

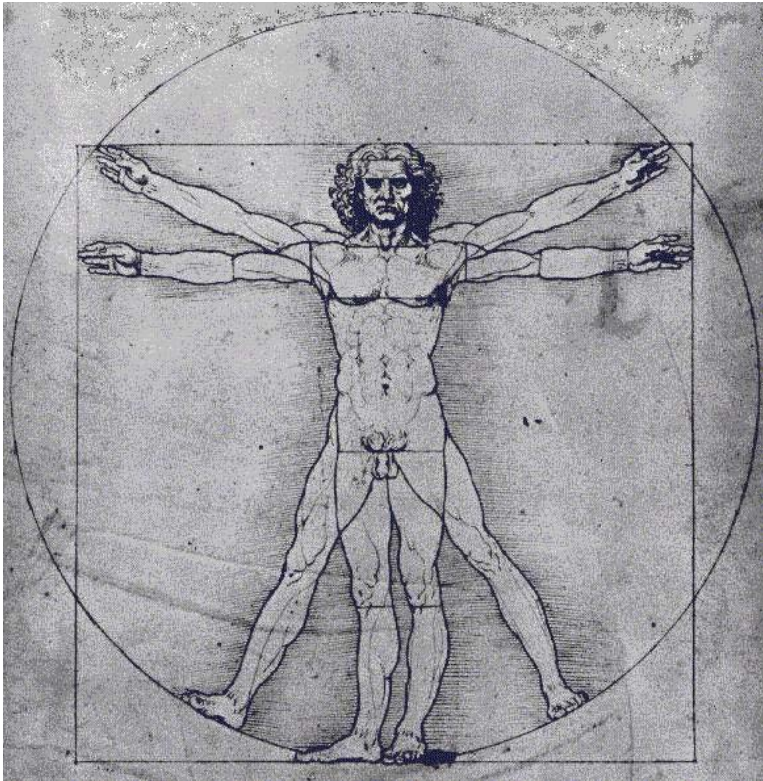
BIOMECÁNICA COMO DISCIPLINA

Ft. Maria Solange Patiño Segura
Docente Escuela de Fisioterapia
Maestría en Fisioterapia

Diferencias entre biomecánica y kinesiología?

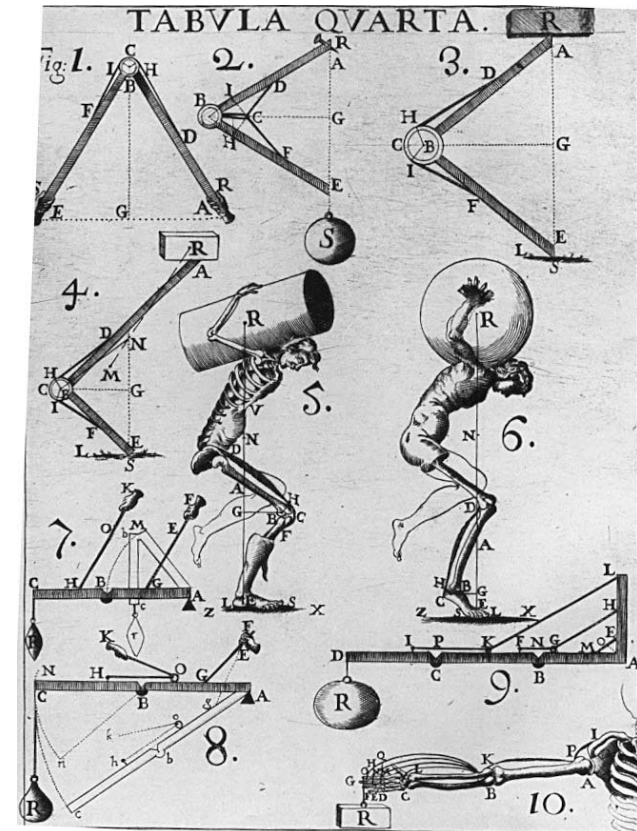
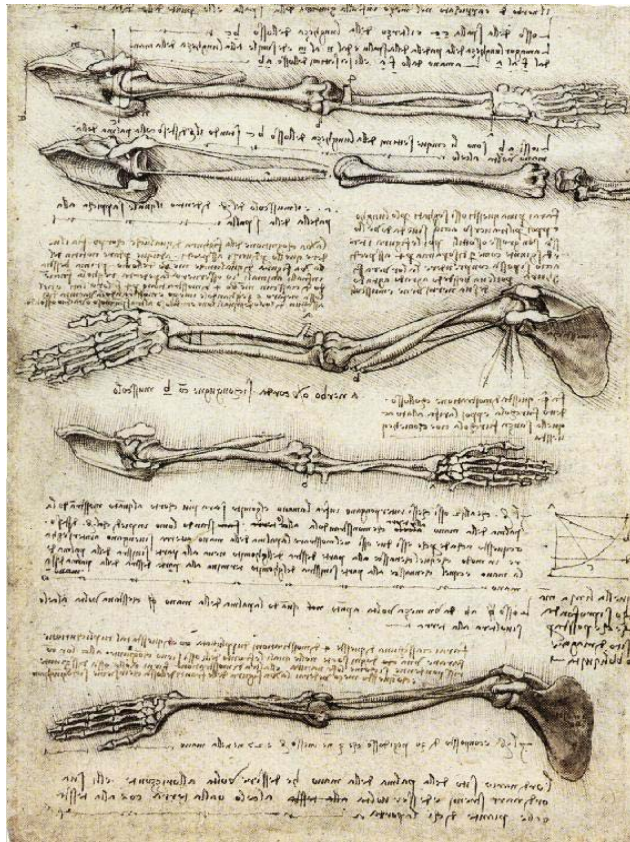
Kinesis – logos

Bios – mechane



KINESIOLOGÍA

Ciencia que estudia el movimiento, enfatizando la interacción entre la anatomía y la biomecánica.



Neumann DA, 2002.

BIOMECÁNICA

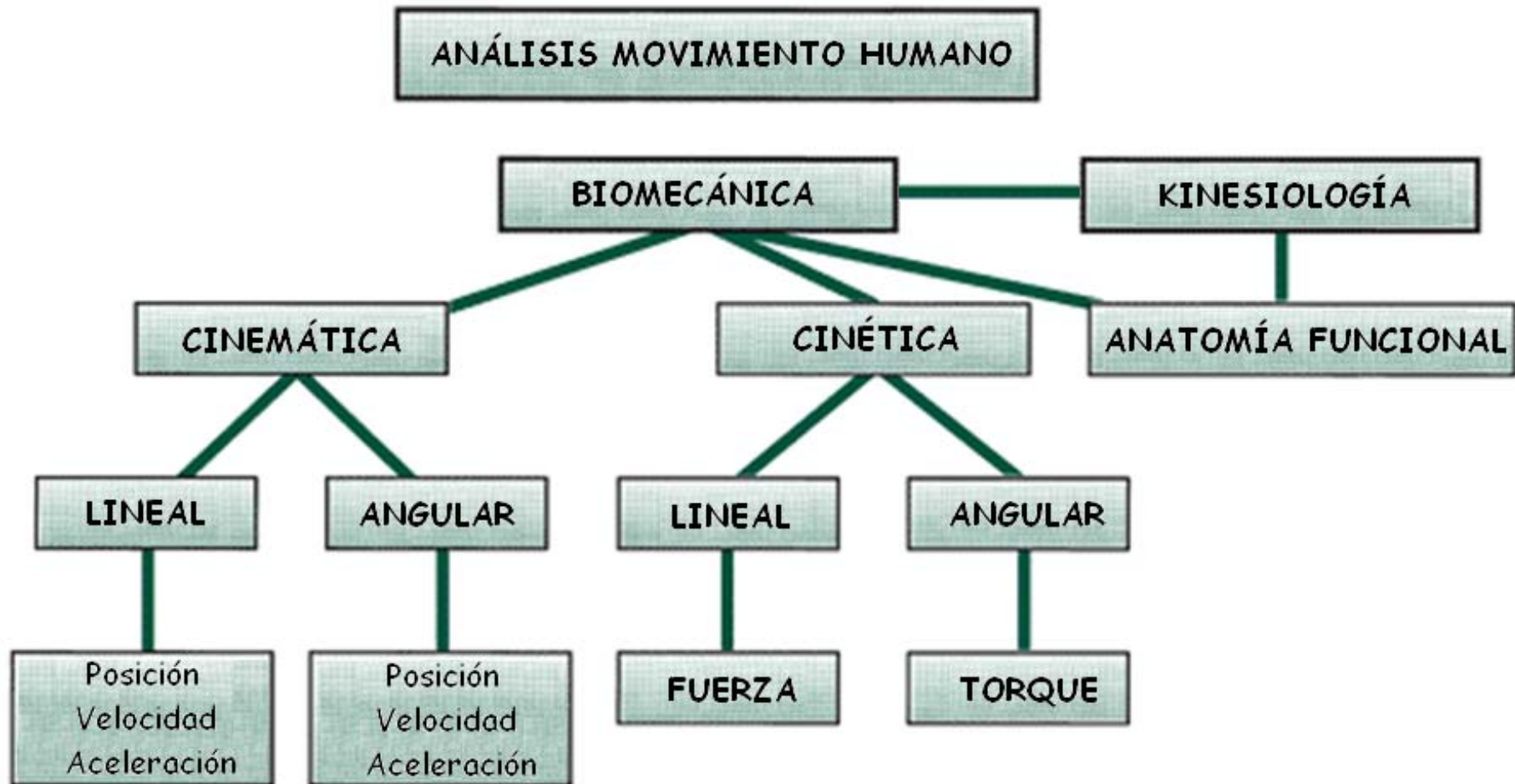
Aplicación de las leyes de la mecánica, para el estudio del movimiento de los seres vivos.

American Society of Biomechanics

Estudio de las fuerzas que actúan y se generan dentro de un cuerpo; así como los efectos de estas fuerzas sobre los tejidos, fluidos o materiales utilizados para diagnóstico, tratamiento o con fines investigativos.

European Society of Biomechanics

BIOMECÁNICA vs. KINESIOLOGÍA

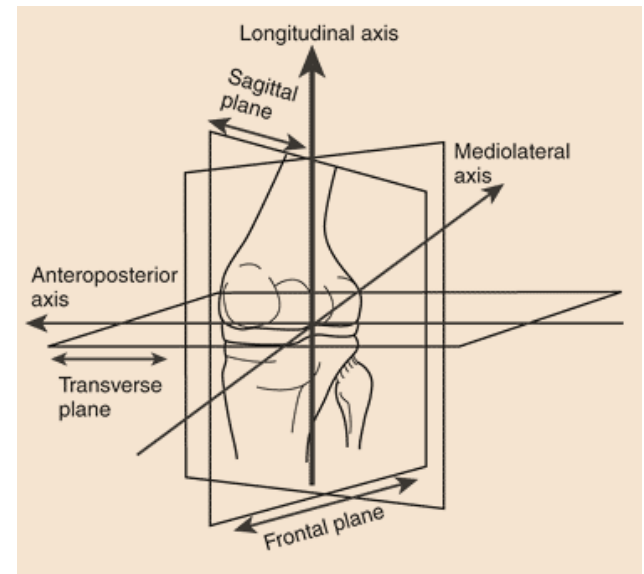
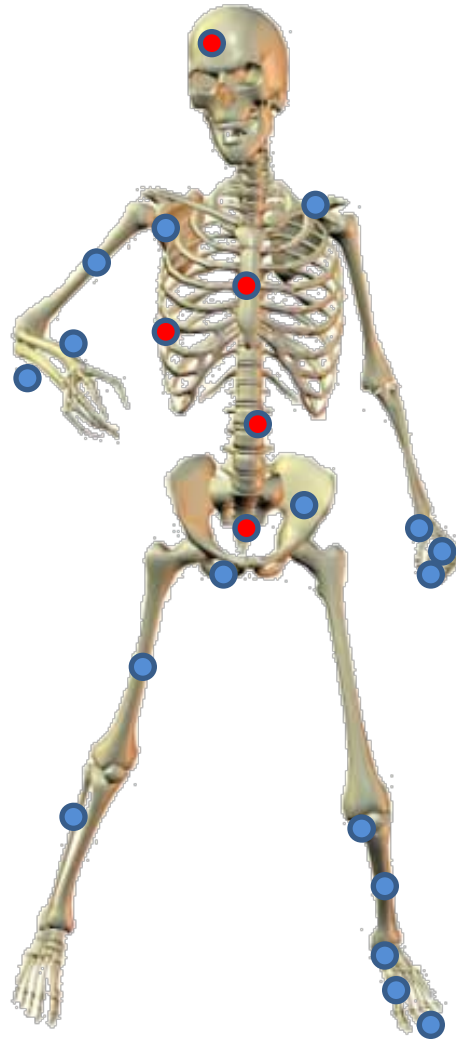
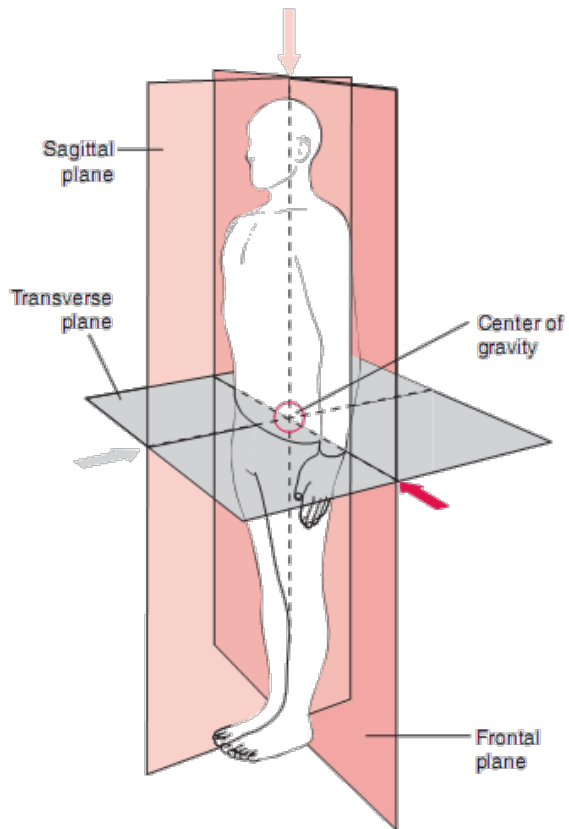


