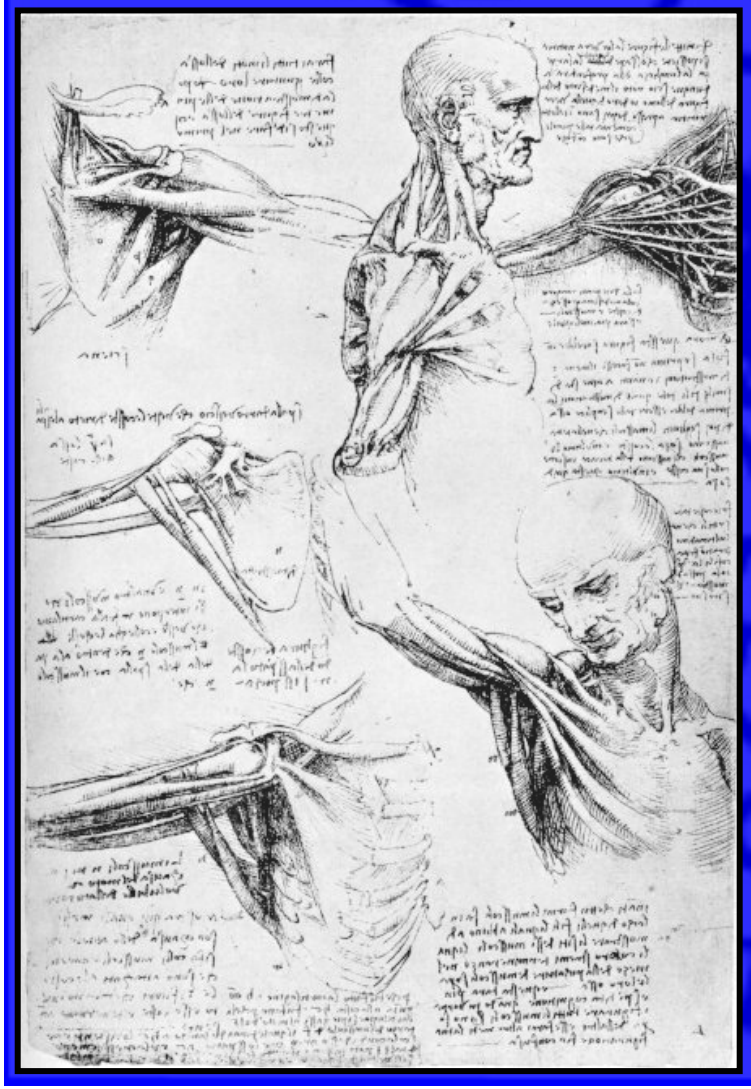

LA BIOMECCANICA della SPALLA

LA BIOMECCANICA

LA BIOMECCANICA E' LA SCIENZA CHE STUDIA LE CONDIZIONI DI RIPOSO O DI MOVIMENTO DI PARTICELLE O DI CORPI SOTTOPOSTI AD AZIONI DI FORZE.

LA BIOMECCANICA

capire la biomeccanica e' indispensabile al fine di misurare il movimento e valutare la funzionalita' degli arti in condizioni normali, patologiche e dopo interventi chirurgici.

LA BIOMECCANICA

- CINEMATICA
- CINETICA
- VINCOLI ART.

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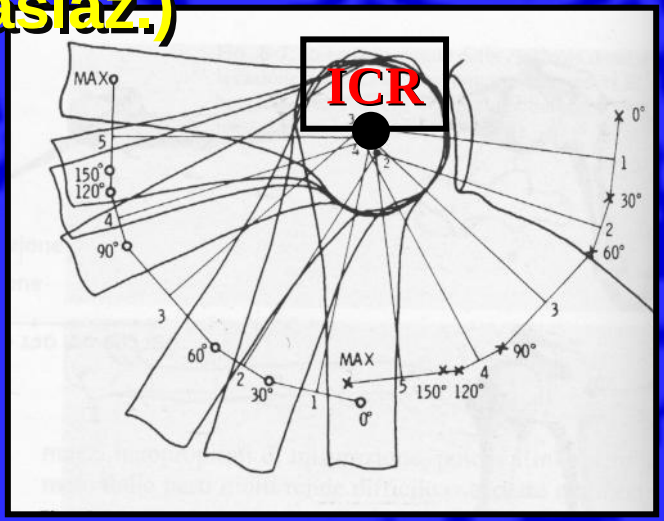
LA BIOMECCANICA

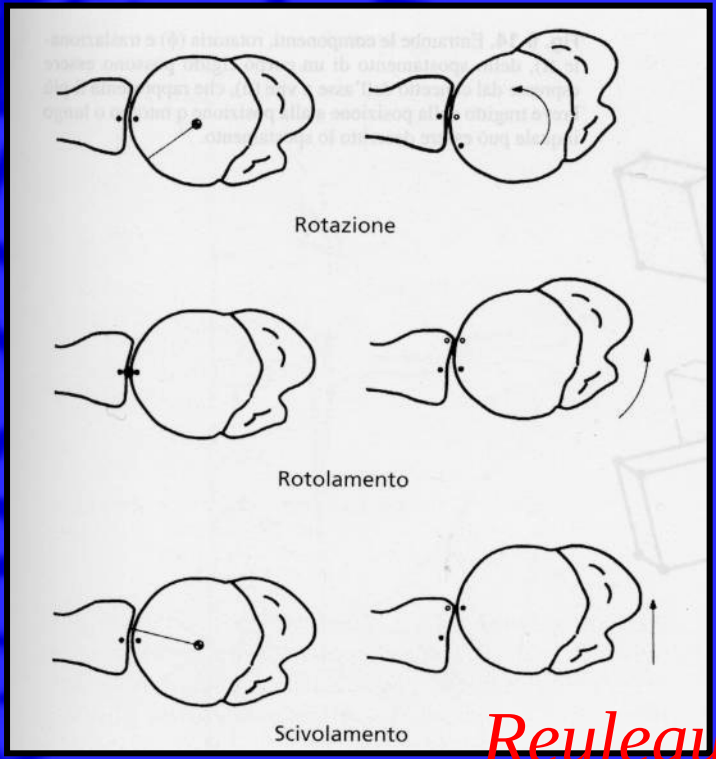
CINEMATICA

CINETICA

VINCOLI ART.

6 gradi di libertà
(3 rotaz., 3 traslaz.)





Reuleaux

LA BIOMECCANICA

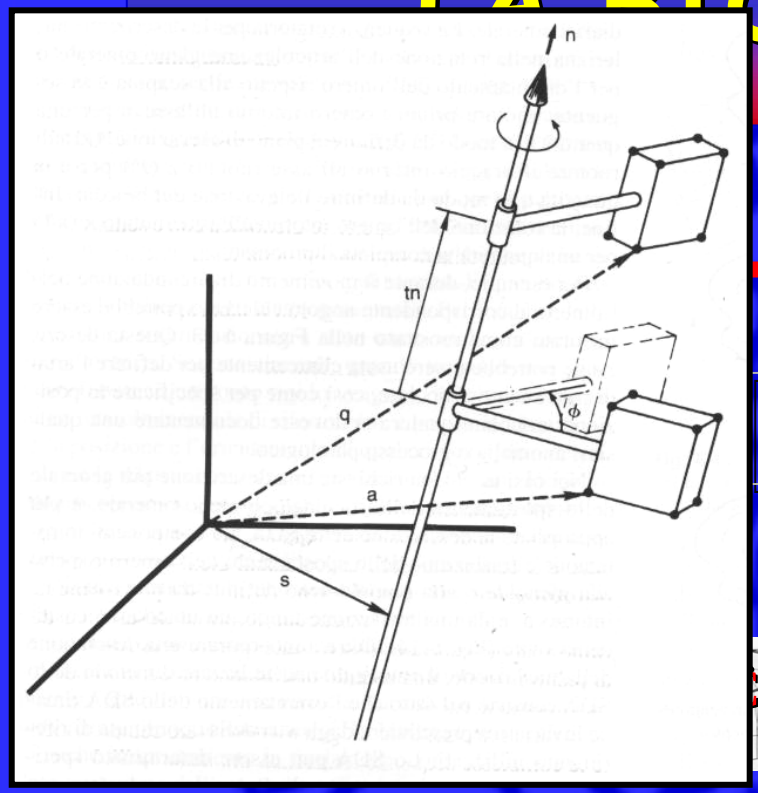
CINEMATICA

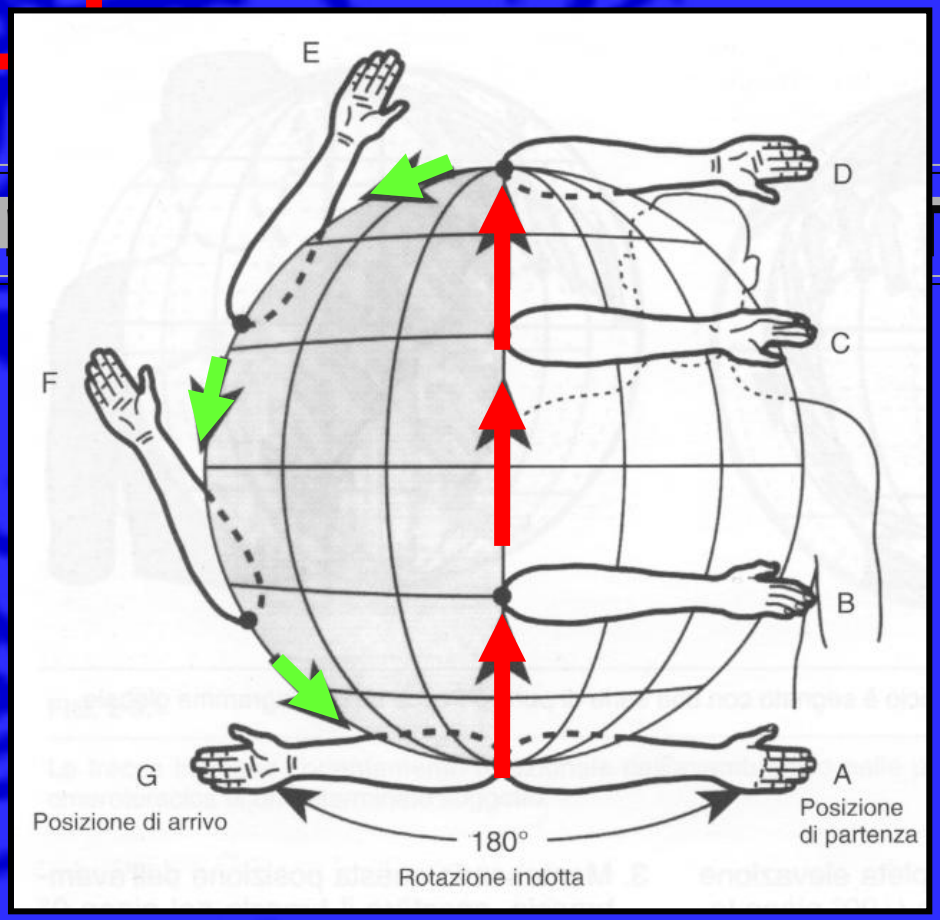
6 gradi di libertà
(3 rotaz., 3 traslaz.)

