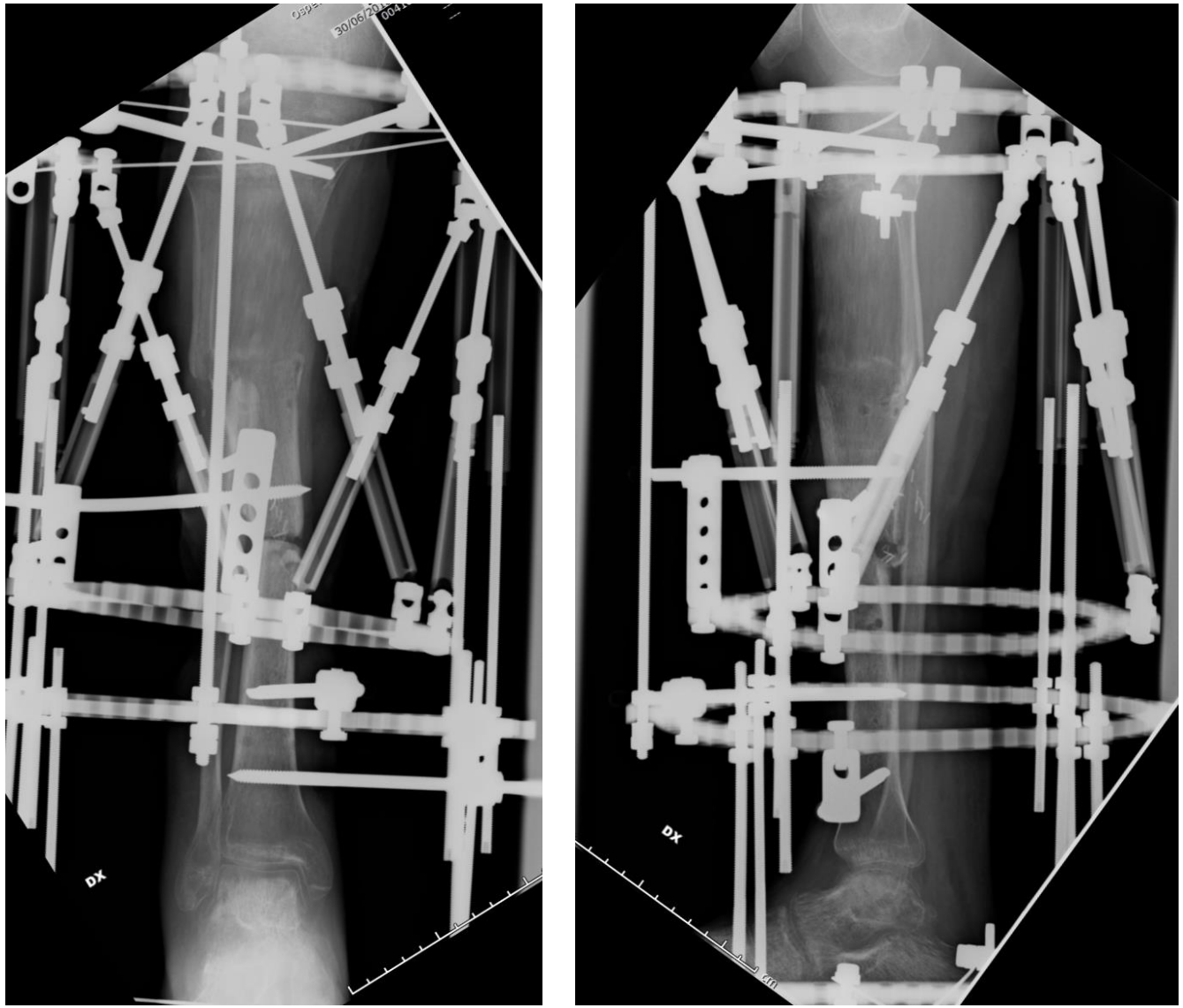
Costrutto finale con trasporto osseo con fissatore esterno esapodalico

Trauma

Damage Control

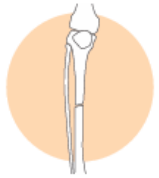


Trasporto



Trasporto ultimato

Sintesi finale con chiodo endomidollare



Non-unions/mal-unions

Pseudoartrosi & Osteomilieliti

SOCIETÀ ITALIANA FISSAZIONE ESTERNA

Outcomes of two circular external fixation systems in the definitive treatment of acute tibial fracture related infections