Hamill J, Knutzen KM, 2009

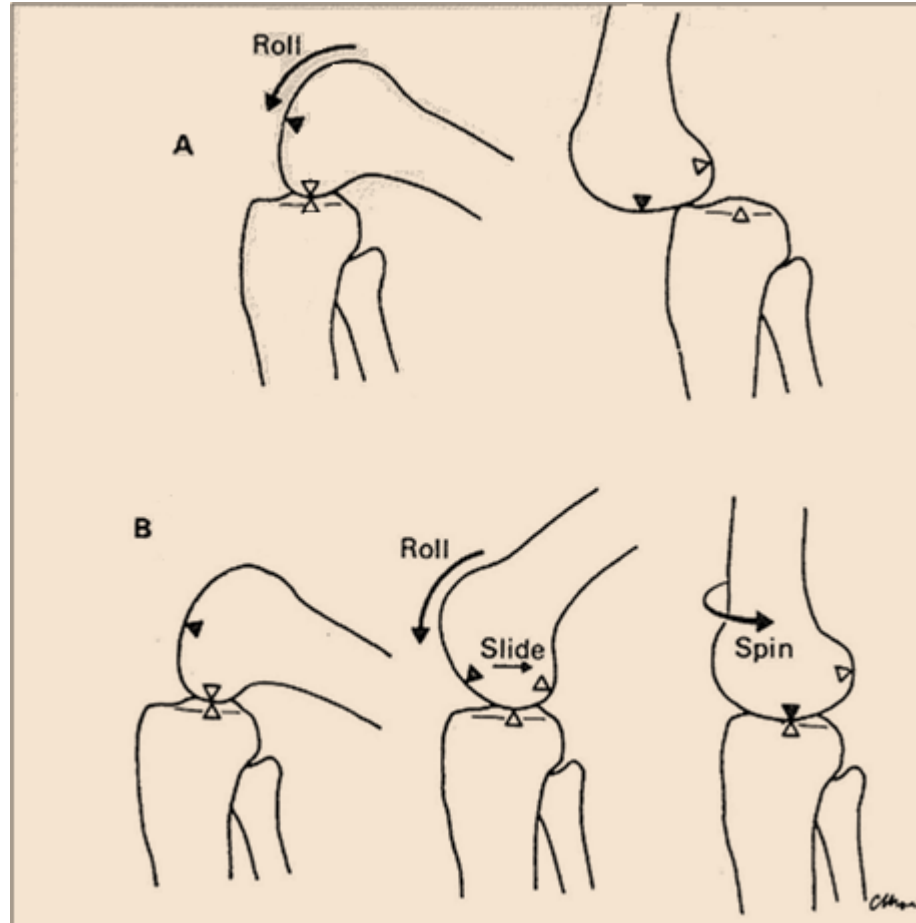
CINEMÁTICA



OSTEOCINEMÁTICA



ARTROCINEMÁTICA



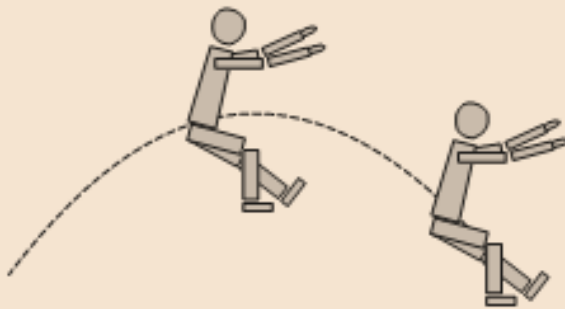
Kaltenborn F.

TRASLACIÓN

Linear motion



Rectilinear motion



Curvilinear motion

Describe el movimiento lineal, ya sea en línea recta o curvilíneo.

Knutzen KM.

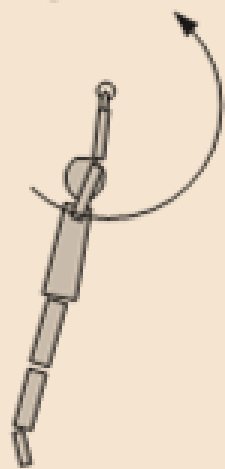
ROTACIÓN

Angular motion

Somersault



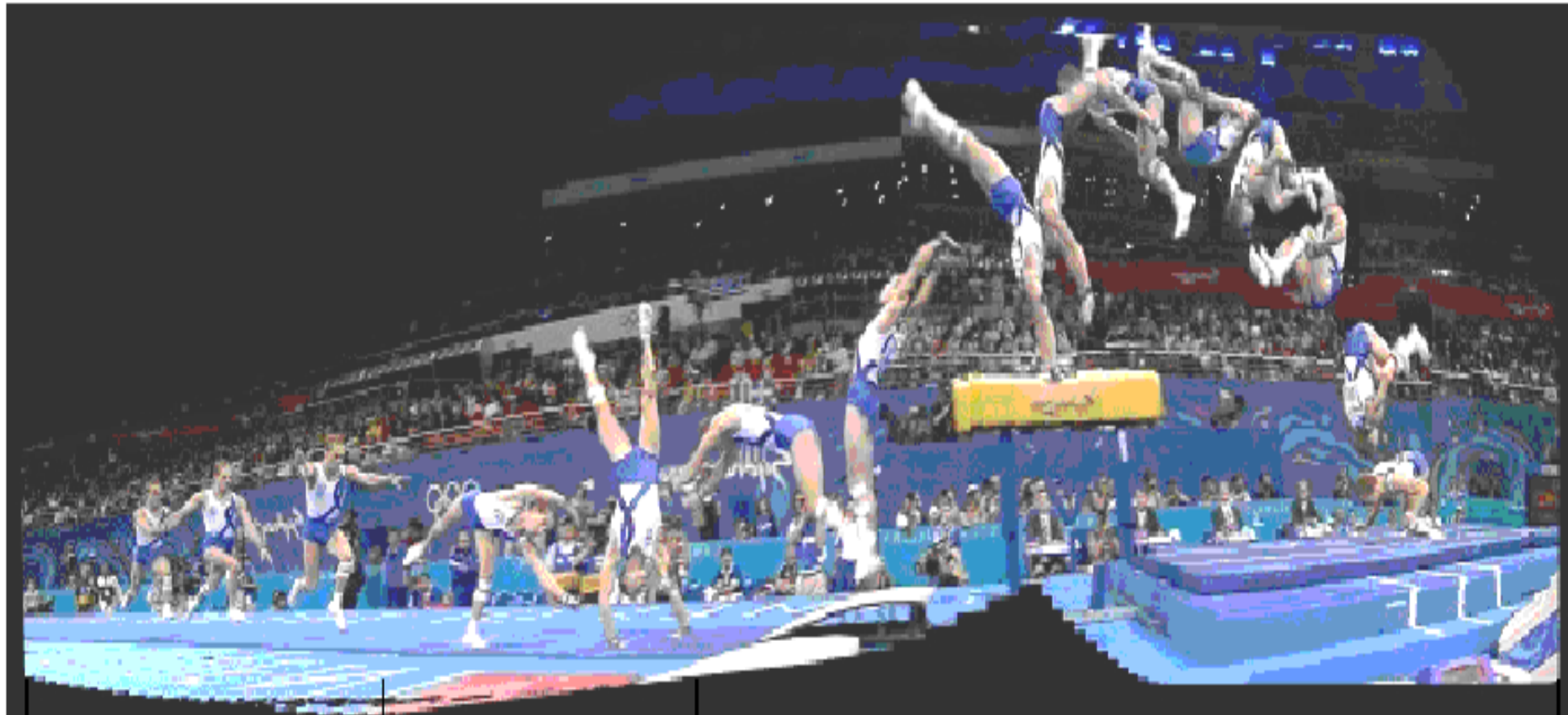
High bar swing



Describe el movimiento de forma circular, alrededor de un punto pivote.

Knutzen KM.

ANÁLISIS DE MOVIMIENTO

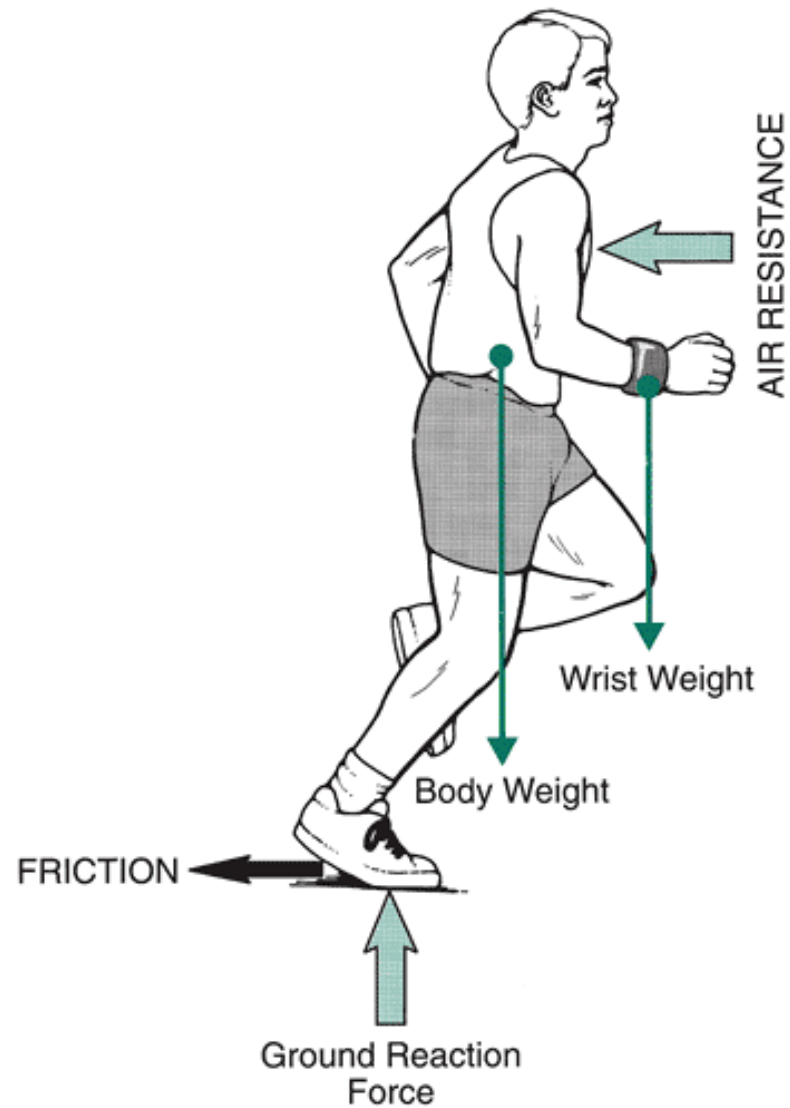


a

b

c

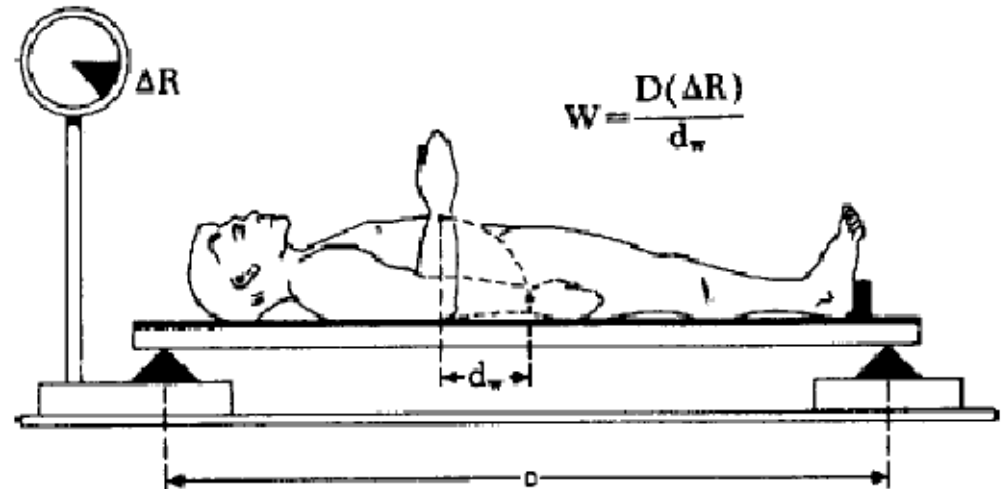
CINÉTICA



Knutzen KM.