~~sistema cerniera~~

paradosso di Codman

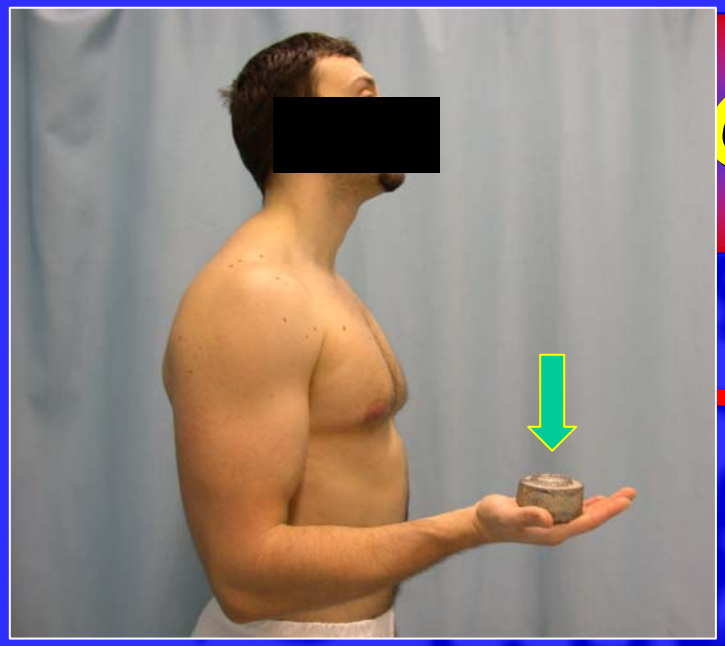
LA BIOMECCANICA





~~SISTEMA a cerniera~~

paradosso di Codman → modello SDA



OMECCA

CINETICA

Funz. Statica — Funz. Dinamica

Carico Interno ↔ Carico Esterno

VINCOLI ART.
bilanciamento
Ampiezza
+
Stabilità al M.
SPAR
680

LA BIOMECCANICA

- **Studi di Laboratorio**

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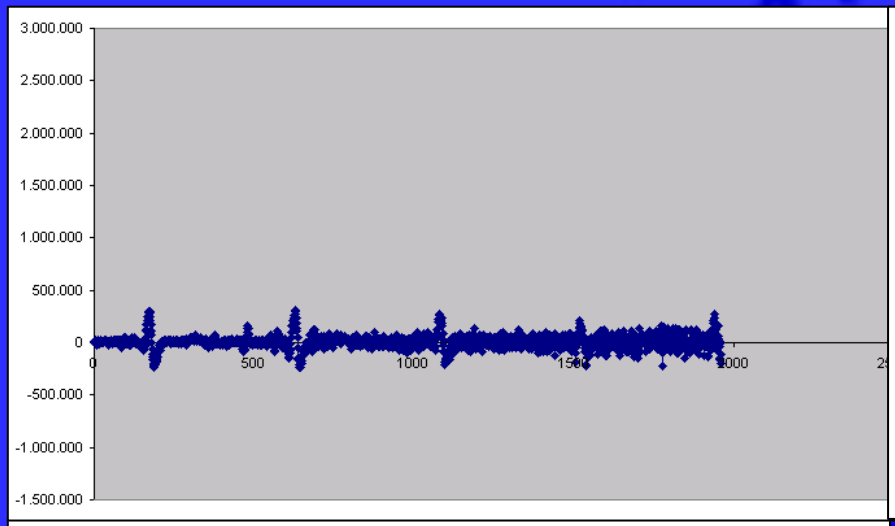
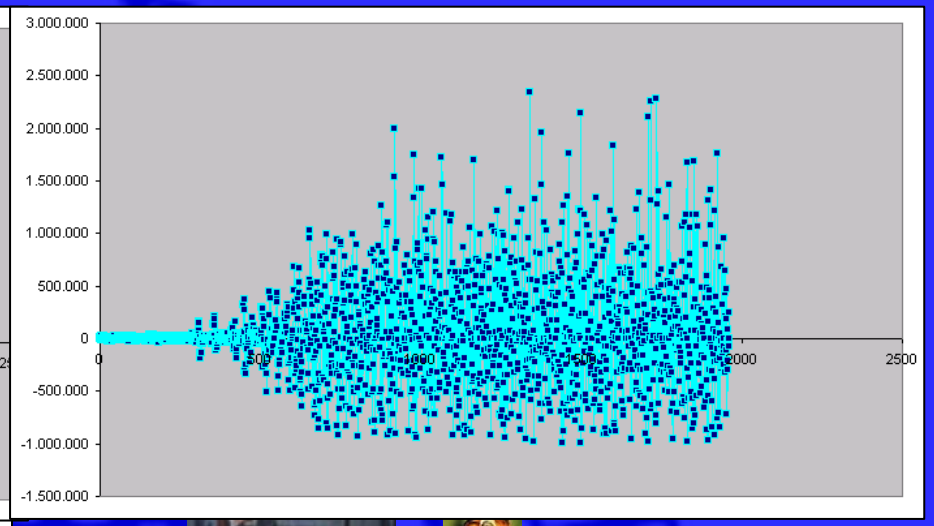
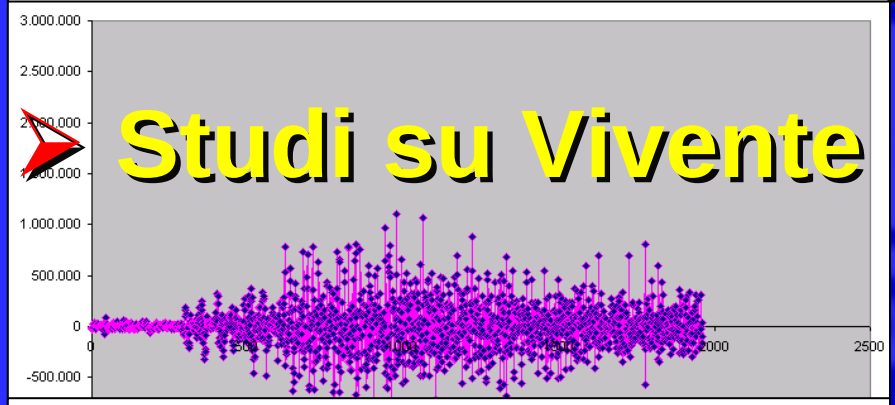
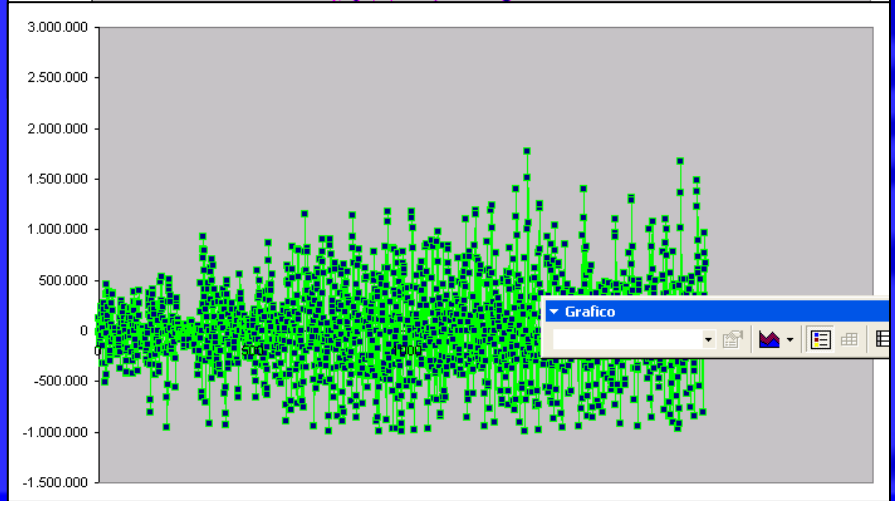
Studi su Vivente