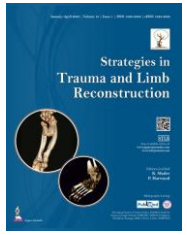
Pablo S. Corona[a,b,c,1], Oriol Pujol[a,c,1,*], Matías Vicente[a,b,c], Elisenda Ricou[d], Matías de Albert[e], Domingo Maestre Cano[f], César Salcedo Cánovas[f,g], Javier Martínez Ros[f,g]

Conclusions: Definitive circular external fixation is an excellent treatment for acute tibial FRI. Both Ilizarov and hexapod systems offer a very high rate of fracture healing and infection eradication. Although both presented very low radiological post-operative residual deformity, the hexapod system showed less residual coronal translation deformity and better callus quality.

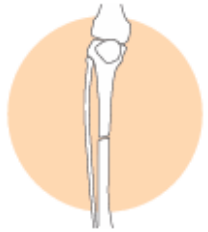
Hexapod Circular Frame Fixation for Tibial Non-union: A Systematic Review of Clinical and Radiological Outcomes

Khalis Boksh[1], Senthooran Kanthasamy[2], Pip Divall[3], Alwyn Abraham[4]

Received on: 16 March 2022; *Accepted on*: 19 October 2022; *Published on*: 30 December 2022



Conclusion: Hexapod frames for the treatment of tibial non-unions produce favourable functional outcomes. Complication rates are present and need to be discussed when this modality of treatment is proposed. Further comparative studies will allow for this option to be evaluated against that of the traditional Ilizarov frame and other methods of non-union surgery.

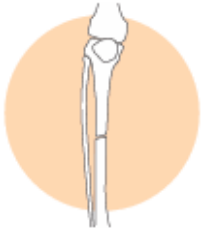


Non-unions/mal-unions

Maschio, 16 anni
Trauma della Strada
Frattura esposta tibia
(Gustilo 3a)

Trattamento definitivo

Debridment, fissatore esterno monoassiale, VAC su area di esposizione e innesto cutaneo non appena possibile