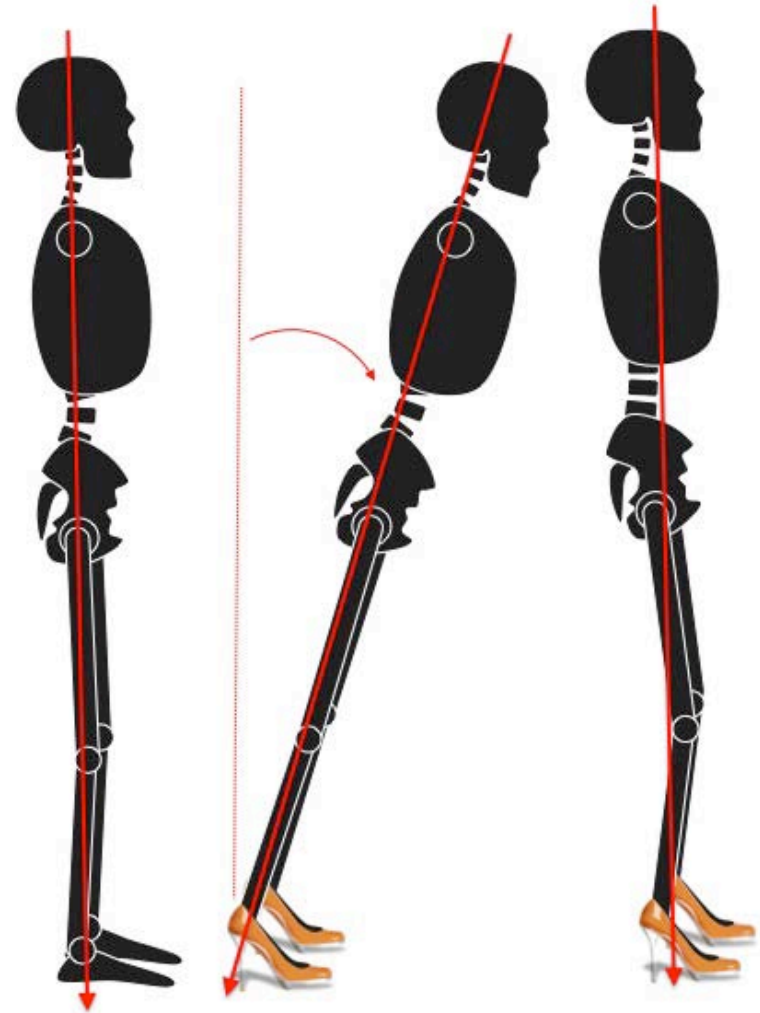
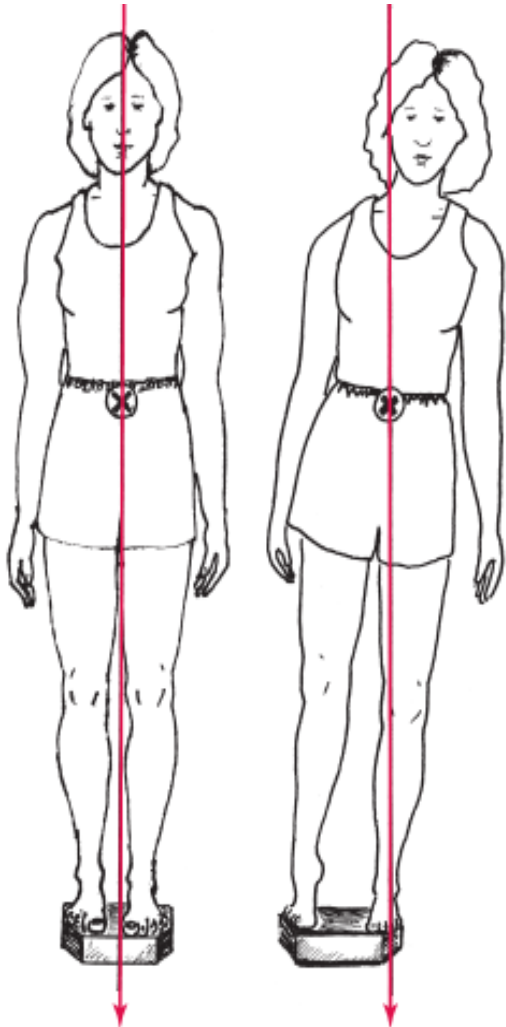
CENTRO DE GRAVEDAD

Punto imaginario donde se concentra todo el **peso** corporal.

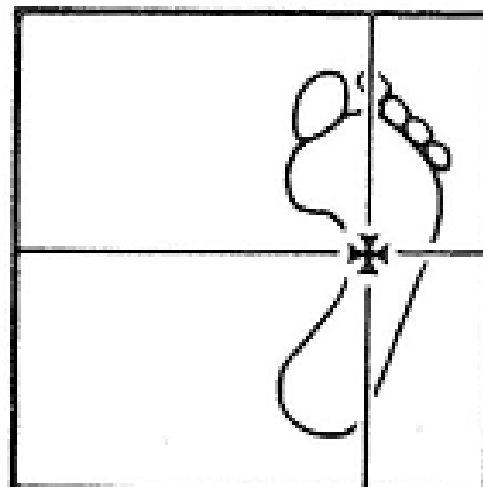
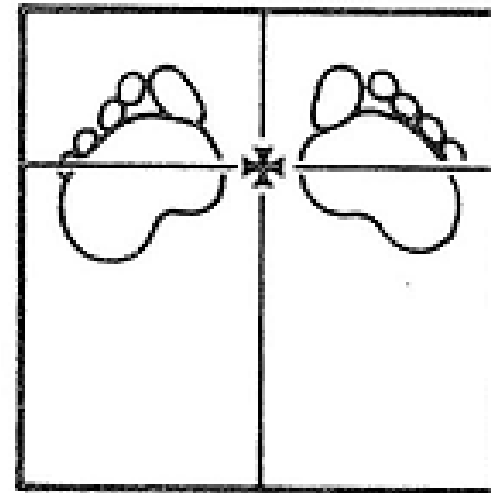
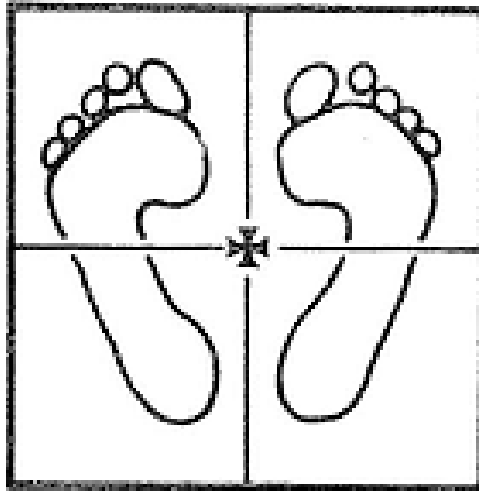


Smith L, Weiss E, Lehmkuhl L.

LÍNEA DE GRAVEDAD



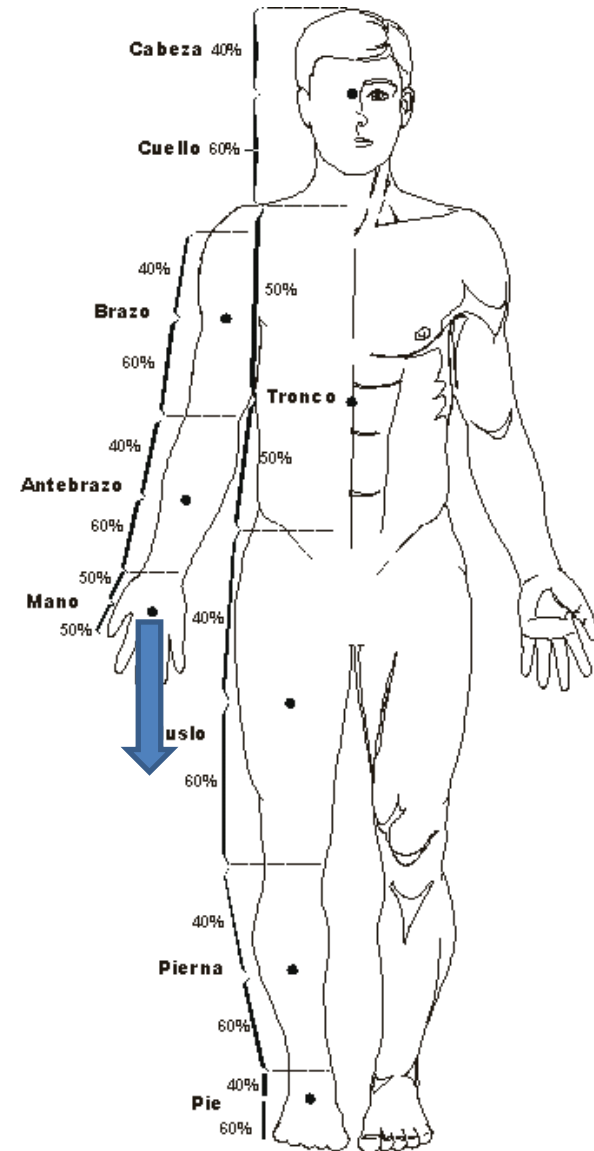
BASE SOPORTE



CINÉTICA – centro de masa

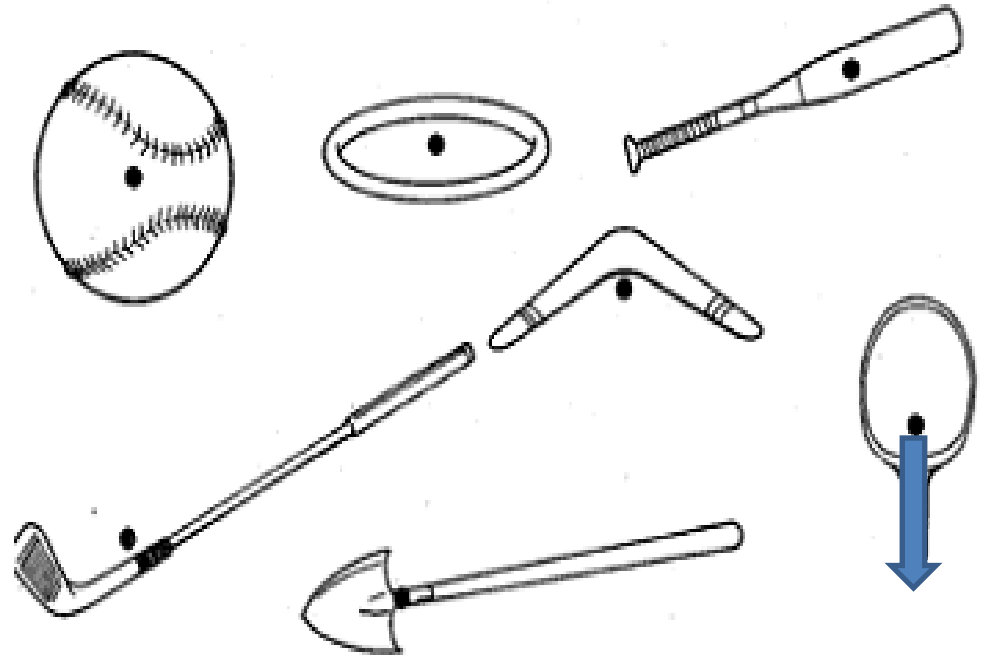
Punto imaginario donde se concentra toda la **masa** del segmento.