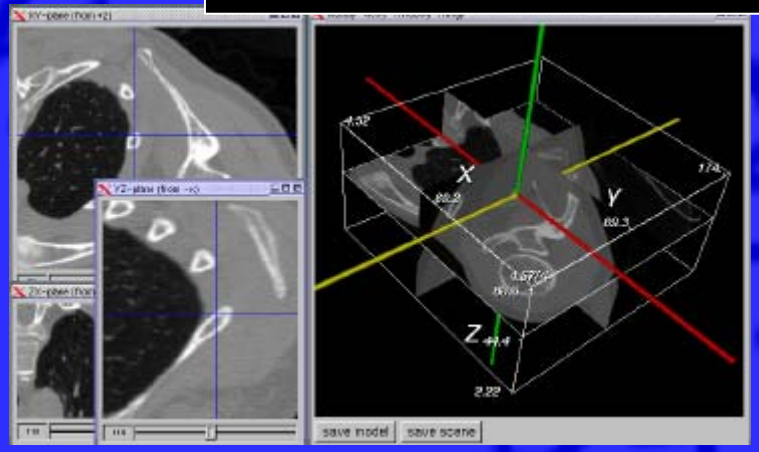


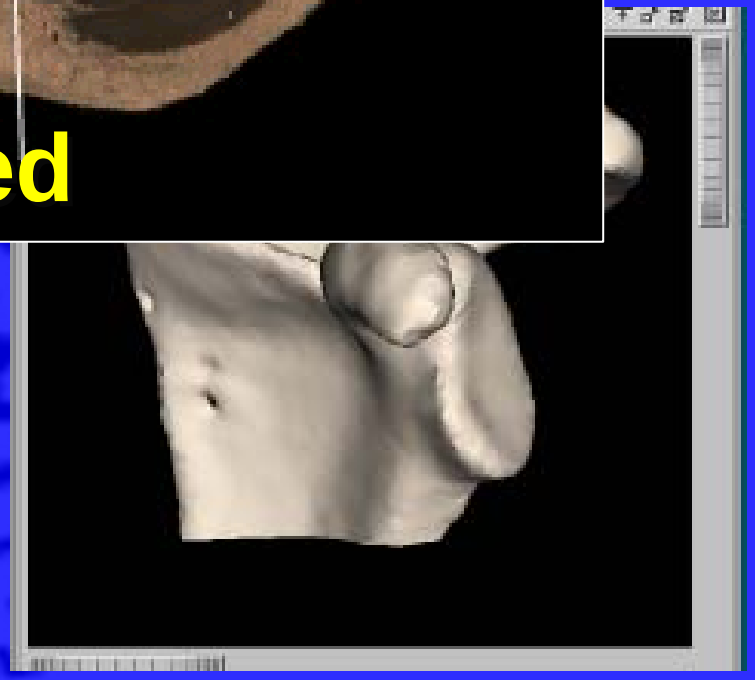




La

- Studi di
- Studi su
- Studi CT / RMN based





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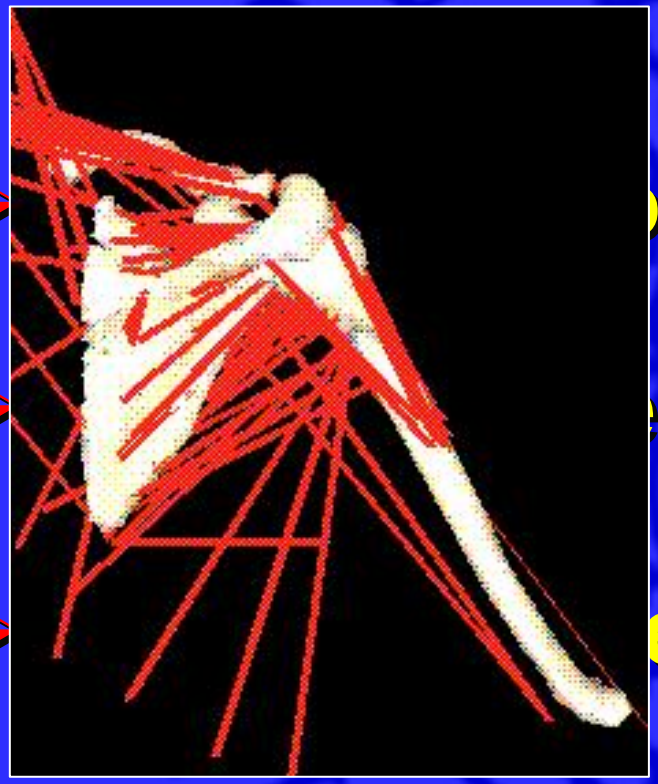
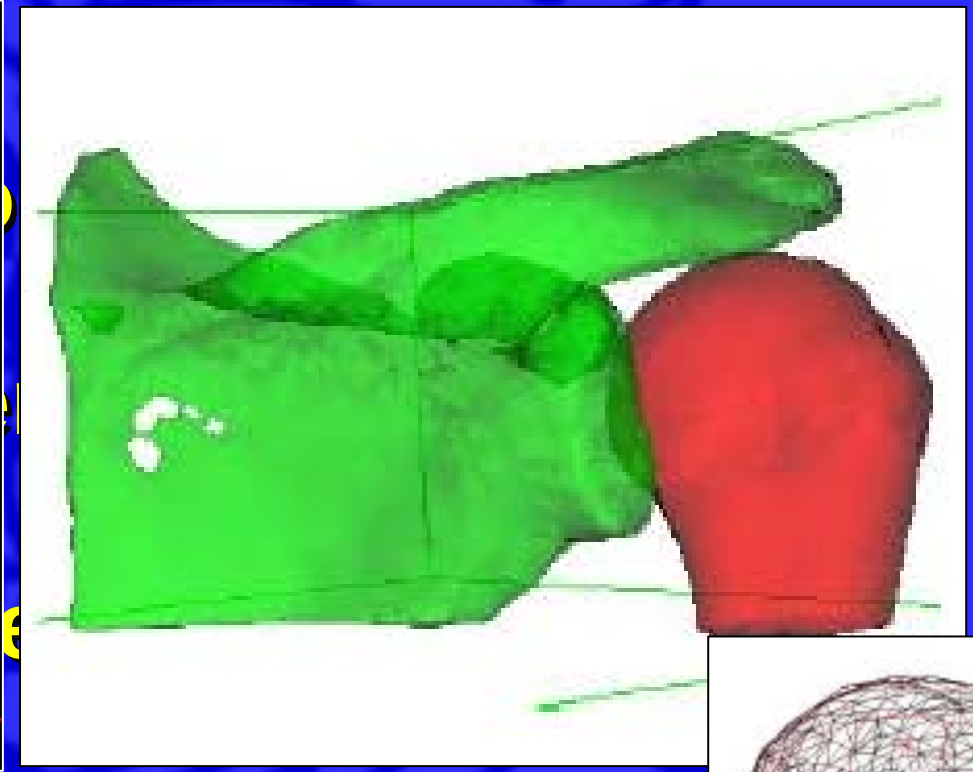
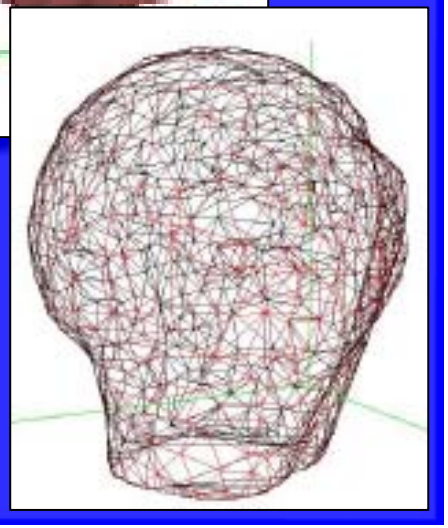






- Studi Sperimentali (FEM)

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- Elevazione Omerale
- Rotazione Interna
- Rotazione Esterna
- Abduzione
- Adduzione
- Estensione
- Innalzamento
- Anteposizione
- Retroposizione

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- Elevazione Omerale
- Rotazione Intern
- Rotazione Esterr
- Abduzione
- Adduzione
- Estensione
- Innalzamento
- Anteposizione
- Retroposizione

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- Elevazione Omerale
- Rotazione Interna
- Rotazione Esterna
- Abduzione
- Adduzione
- Estensione
- Innalzamento
- Anteposizione
- Retroposizione

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- Elevazione Omerale
- Rotazione Interna
- Rotazione Esterna
- Abduzione
- Adduzione
- Estensione
- Innalzamento
- Anteposizione
- Retroposizione

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- Elevazione Om
- Rotazione Inte
- Rotazione Este
- Abduzione
- Adduzione
- Estensione
- Innalzamento
- Anteposizione
- Retroposizione

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- Elevazione Om
- Rotazione Inte
- Rotazione Este
- Abduzione
- Adduzione
- Estensione
- Innalzamento
- Anteposizione
- Retroposizione

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- Elevazione Omerale
- Rotazione Interna
- Rotazione Esterna
- Abduzione
- Adduzione
- Estensione
- Innalzamento
- Anteposizione
- Retroposizione

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- Elevazione Omerale
- Rotazione Inte
- Rotazione Este
- Abduzione
- Adduzione
- Estensione
- Innalzamento
- Anteposizione
- Retroposizione

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- Elevazione Ome
- Rotazione Interr
- Rotazione Ester
- Abduzione
- Adduzione
- Estensione
- Innalzamento
- Anteposizione
- Retroposizione

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- Elevazione Omerale
- Rotazione Interna
- Rotazione Esterna
- Abduzione
- Adduzione
- Innalzamento
- Abbassamento
- Anteposizione
- Retroposizione