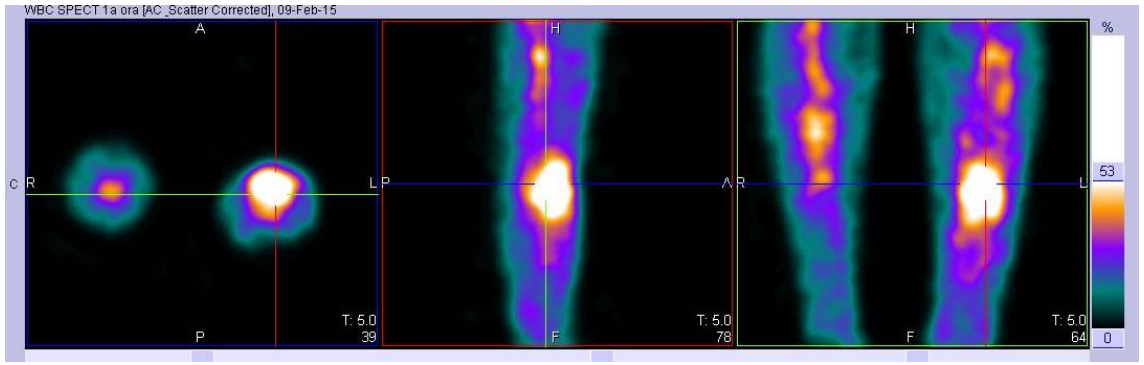


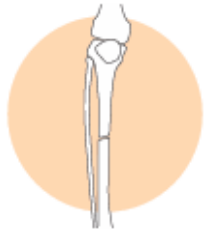
Non-unions/mal-unions

Evoluzione

in

PSA INFETTA

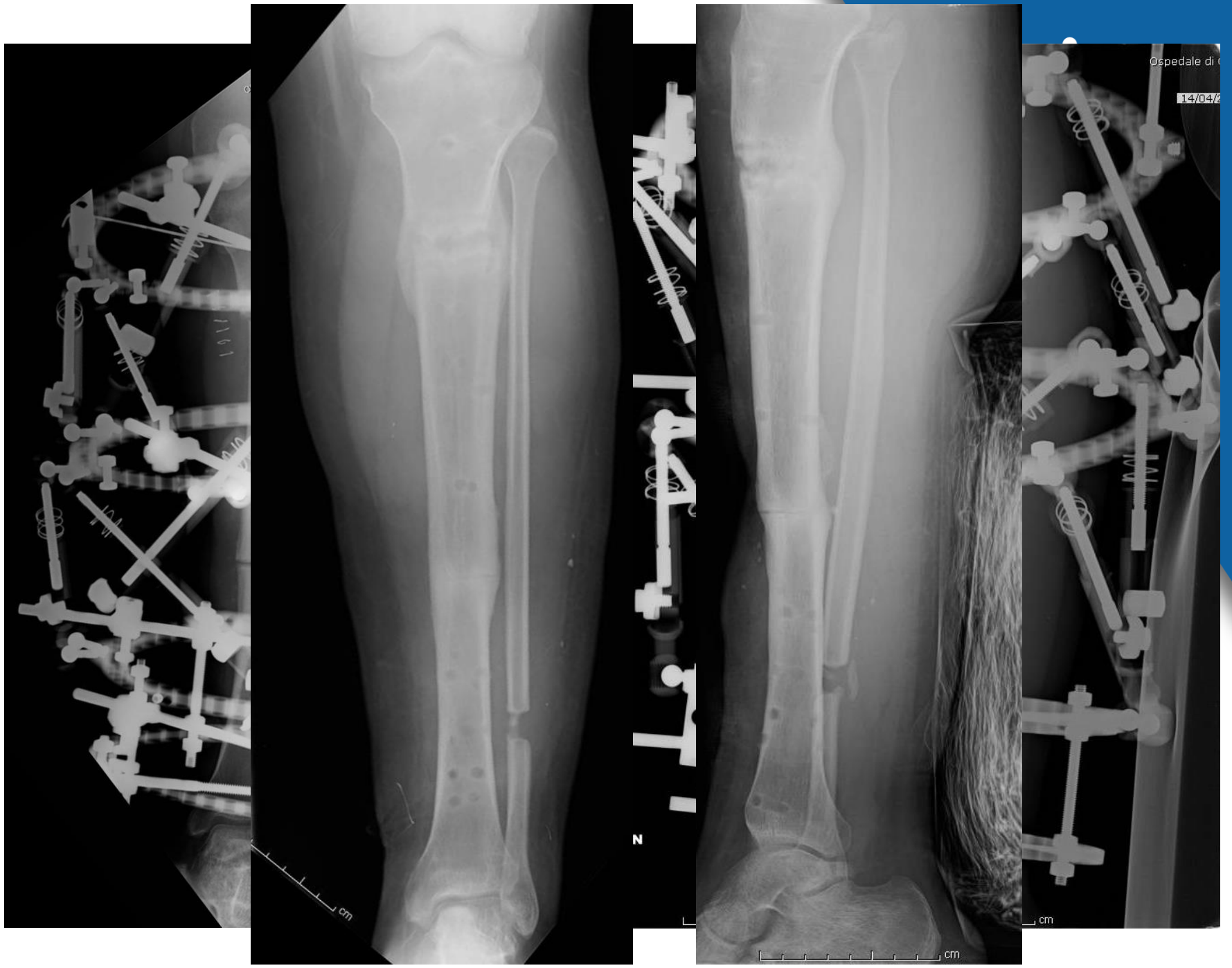




Non-unions/mal-unions

Debridment, con asportazione del focolaio di PSA, impianto doppio Hexapod per iniziare trattamento di compressione distale e distrazione prossimale