Dempster, Clauser, Zartziosky.

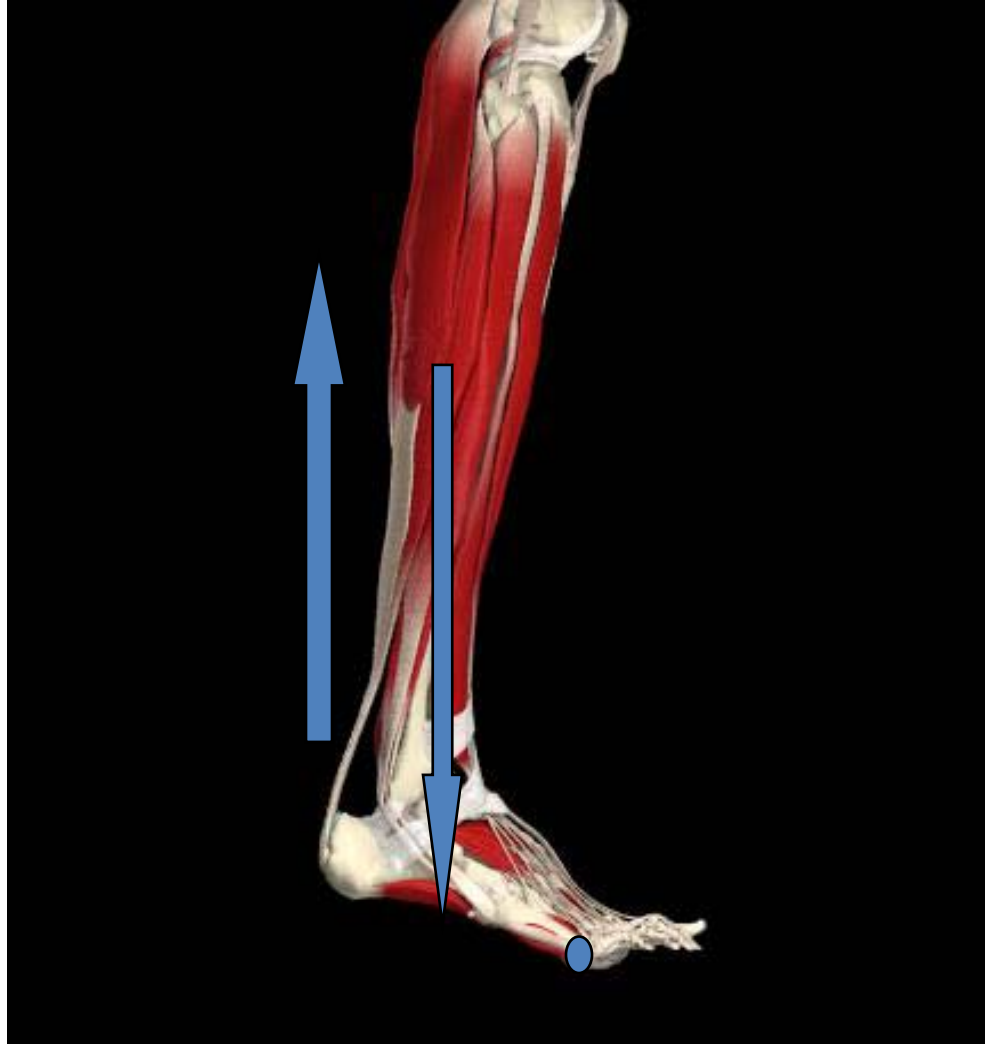


PESO

Es la fuerza gravitacional ejercida sobre un cuerpo, que actúa en dirección vertical al centro de la tierra.



CINÉTICA

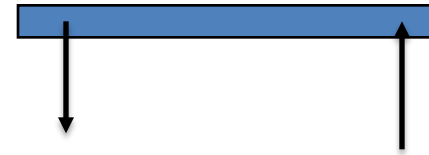


CINÉTICA – SISTEMAS DE FUERZA

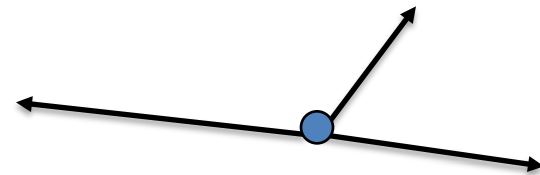
Lineal



Paralelo

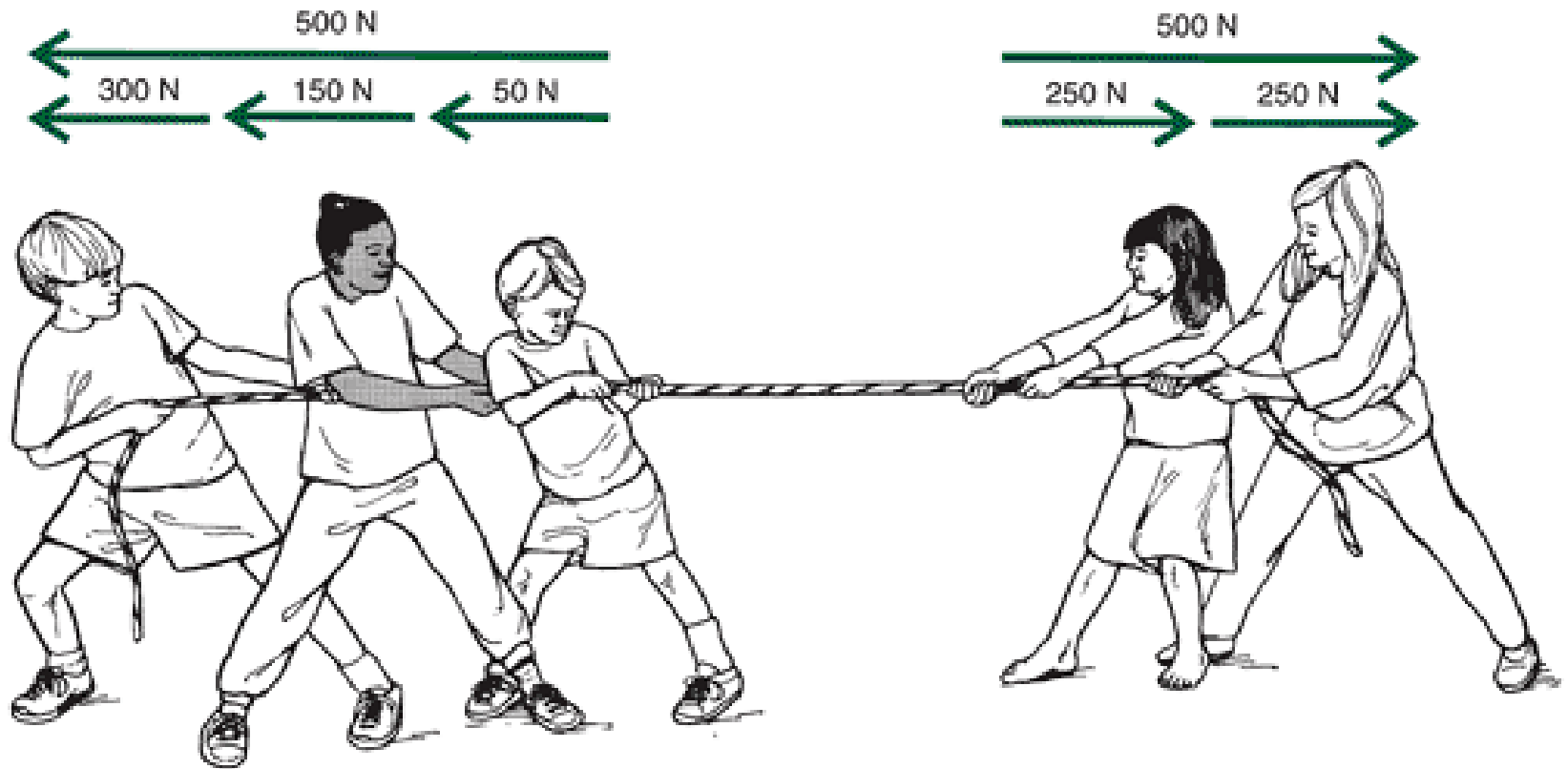


Angular



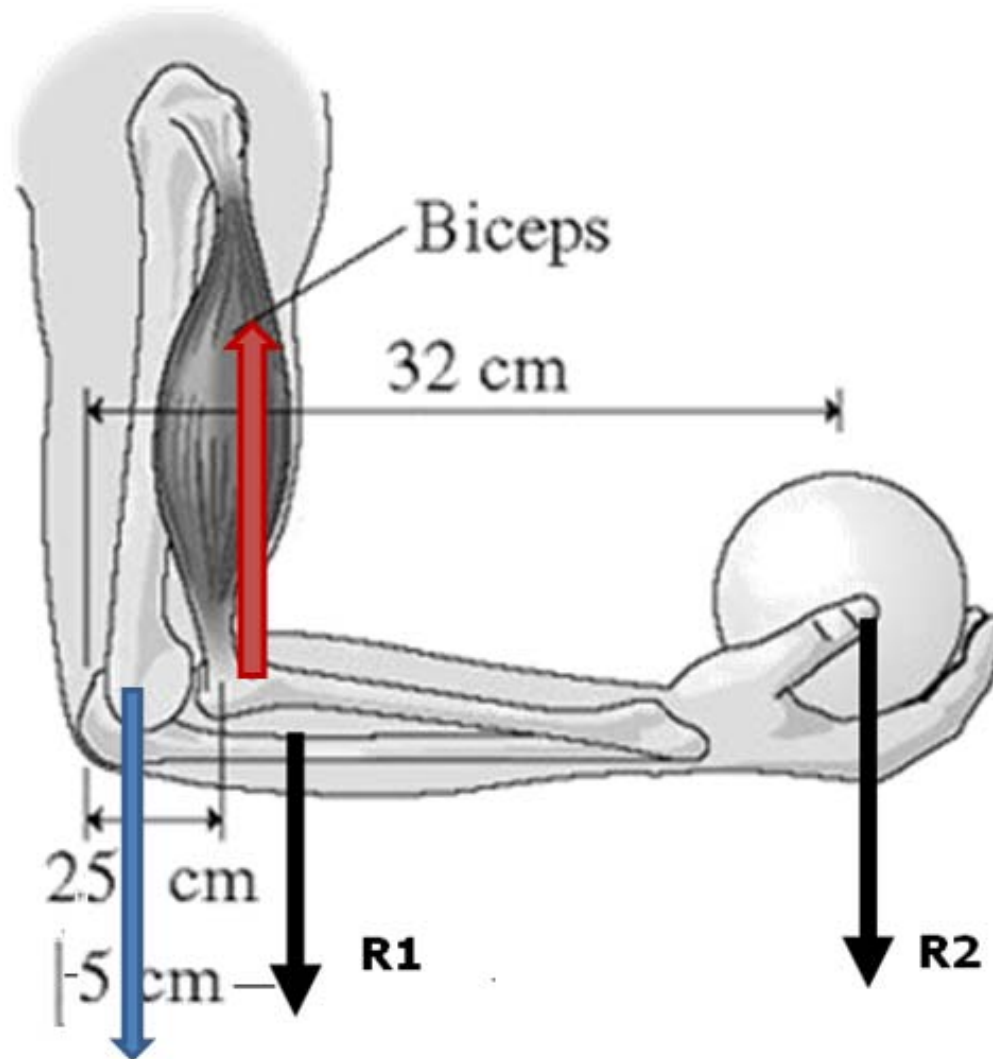
Le Veau B.

FUERZA LINEAL



Knutzen KM.