4 ARTICOLAZIONI

SternoClaveare

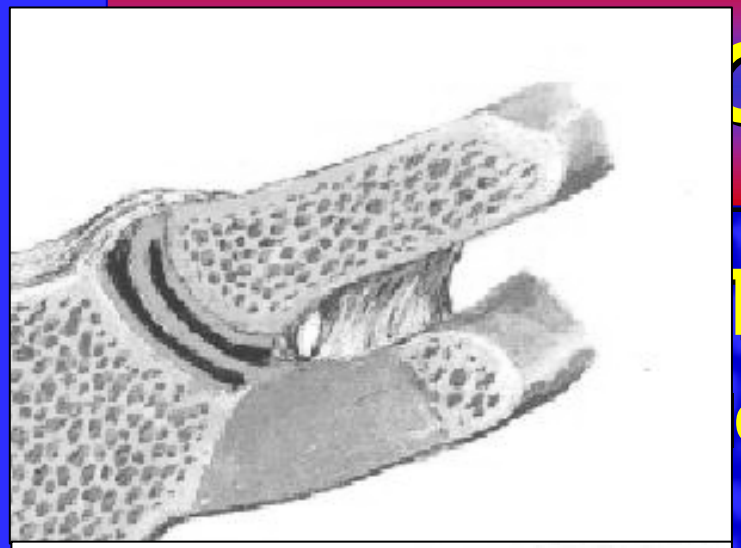
AcromionClaveare

GlenoOmerale

ScapoloToracica

OMECCANICA

TO DELLA SPALLA



e

4 ARTICOLAZIONI

SternoClaveare

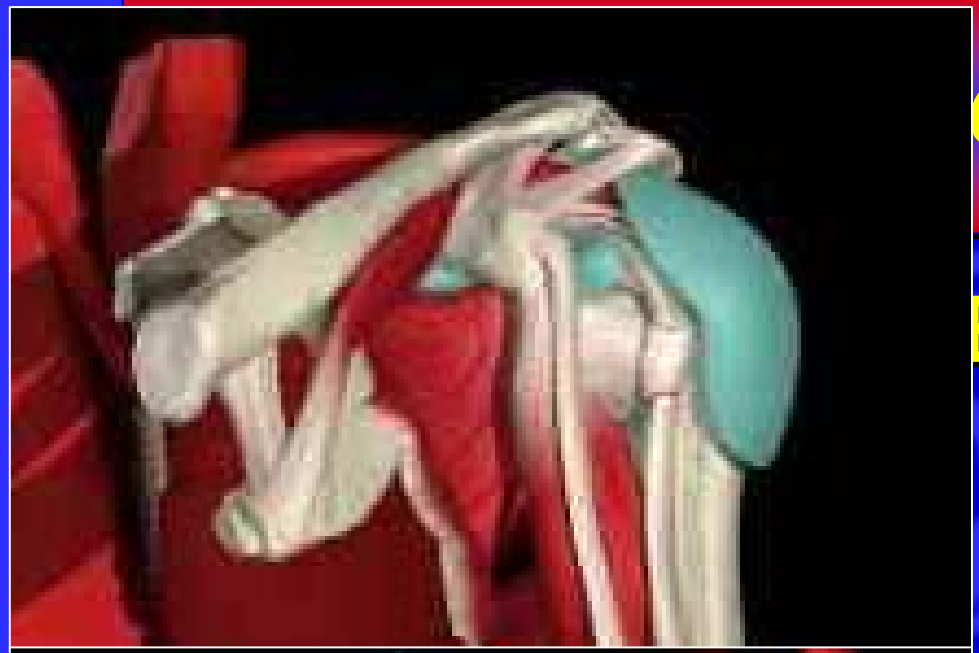
AcromionClaveare

GlenoOmerale

ScapoloToracica

Elevazione

0° – 90° / 130°- 180°



CCANICA

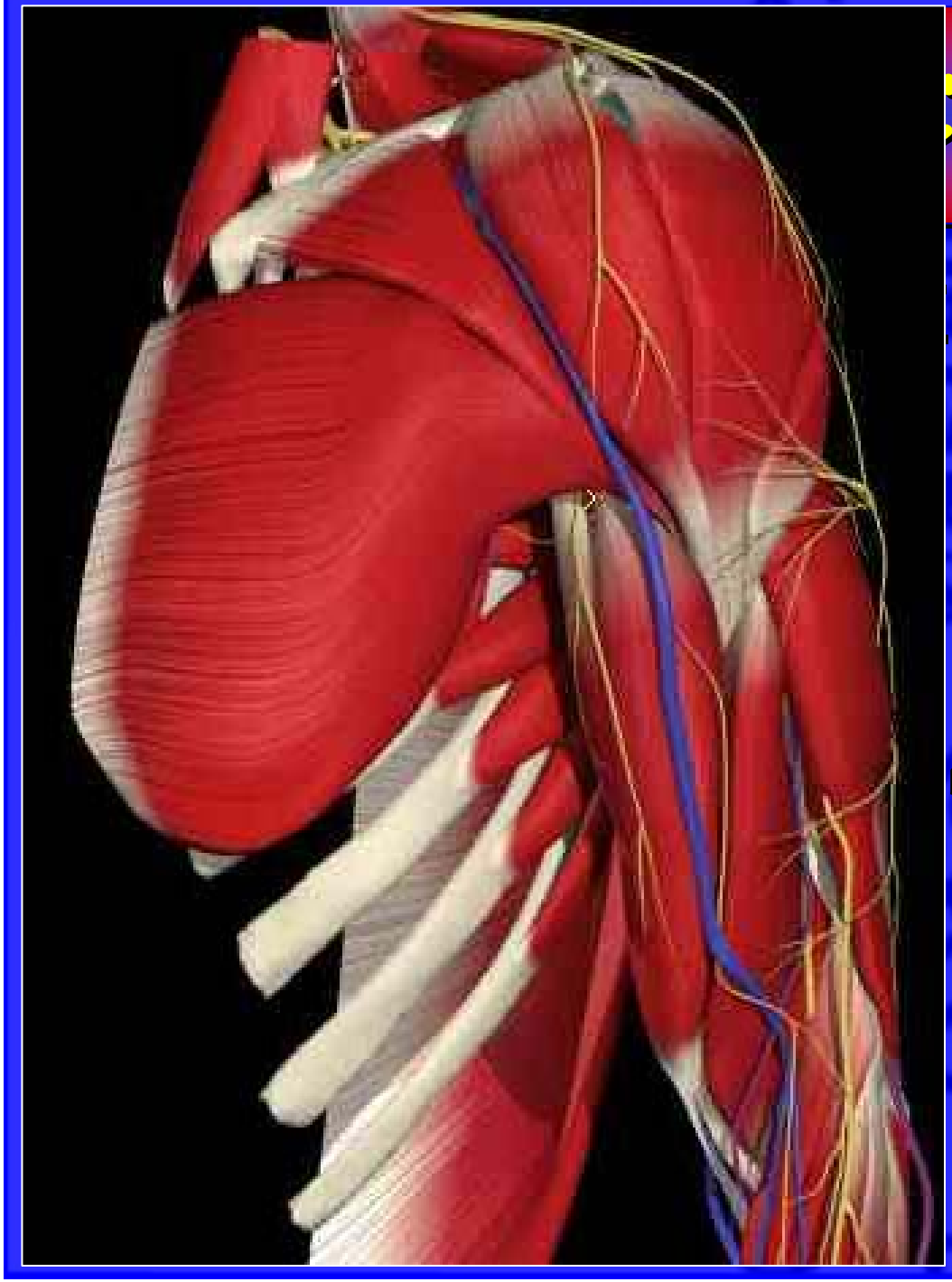
ELLA SPALLA

4 ARTICOLAZIONI

- SternoClaveare
- AcromionClaveare
- GlenoOmerale
- ScapoloToracica

Elevazione → *180°*

Extra-intrarotaz. → *150°*



CANICA

LLA SPALLA

~ 30 MUSCOLI

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

Muscolo	Azione									
	Omero						Scapola			
	Fles	Est	IR	ER	Ab	Ad	Elev	Depr	Protr	Retr
Bicipite brachiale-capo breve	X									
Bicipite brachiale-capo lungo	X				X					
Tricipite brachiale-capo lungo		X				X				
Sovraspinoso				X	X					
Deltoide										
Anteriore	X		X							
Medio	X				X					
Posteriore		X	X	X		X				
Coraco-brachiale	X					X				
Gran dorsale		X				X				
Grande pettorale										
Capo clavicolare	X		X					X	X	
Capo sternale		X	X			X		X		
Sottoscapolare			X			X				
Grande rotondo		X	X							
Sottospinoso				X						
Piccolo rotondo				X						
Piccolo pettorale								X	X	
Romboide							X			X
Elevatore della scapola							X			
Trapezio										
Superiore							X			X
Medio										X
Inferiore								X		
Dentato anteriore										
Fibre superiori							X		X	
Fibre inferiori								X	X	