Risultato finale

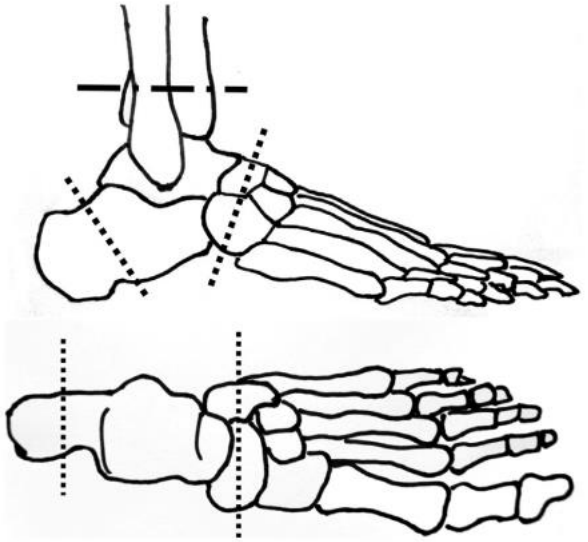


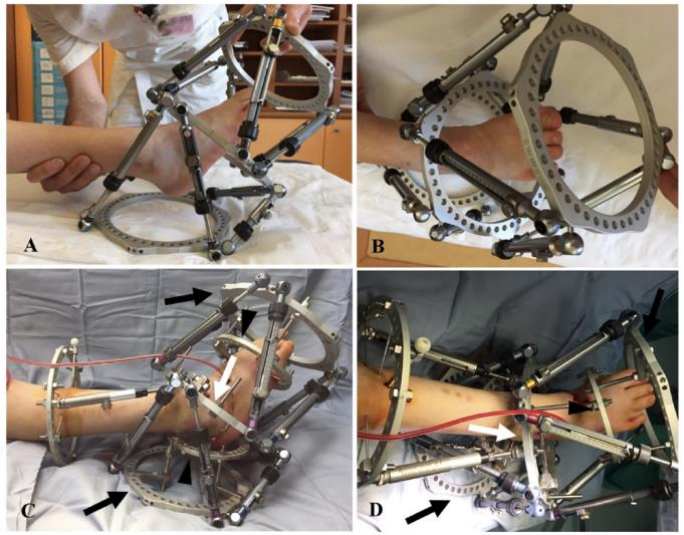
Forme severe Piede Torto / Mano torta

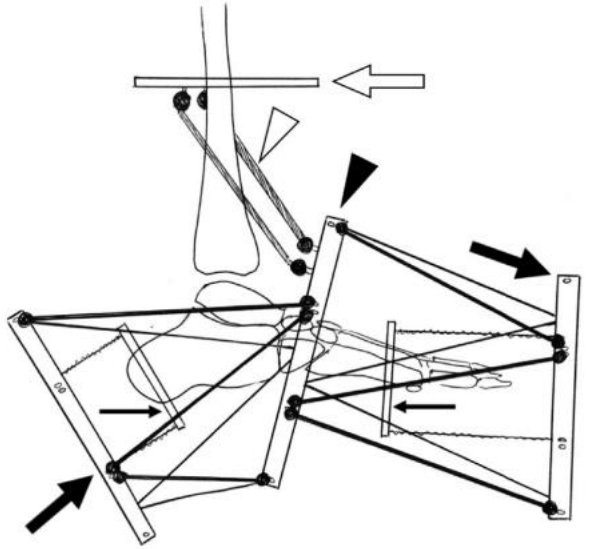
SOCIETÀ ITALIANA FISSAZIONE ESTERNA

Treatment of complex foot deformities with hexapod external fixator in growing children and young adult patients

Simone Riganti[a], Valentino Coppa[b,*], Luigi Aurelio Nasto[a], Mauro Di Stadio[a], Maria Grazia Calevo[c], Antonio Pompilio Gigante[b], Silvio Boero[a]