FUERZA PARALELO

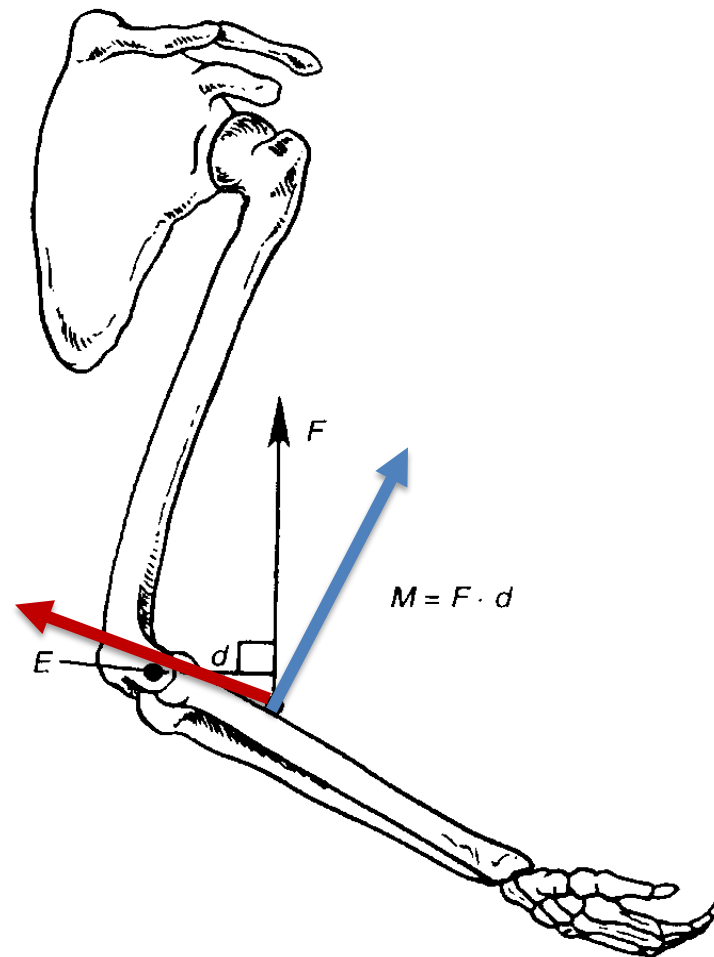


FUERZA ANGULAR

Fuerza muscular

- ❑ Rotación
- ❑ Deslizamiento

$$\Sigma F = 0$$

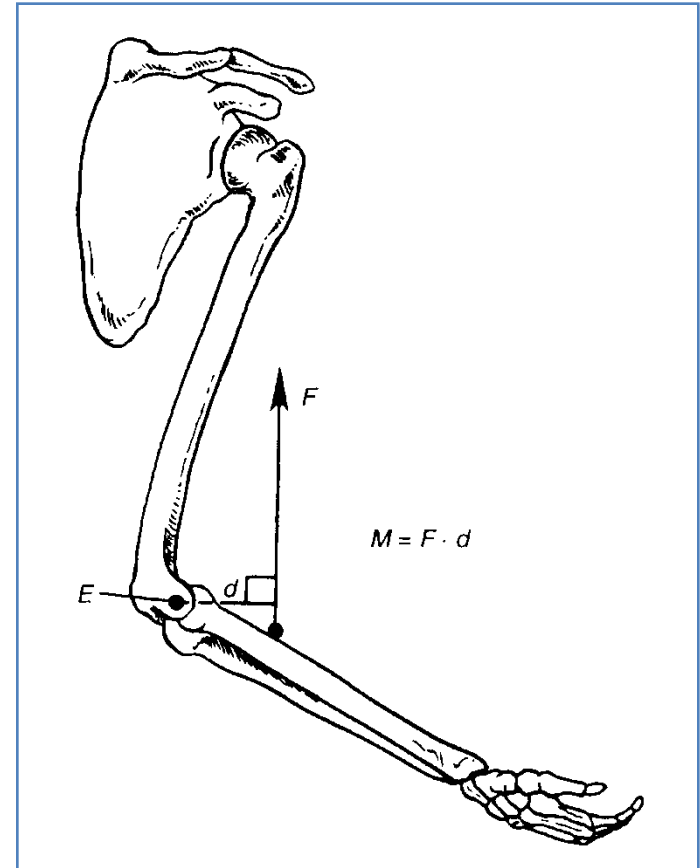


MOMENTO DE FUERZA - torque

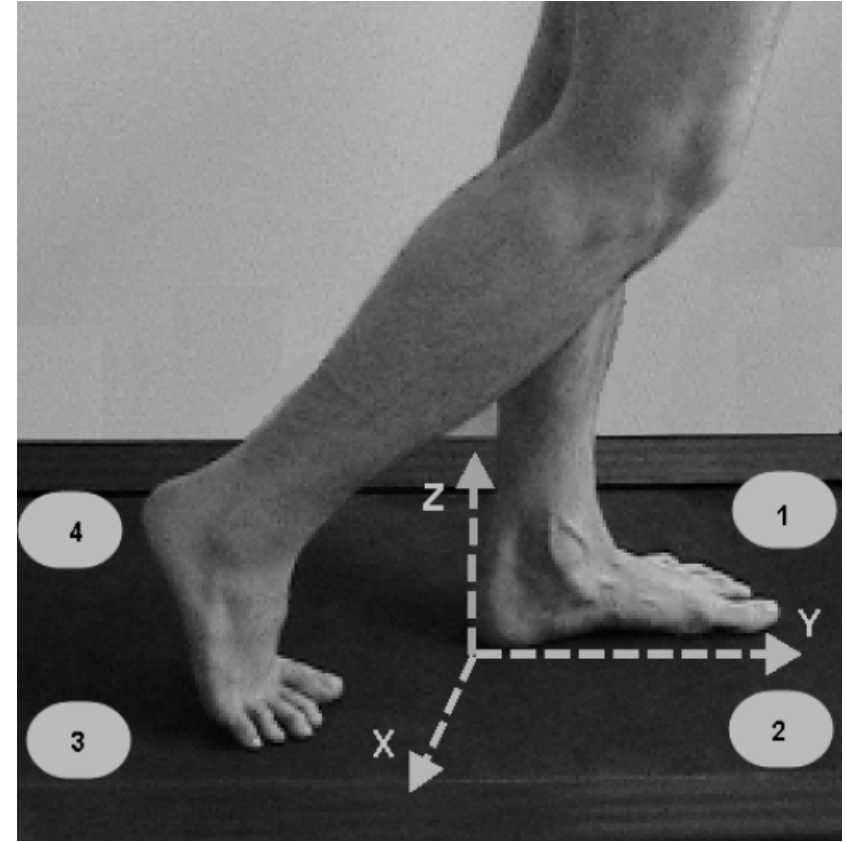
Efecto de un componente de la fuerza que causa rotación alrededor de un eje.

$$T = F \cdot d \text{ (Nm)}$$

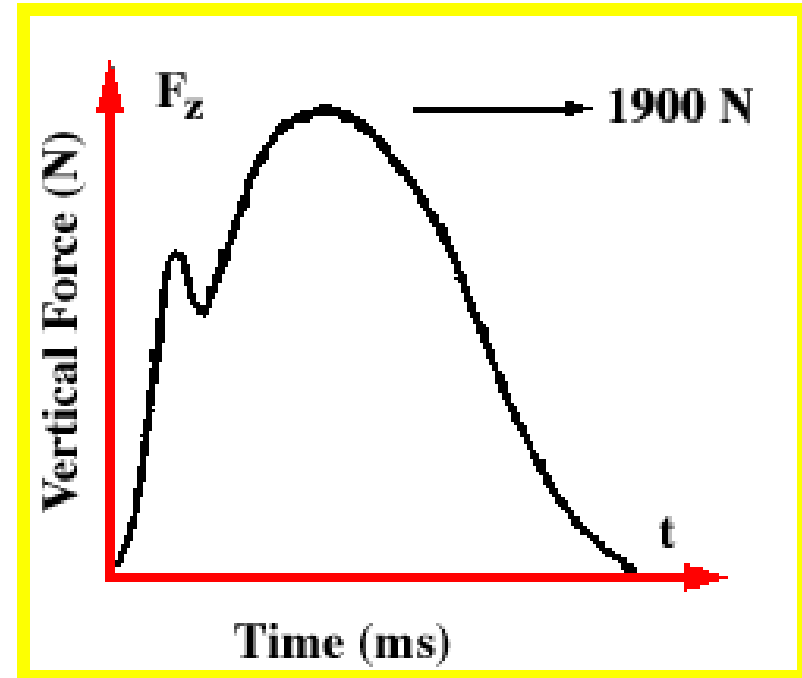
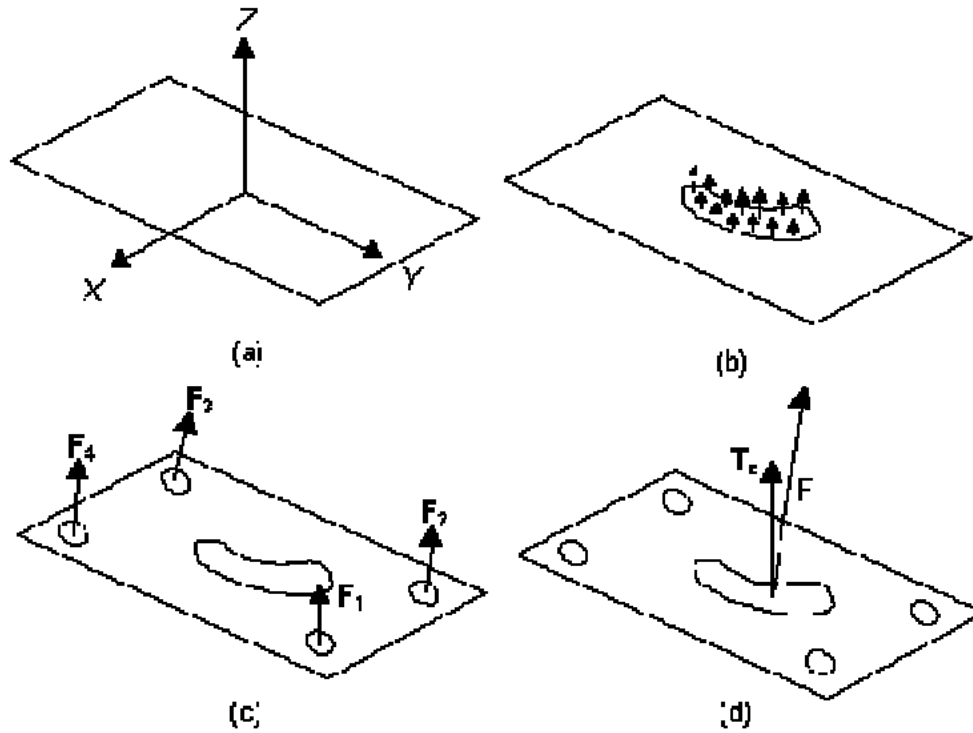
$$\Sigma M = 0$$