LA B NICA

MOVIME A SPALLA

STABILE
FORTE
LEVIGATO

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA PATOLOGICA

- ***DOLORE***
- ***RIGIDITA'***
- ***INSTABILITA'***
- ***DEBOLEZZA***
- ***ASS. LEVIGATEZZA***

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA PATOLOGICA

- ***DOLORE***
- ***RIGIDITA'***
- ***INSTABILITA'***
- ***DEBOLEZZA***
- ***ASS. LEVIGATEZZA***

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA PATOLOGICA

- ***DOLORE***
- ***RIGIDITA'***
- ***INSTABILITA'***
- ***DEBOLEZZA***
- ***ASS. LEVIGATEZZA***

LA BIOMECCANICA

MOVIMENTO DELLA SPALLA PATOLOGICA

- *DOLORE*
- *RIGIDITA'*
- *INSTABILITA'*
- *DEBOLEZZA*
- *ASS. LEVIGATEZZA*

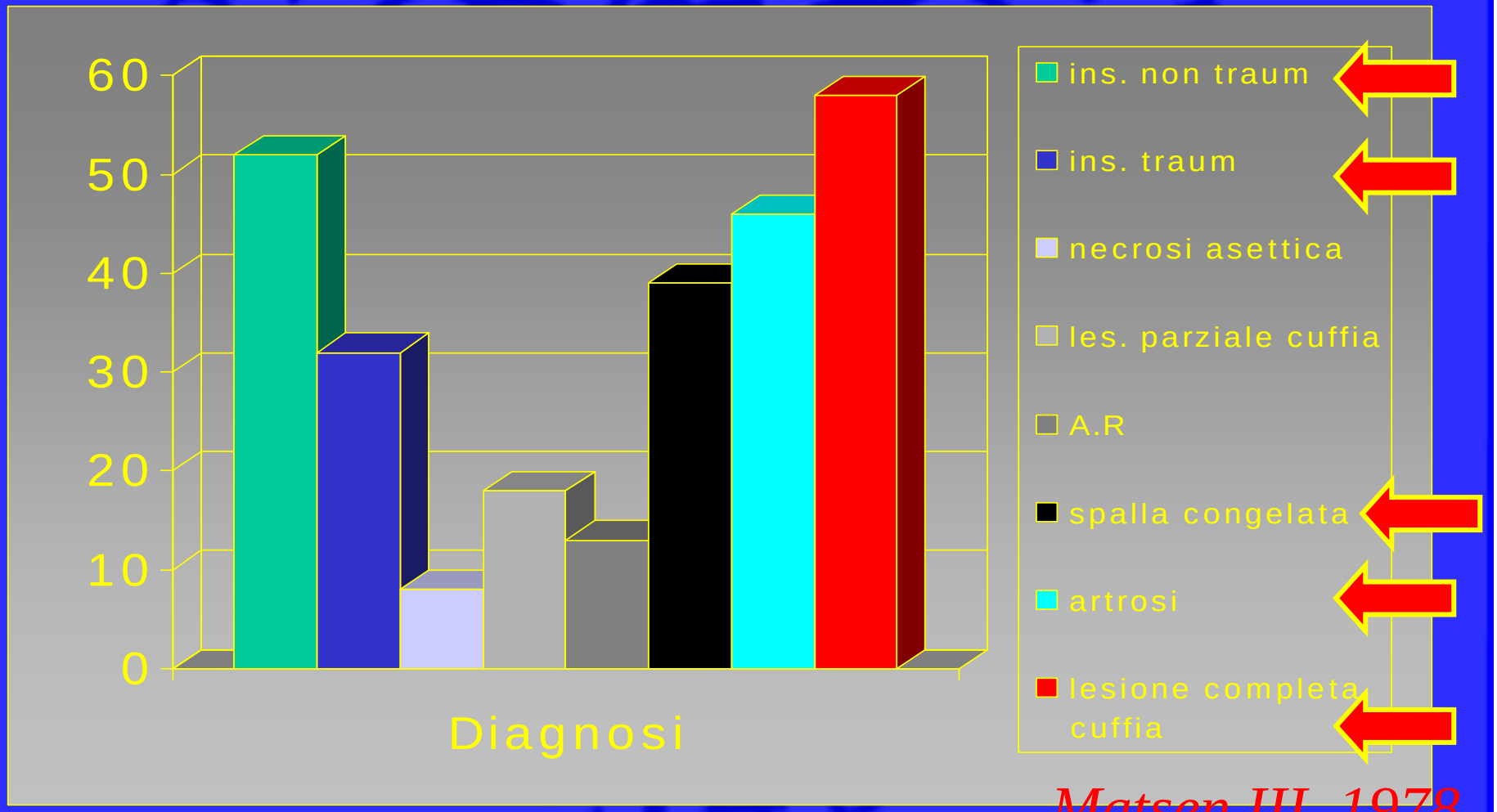
LA BIOMECCANICA

MOVIMENTO DELLA SPALLA

- DOLORE
- RIGIDITA
- INSTABIL
- DEBOLEZ
- ASS. LEVIGATEZZA