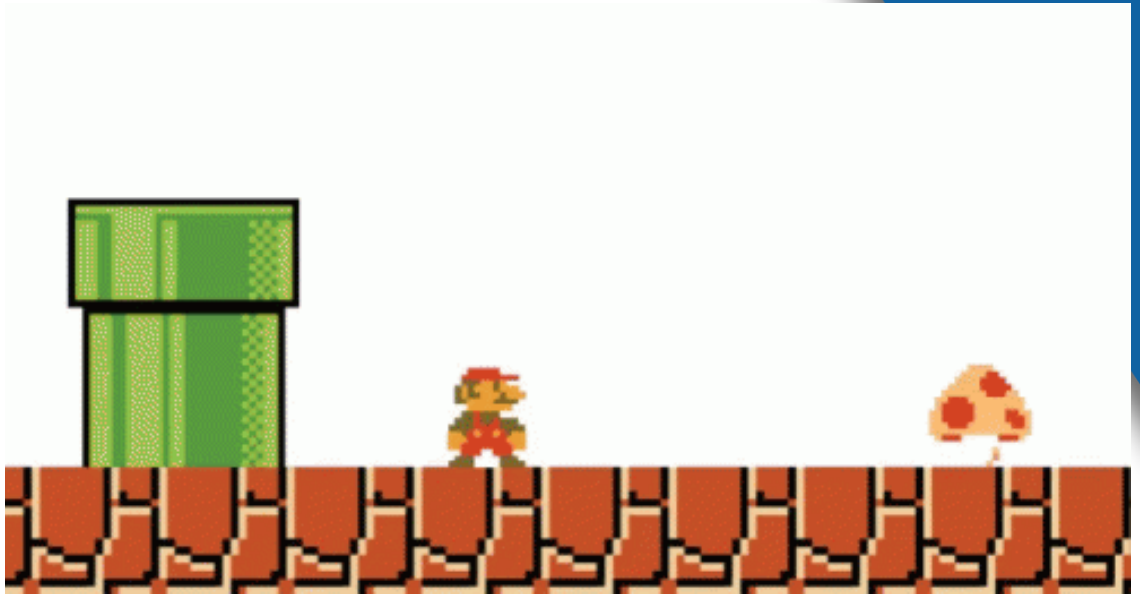




Conclusions: Our study shows that the TrueLok hexapod external fixator is a safe and effective tool in treatment of complex rigid foot deformities. Nevertheless, deformity recurrence can be observed in some cases and treatment remains challenging. Distraction osteogenesis should be reserved as a salvage solution for particularly complex cases and should be performed at dedicated specialized centers.

Limiti

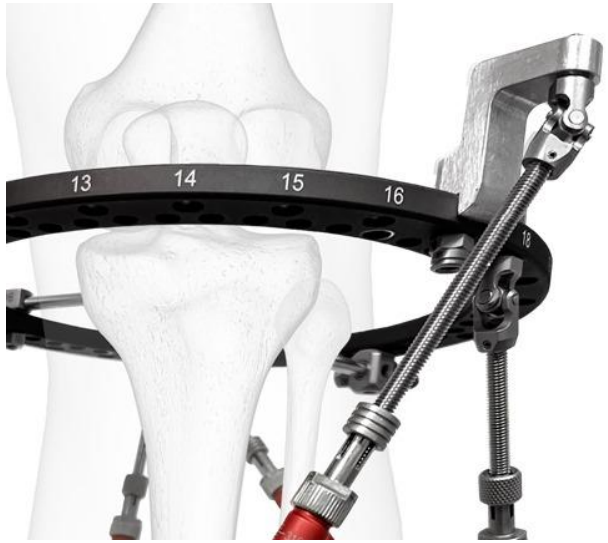
- Hardware
  - Voluminoso e pesante per un bambino
  - Non disegnato per bambini
  - Montaggio non agevole per ingombri hardware
- Radiogrammi
  - Dimensione paziente /ingombro hardware
- Tecnica operatoria
  - Spesso demanding
- Costi

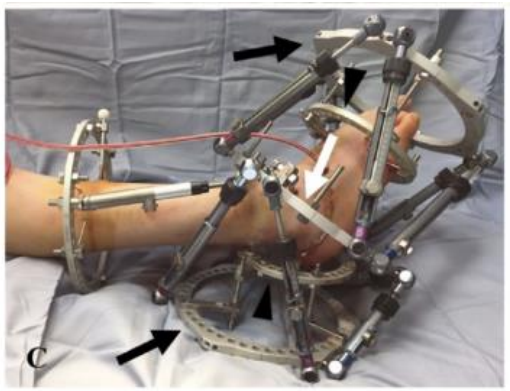


In ortopedia pediatrica, i limiti della fissazione esterna esapodalica sono tendenzialmente maggiori!

Soluzioni

- Hardware
  - Anelli di piccolo diametro
  - Attuatori pediatrici
  - Cerchi in carbonio
  - *ZED plate*
- Radiogrammi
  - Analisi 3d
- Ingegno





Conclusioni

- **Strumento ideale correzioni combinate rotazionali/traslazionali e per trattamento frattura complesse anche in ortopedia pediatrica**
- **I tradizionali problemi della fissazione esterna esapodalica nell'adulto potrebbero risultare amplificati nel bambino**

CONGRESSO NAZIONALE SIFE

Rigenerazione Ossea con tecniche di fissazione interna ed esterna.
Prevenzione e trattamento delle infezioni ossee in traumatologia

27-28 Ottobre 2023

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Grazie per l'attenzione