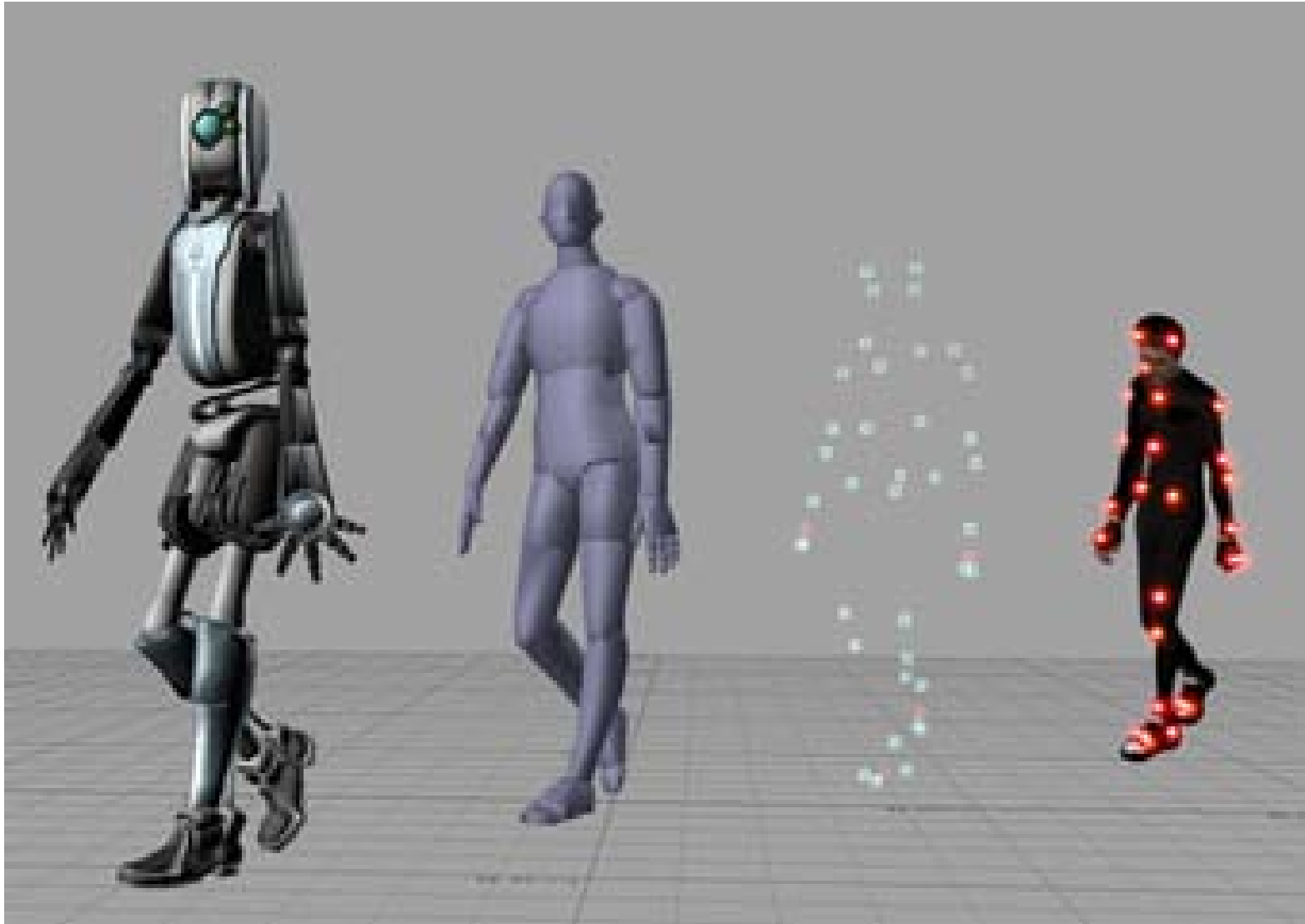
ANÁLISIS CINÉTICO



ANÁLISIS CINÉTICO



APLICACIONES



ANÁLISIS MARCHA



Fase 1



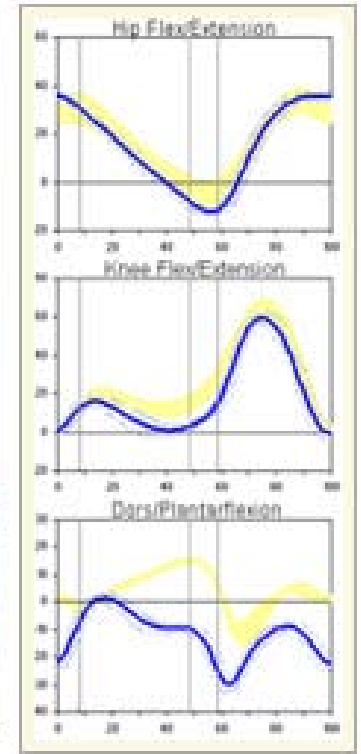
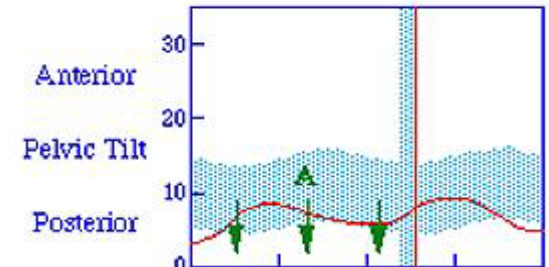
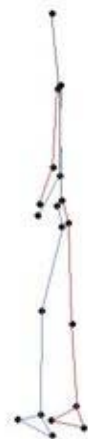
Fase 2



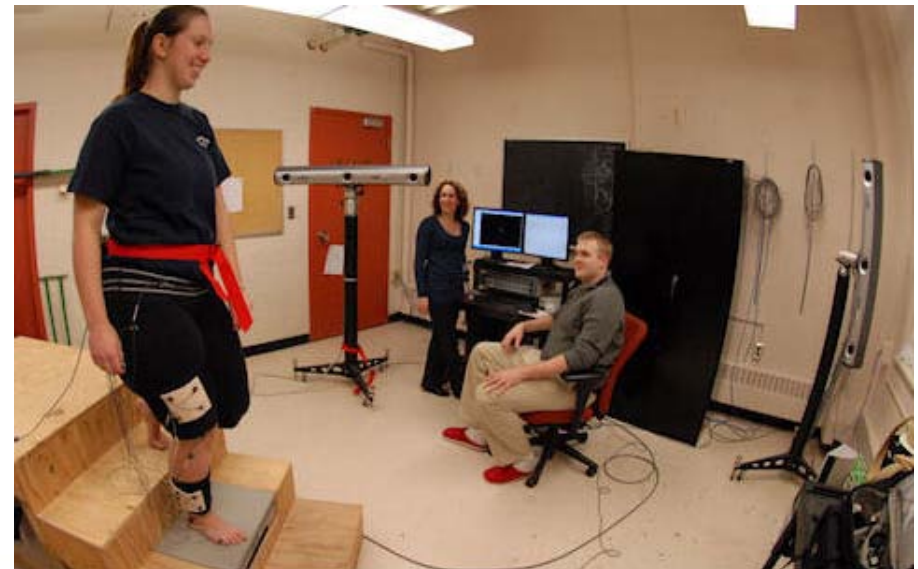
Fase 3



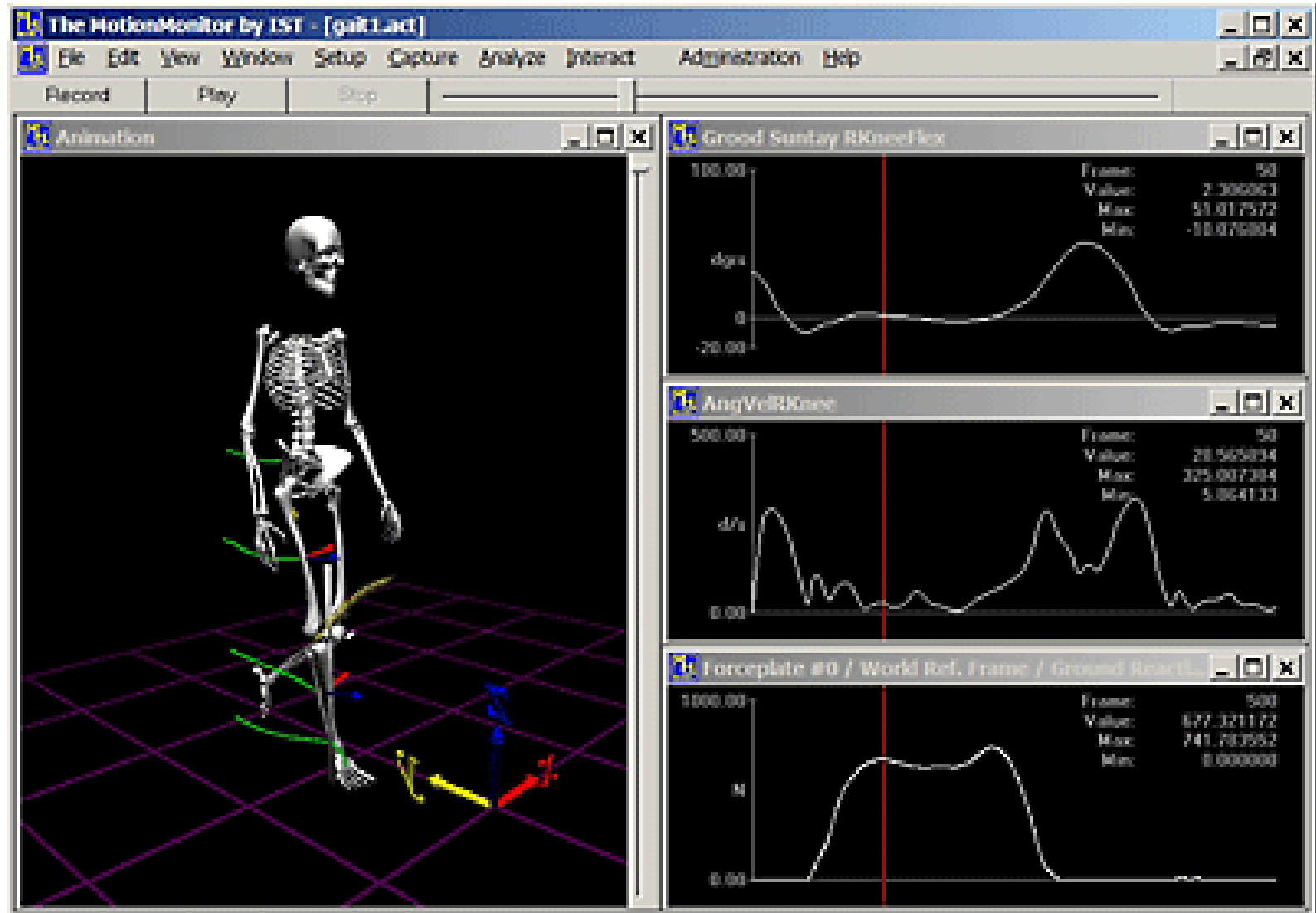
Fase 4



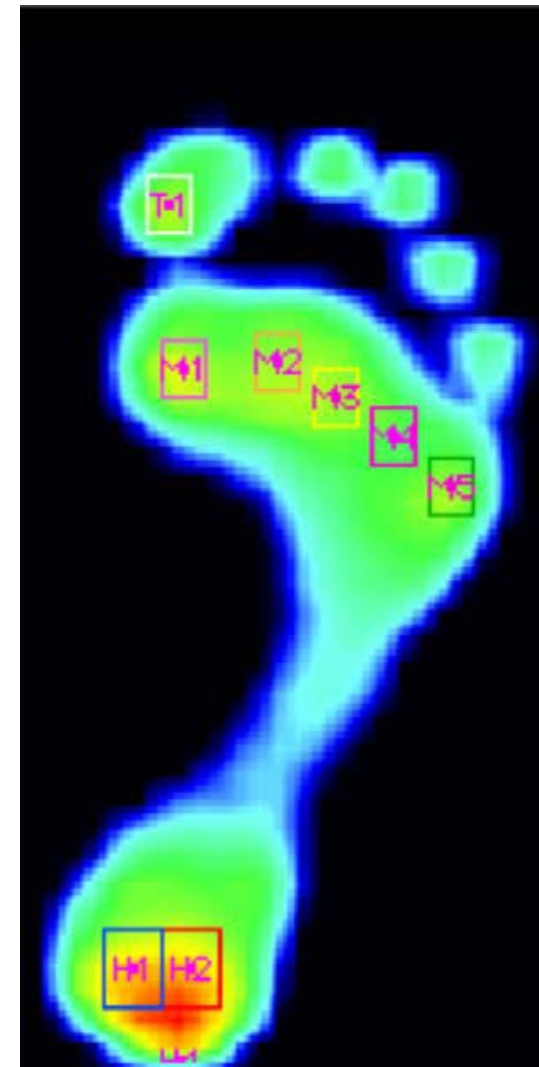
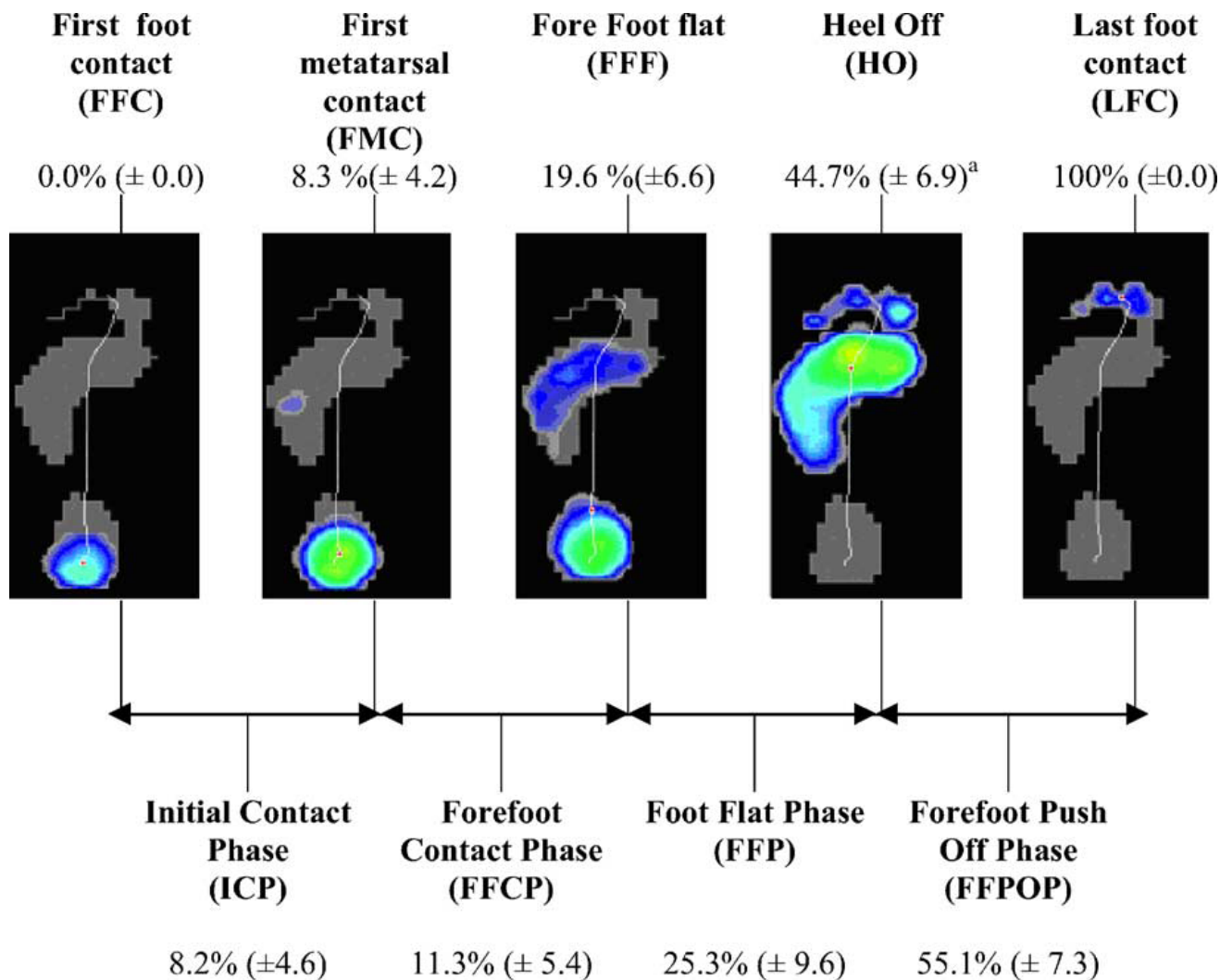
ANÁLISIS MARCHA