LA BIOMECCANICA

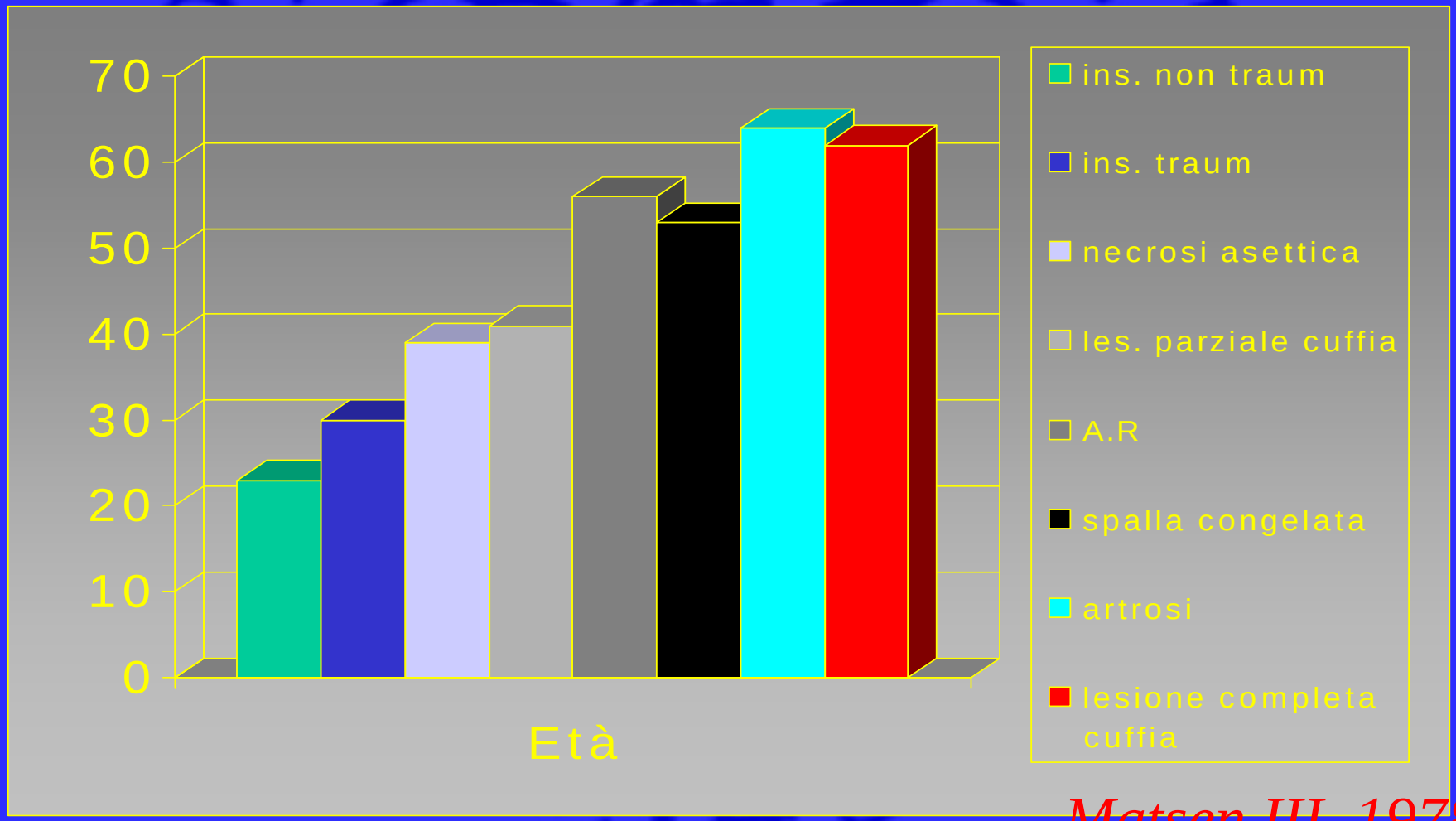
INCIDENZA



Matsen III, 1978

LA BIOMECCANICA

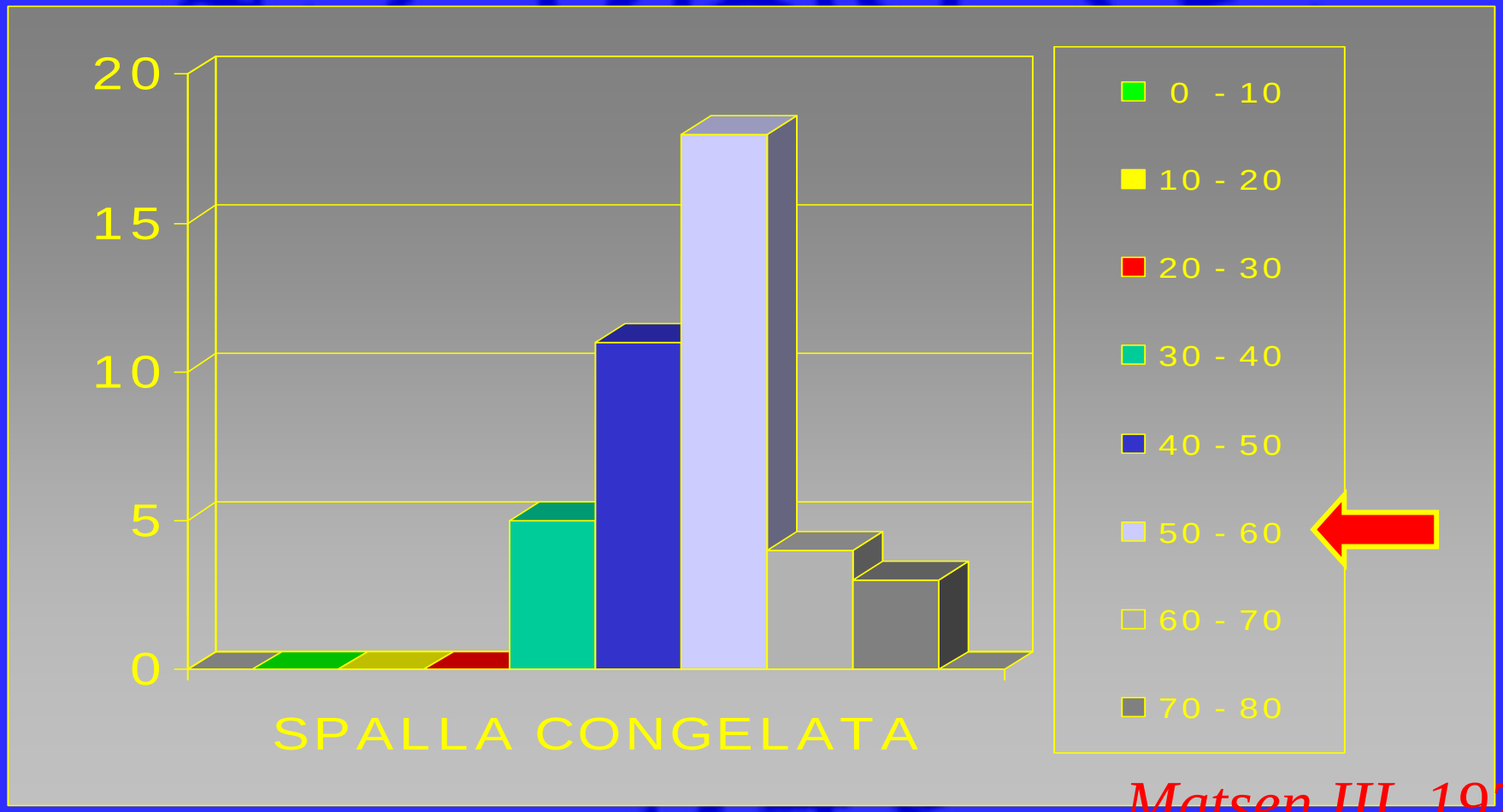
DISTRIBUZIONE



Matsen III, 1978

LA BIOMECCANICA

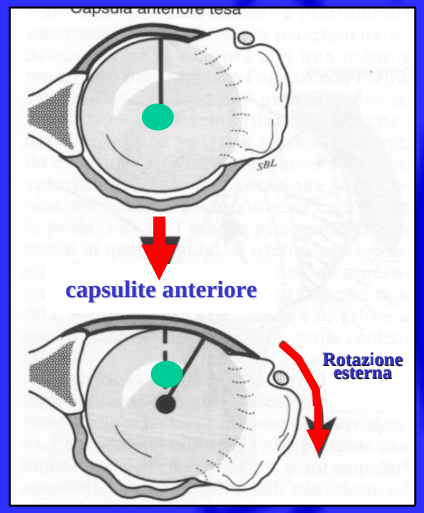
DISTRIBUZIONE SPALLA CONGELATA



Matsen III, 1978

LA BIOMECCANICA

SPALLA CONGELATA



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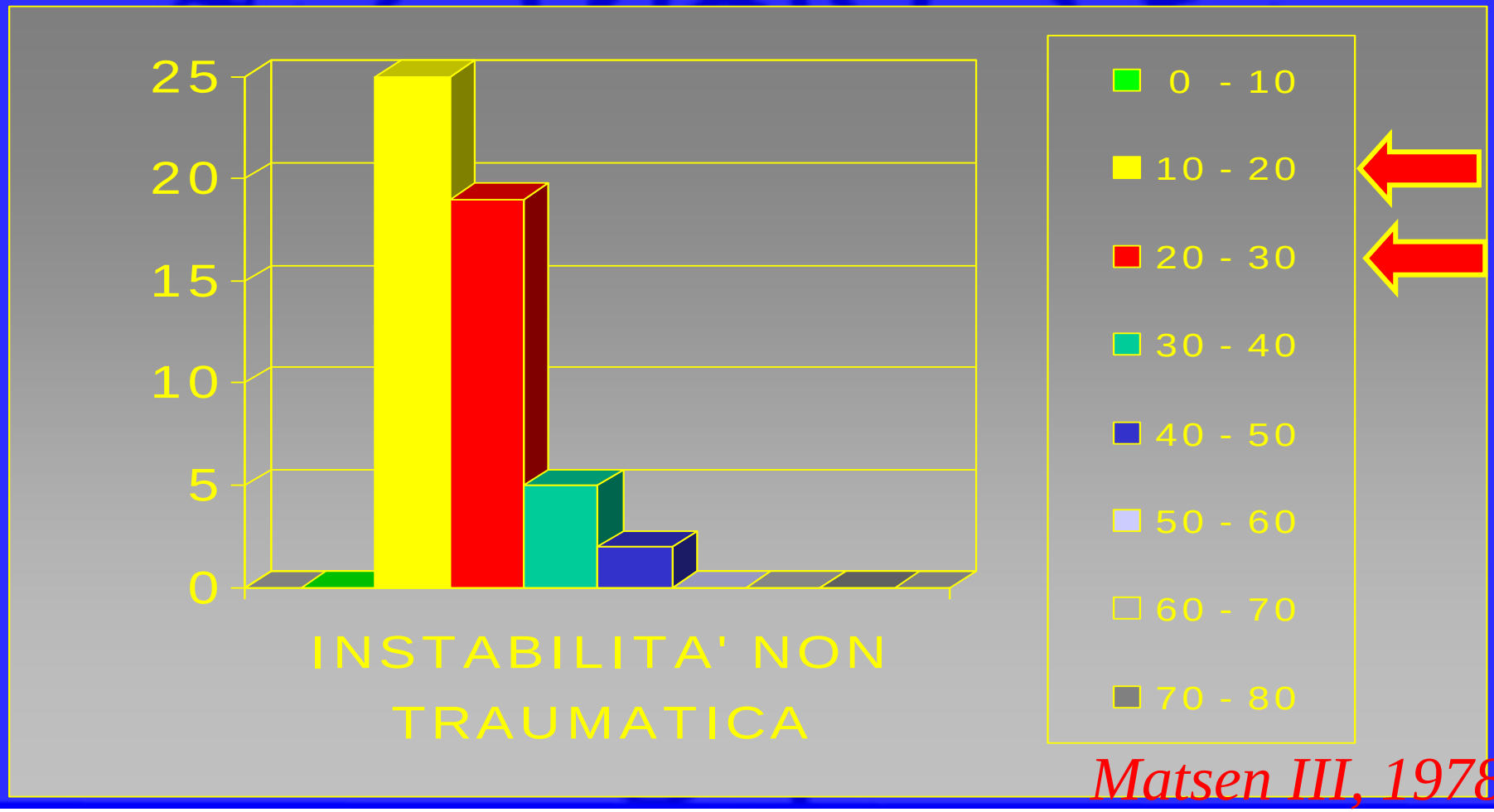

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LA BIOMECCANICA

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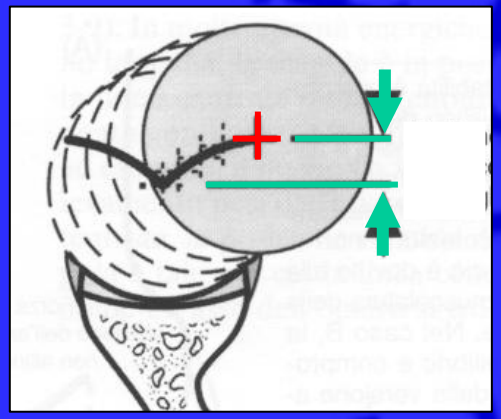

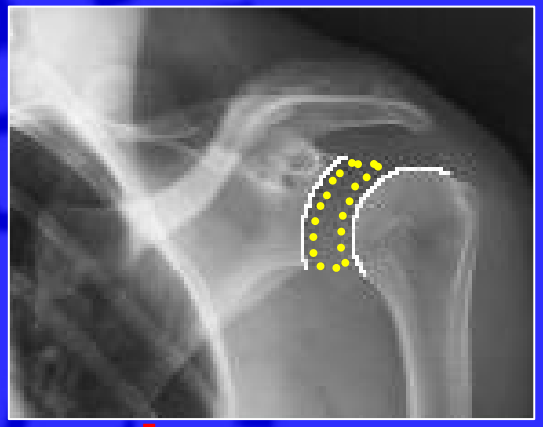

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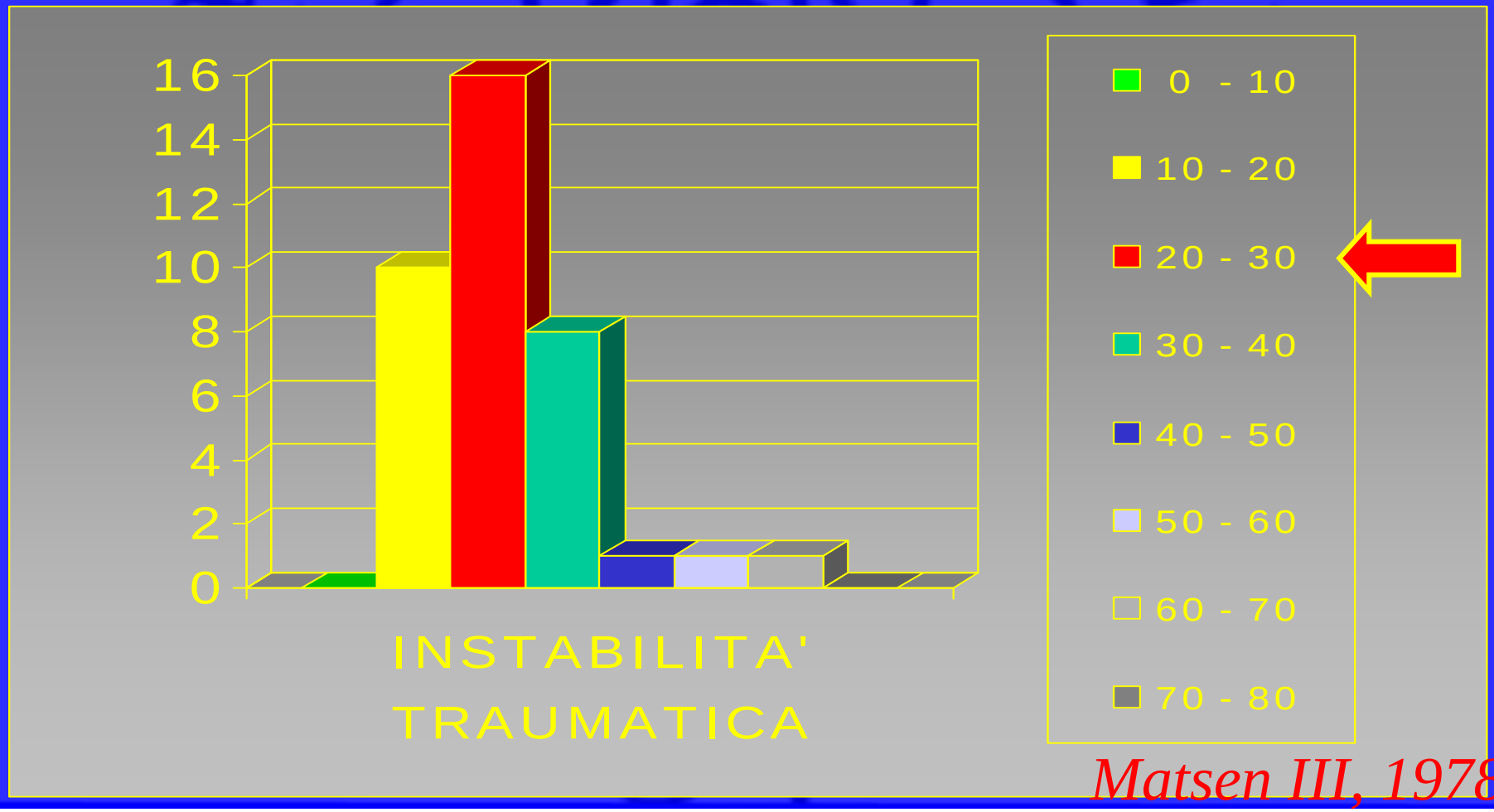
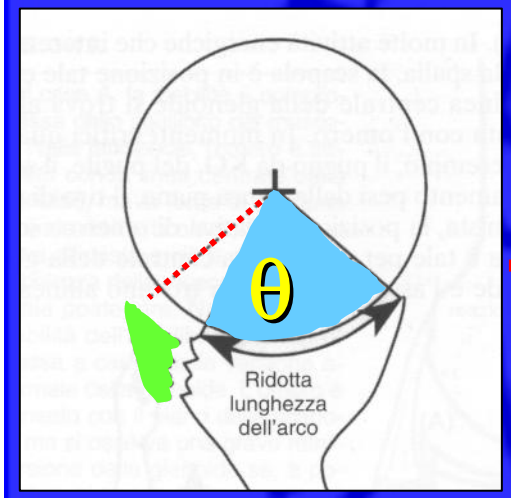
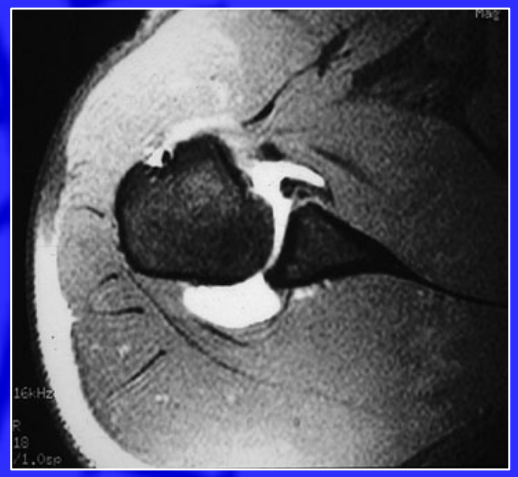