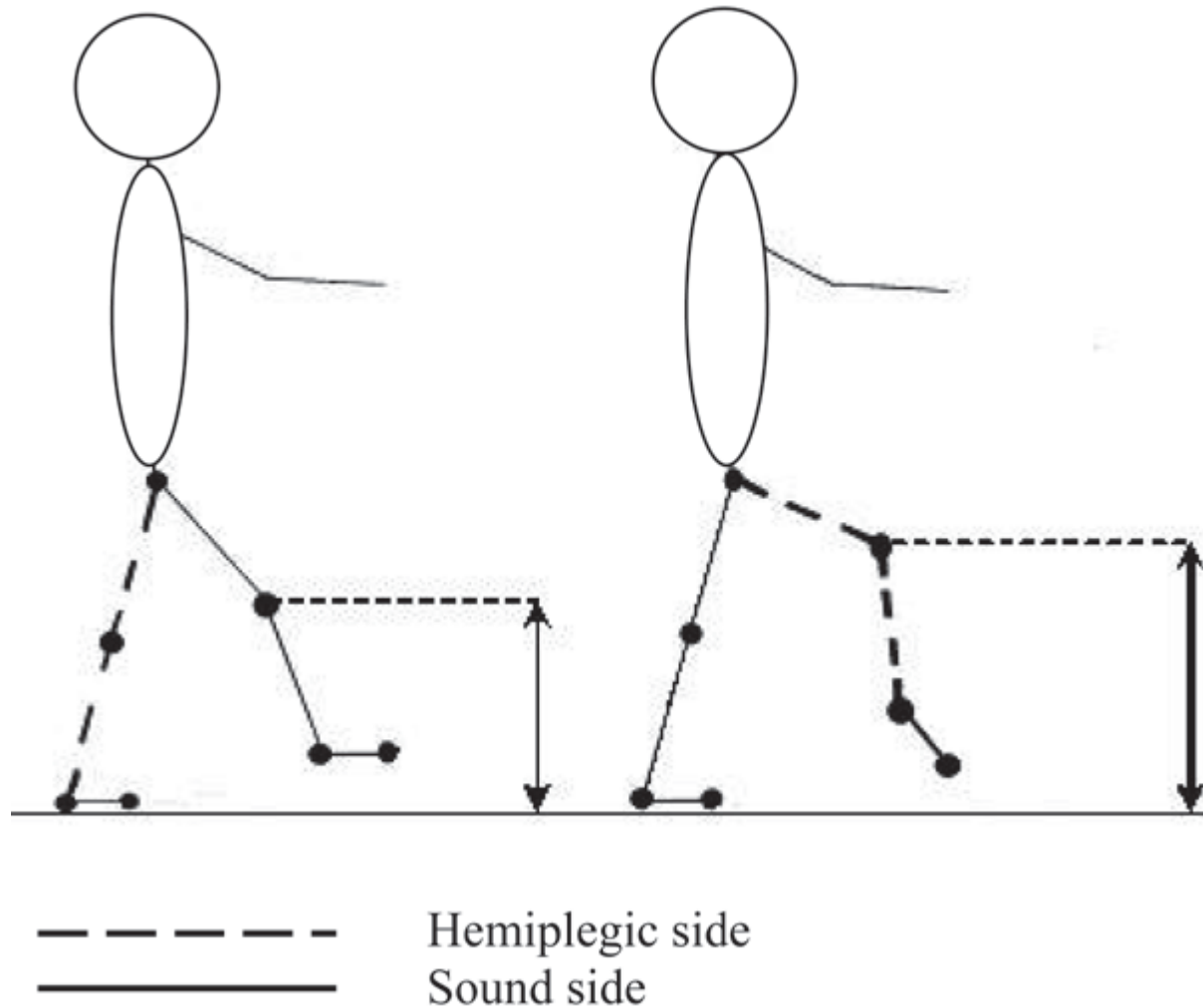
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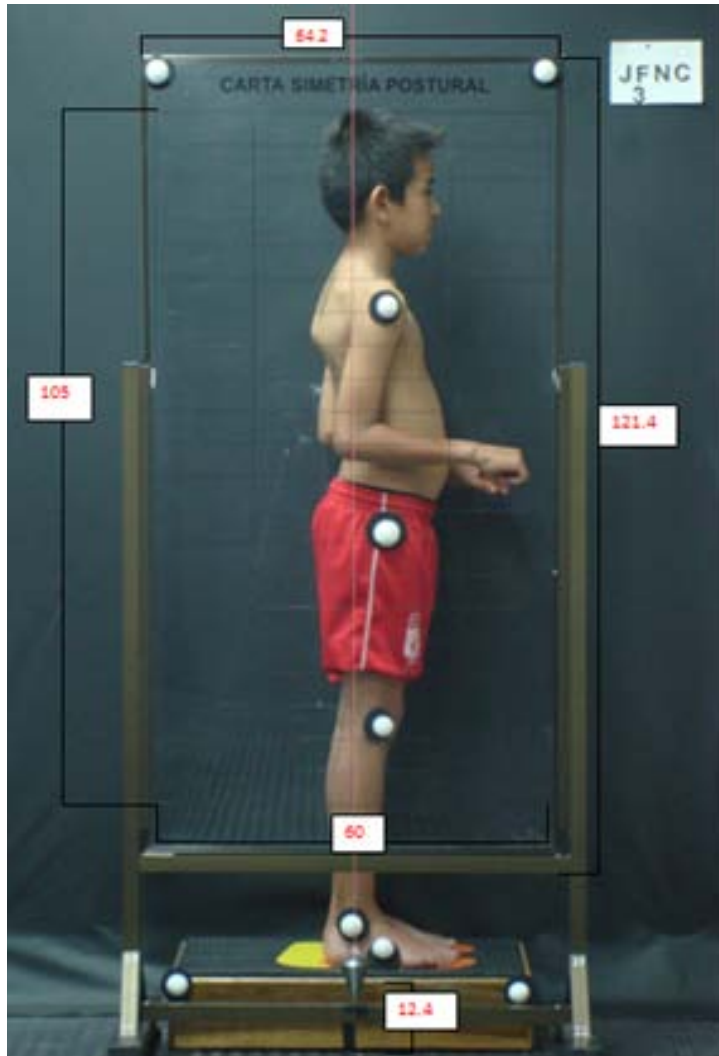
ANÁLISIS MARCHA



ANÁLISIS MARCHA

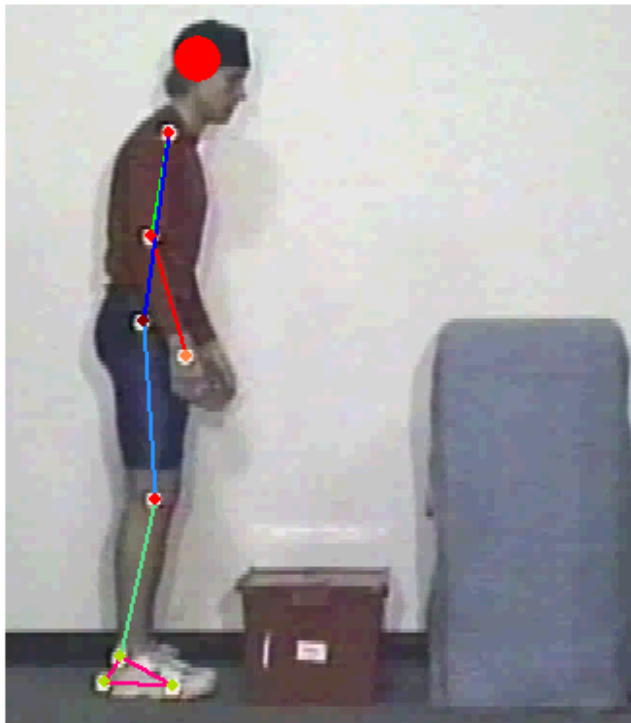


ANÁLISIS POSTURA

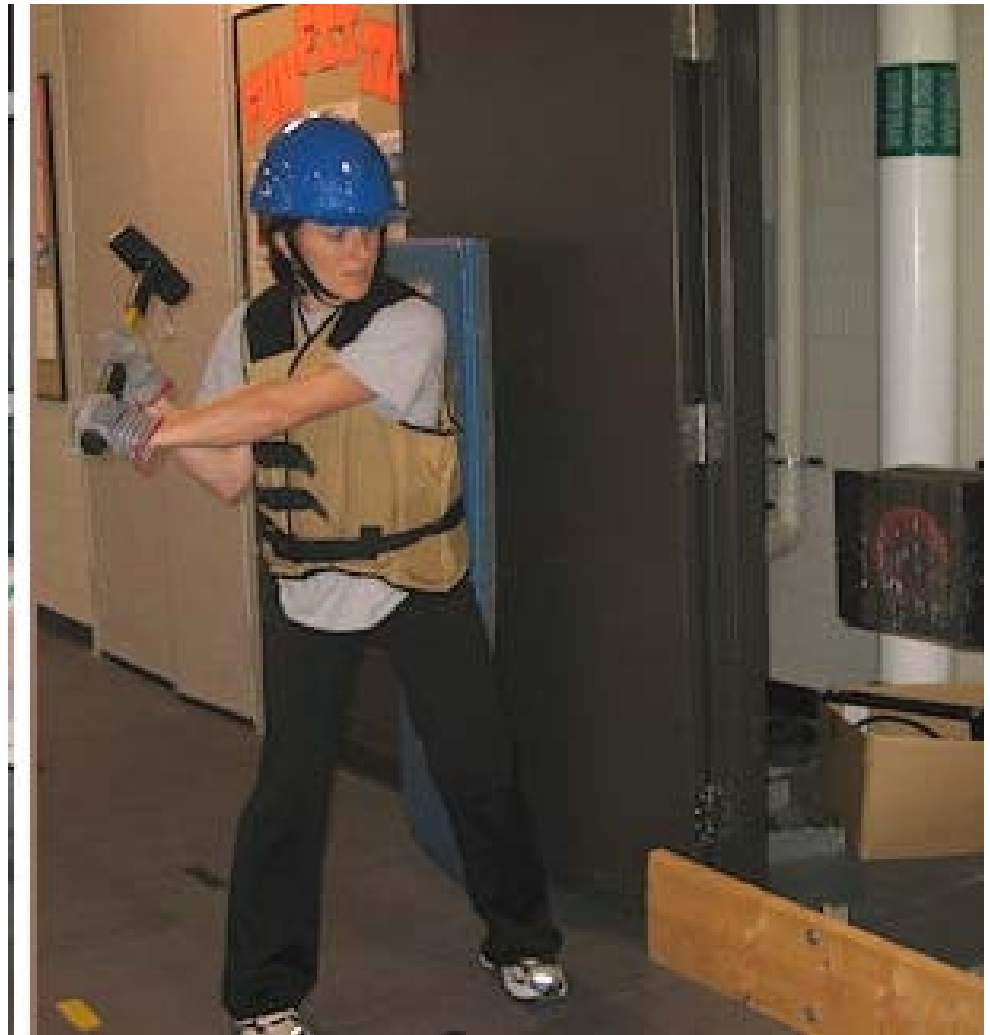


ANÁLISIS LABORAL

2-D Lifting Assessment
Peak Performance Technologies, Inc



	Range	Maximum	Minimum
Trunk to Horizontal Angle	95	82	-13
Knee Flexion Angle	22	164	142
Elbow Flexion Angle	71	163	92

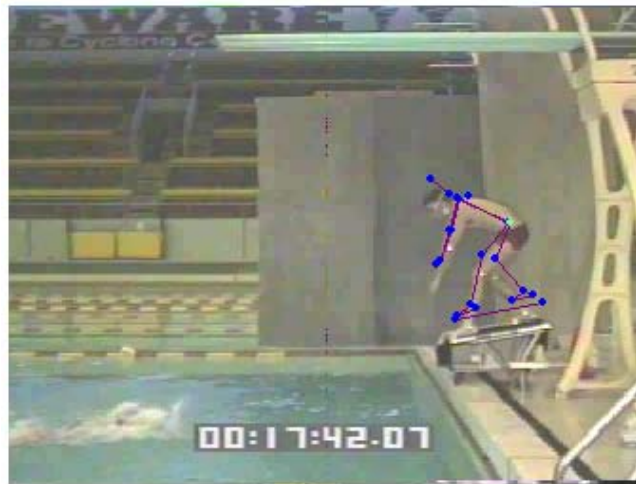


ANÁLISIS TORQUE MUSCULAR

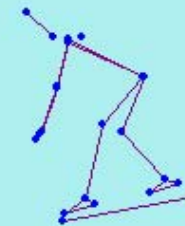


ANÁLISIS GESTO DEPORTIVO

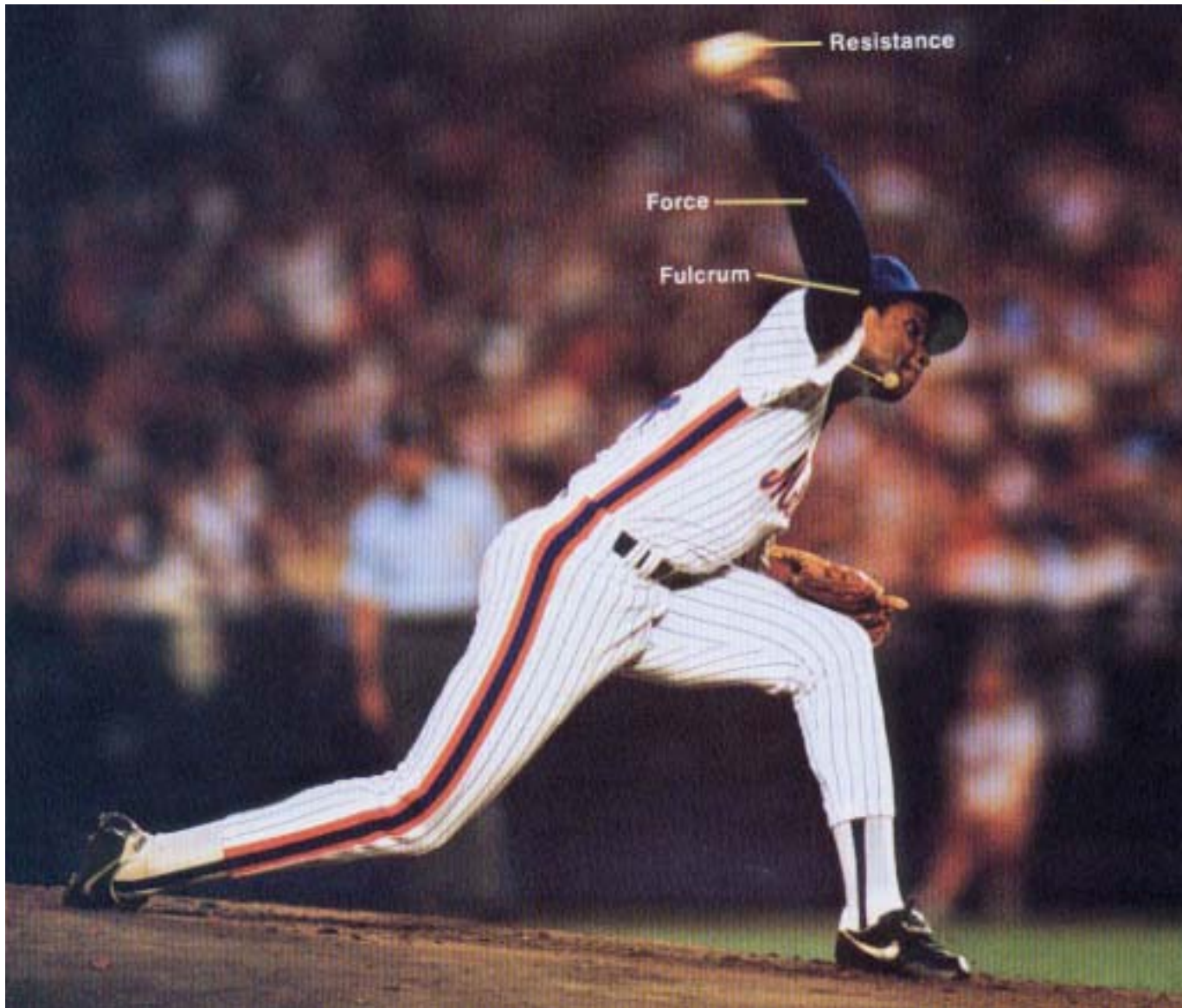
2D RELAY SWIM START



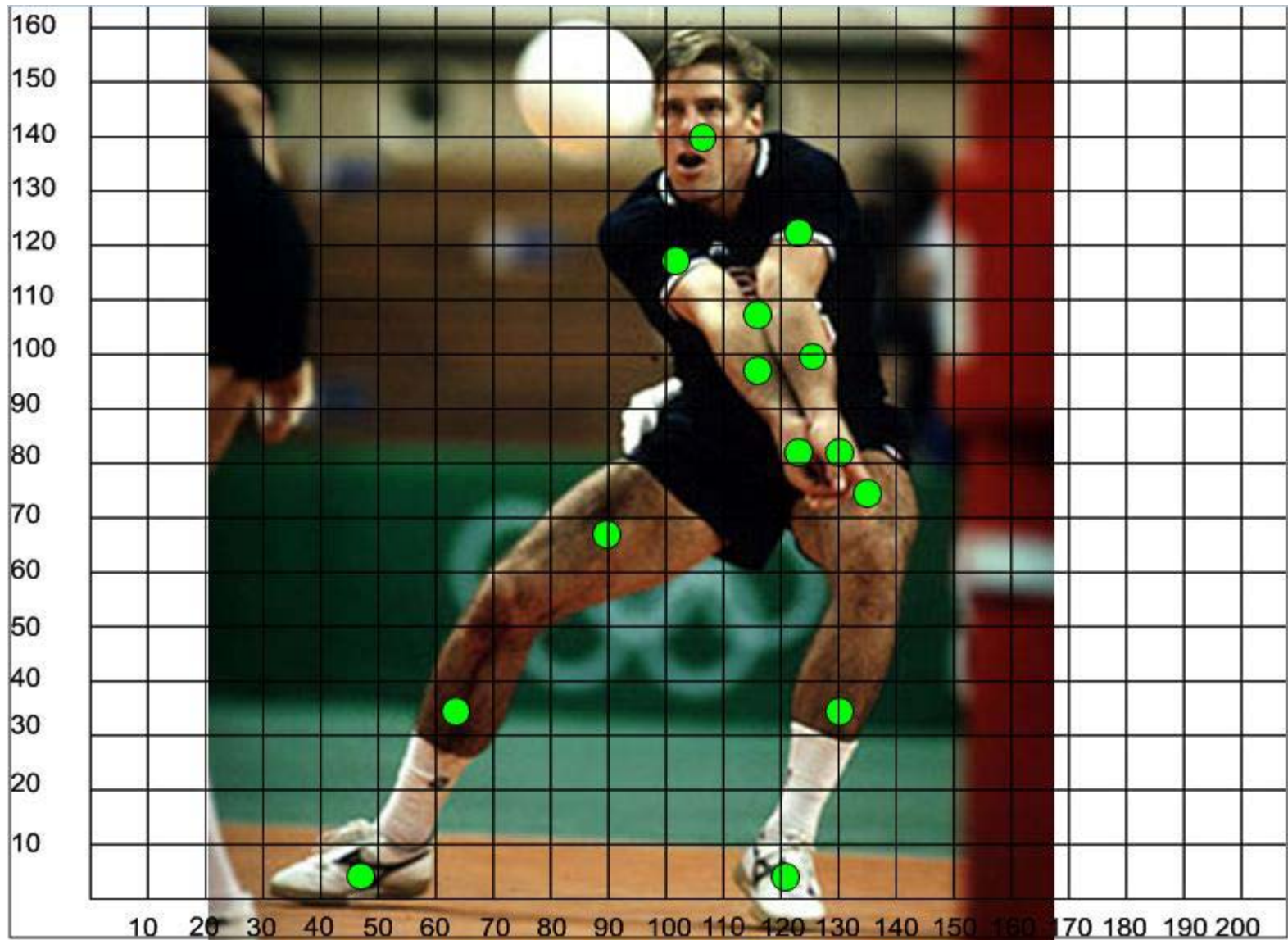
Note velocity vector of sternum shows direction and magnitude.



ANÁLISIS GESTO DEPORTIVO



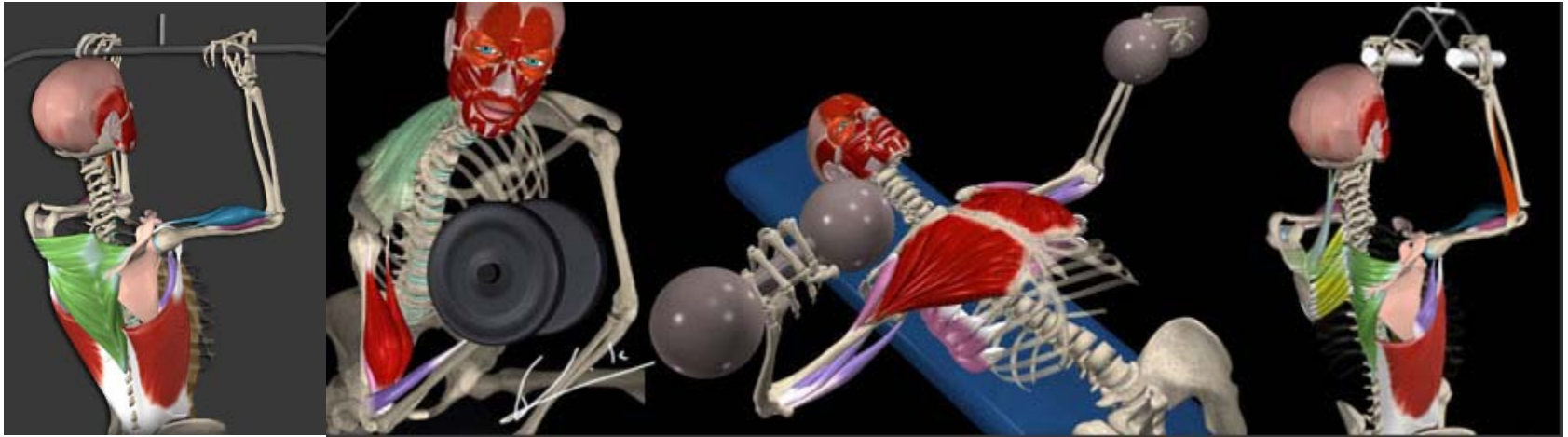
ANÁLISIS GESTO DEPORTIVO



ANÁLISIS CALZADO



ANÁLISIS DE EJERCICIOS



GRACIAS