Matsen III, 1978

LA BIOMECCANICA

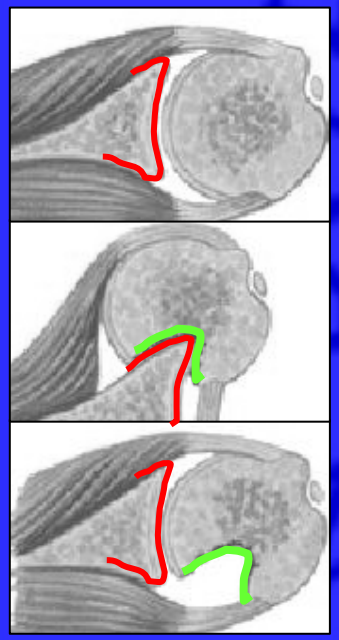
INSTABILITA' POST-TRAUMATICA

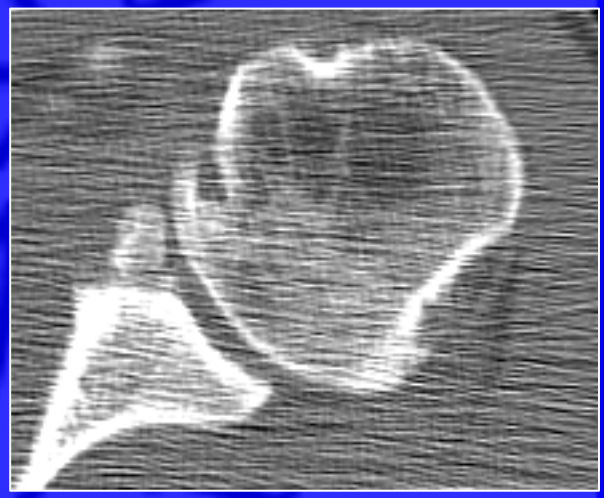


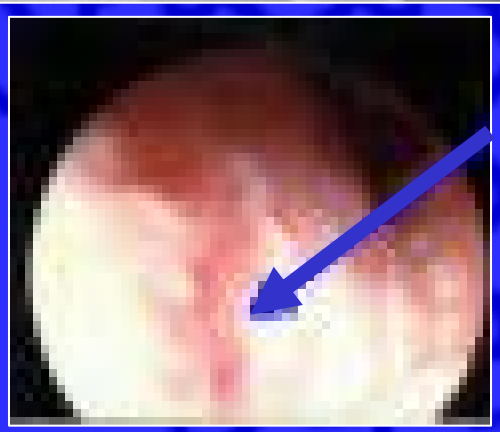


LA BIOMECCANICA

INSTABILITA' POST-TRAUMATICA

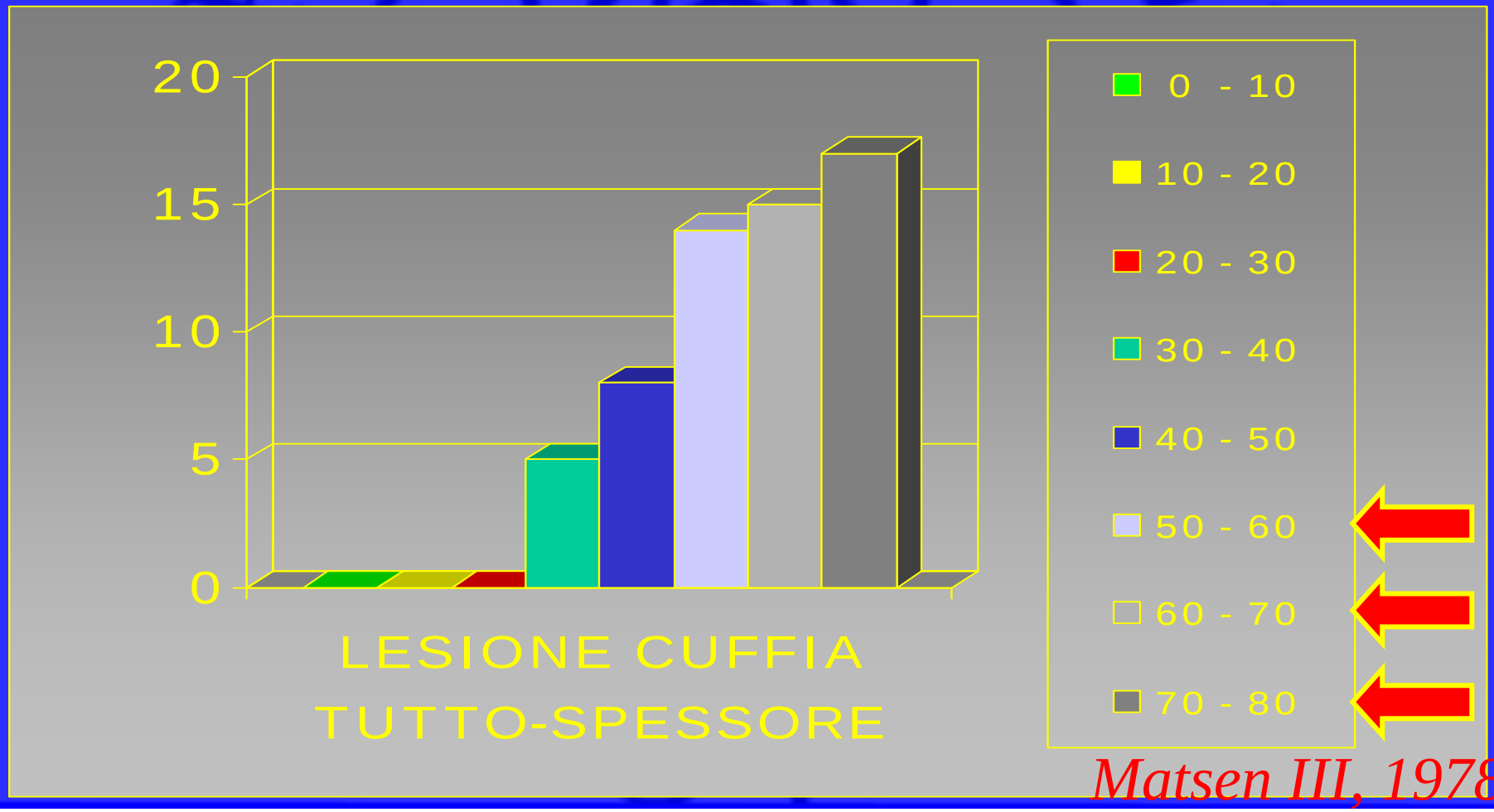






LA BIOMECCANICA

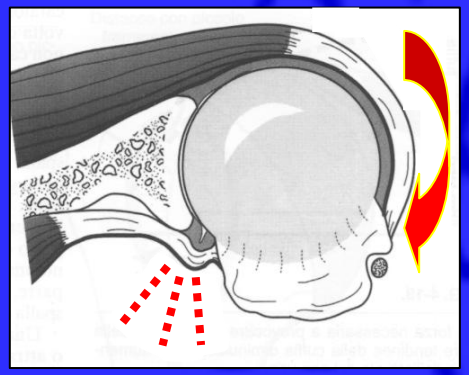
DISTRIBUZIONE LES. CUFFIA

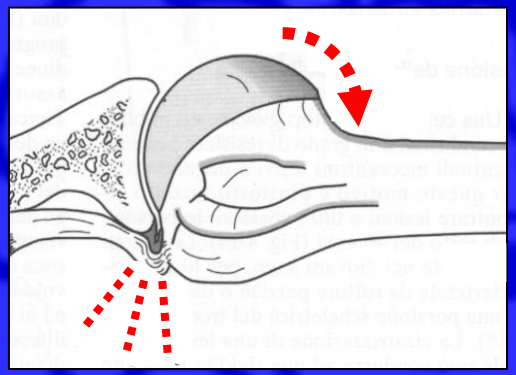


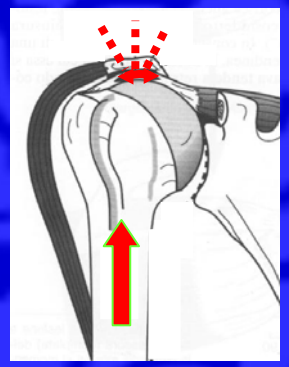
Matsen III, 1978

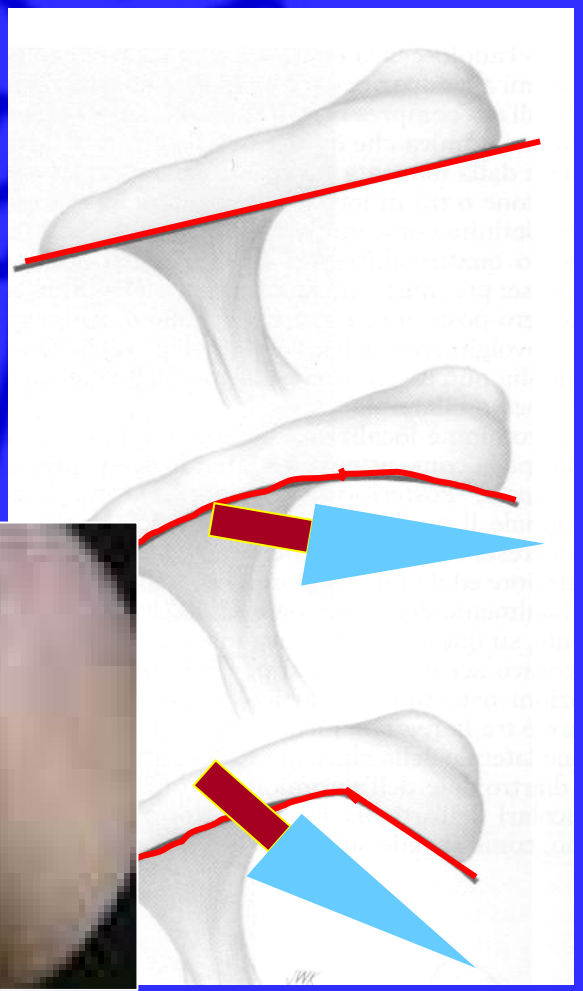
LA BIOMECCANICA

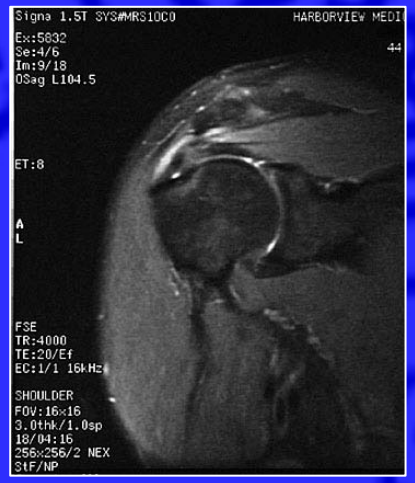
LESIONE CUFFIA DEI ROTATORI











LA BIOMECCANICA

PATOLOGIE
spesso
ASSOCIATE

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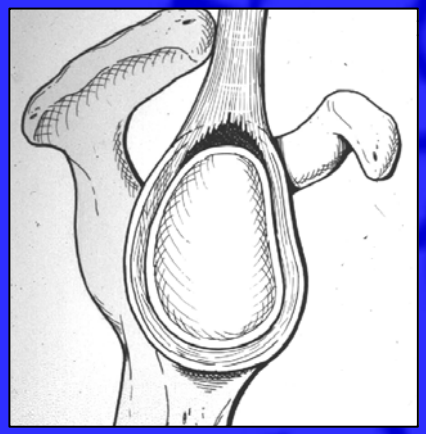
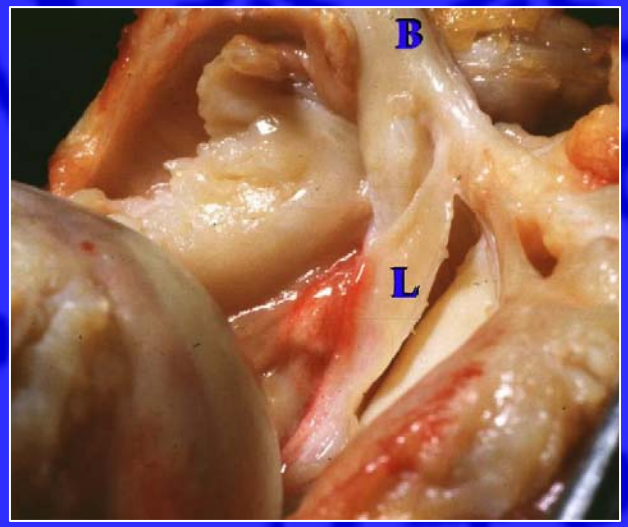
LESIONE CAPO LUNGO BIPITE





LA BIOMECCANICA

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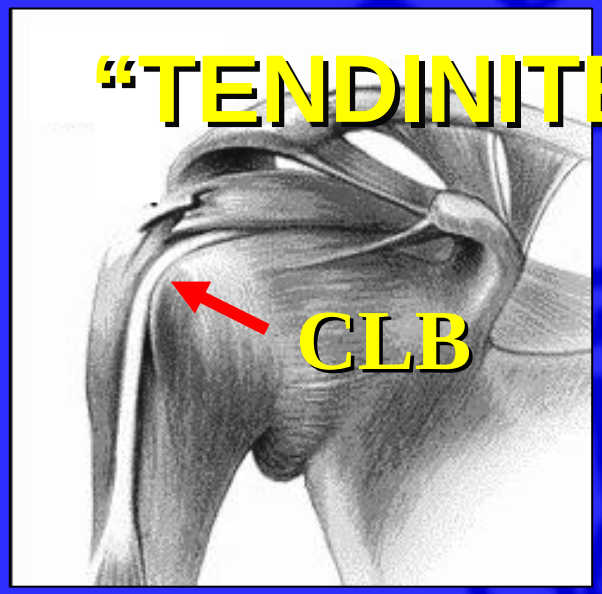

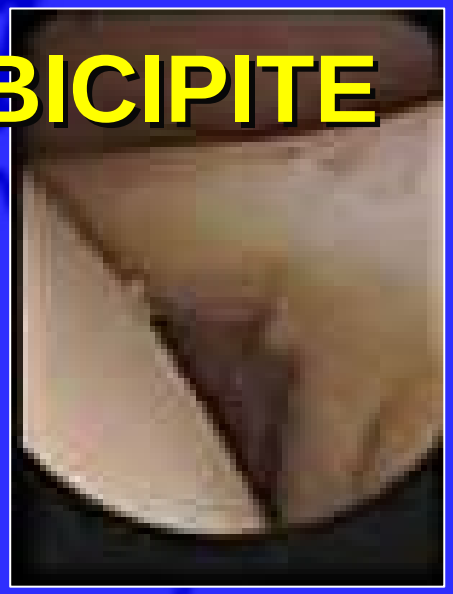

LA BIOMECCANICA

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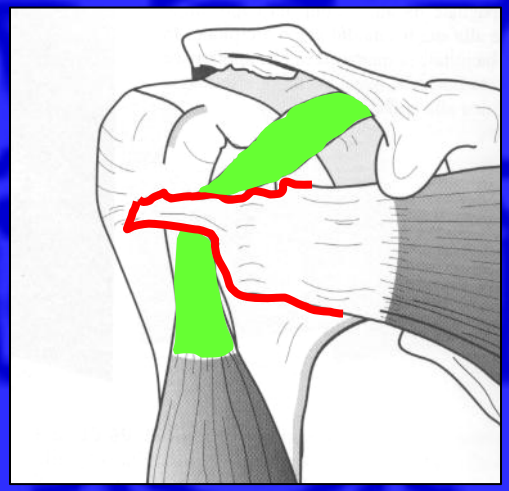

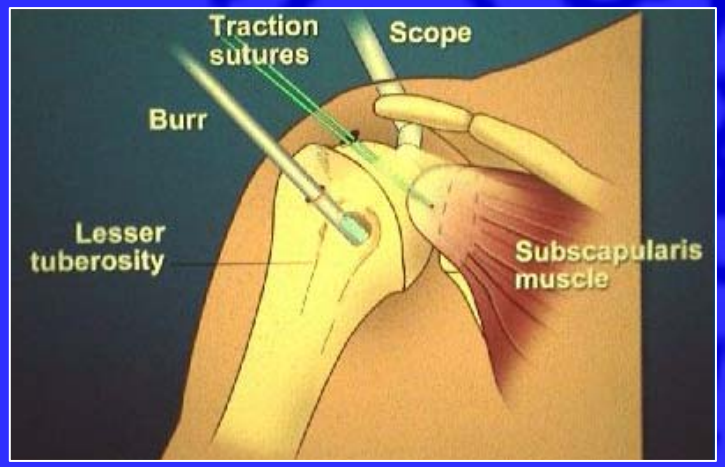

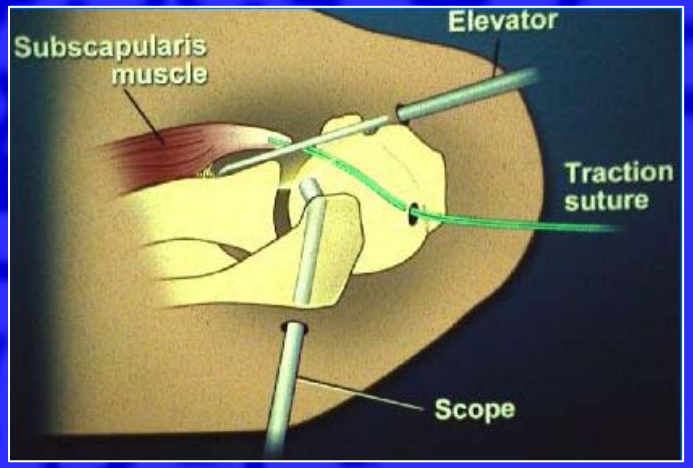

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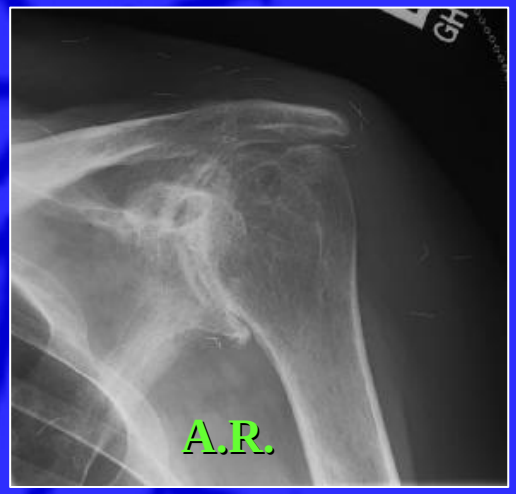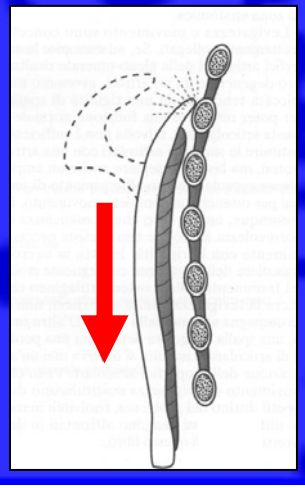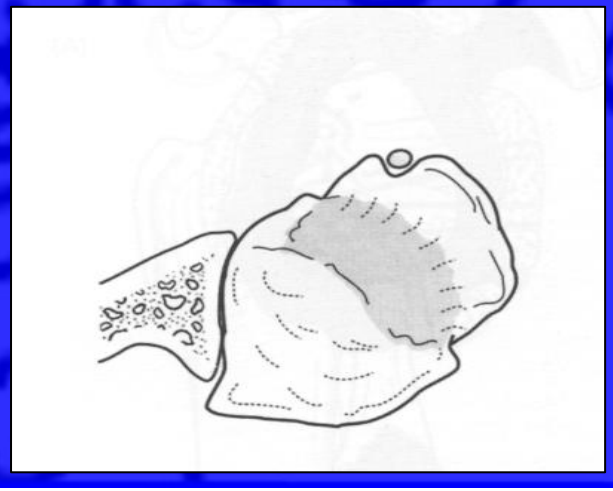
ASSENZA DI LEVIGATEZZA