

Μέθοδοι Βιοκινητικών Μετρήσεων

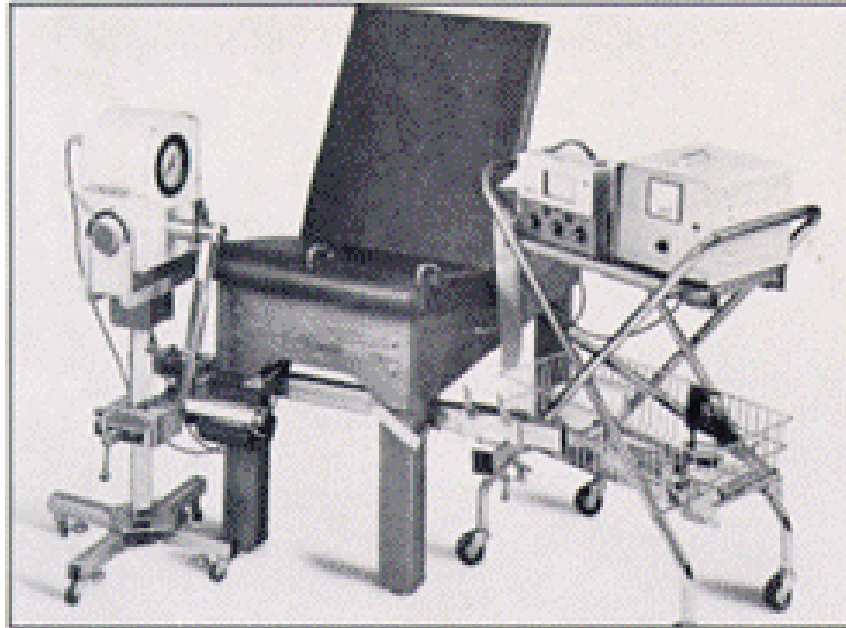
Διάλλεξη 9

Ισοκινητική Δυναμομετρία

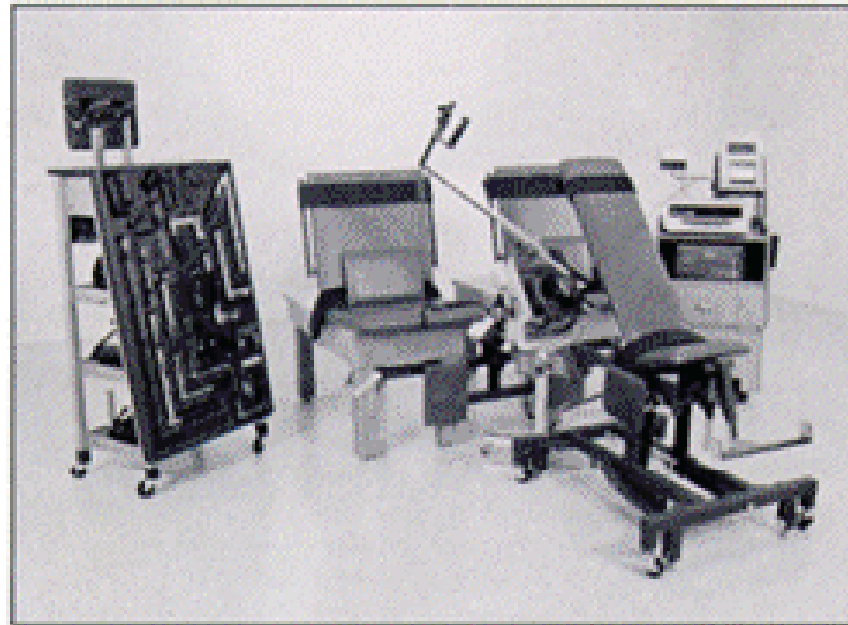
Γιάννης Γιάκας PhD

Theoretical Background

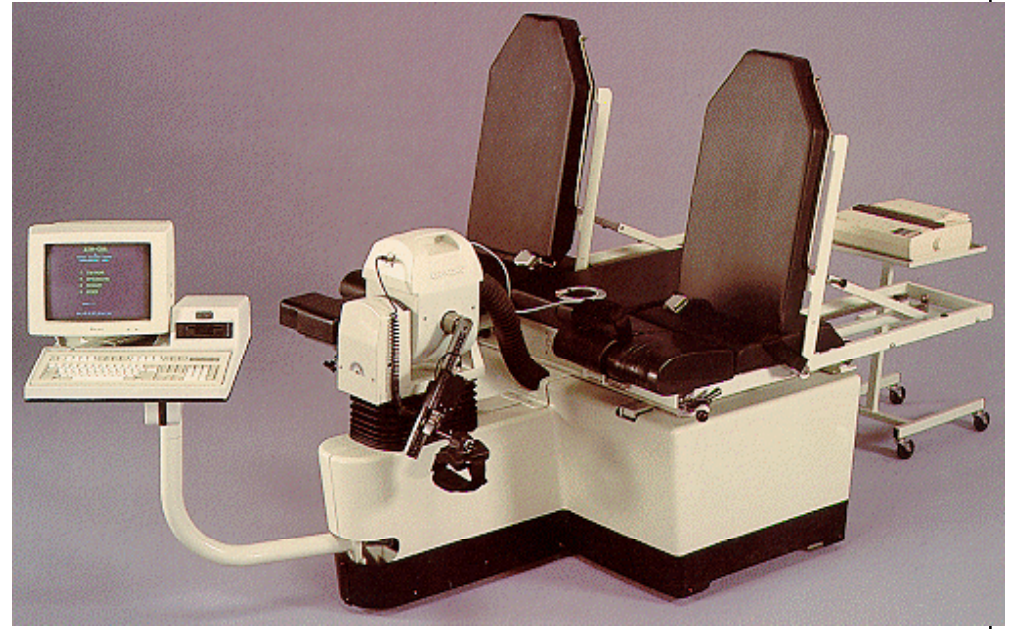
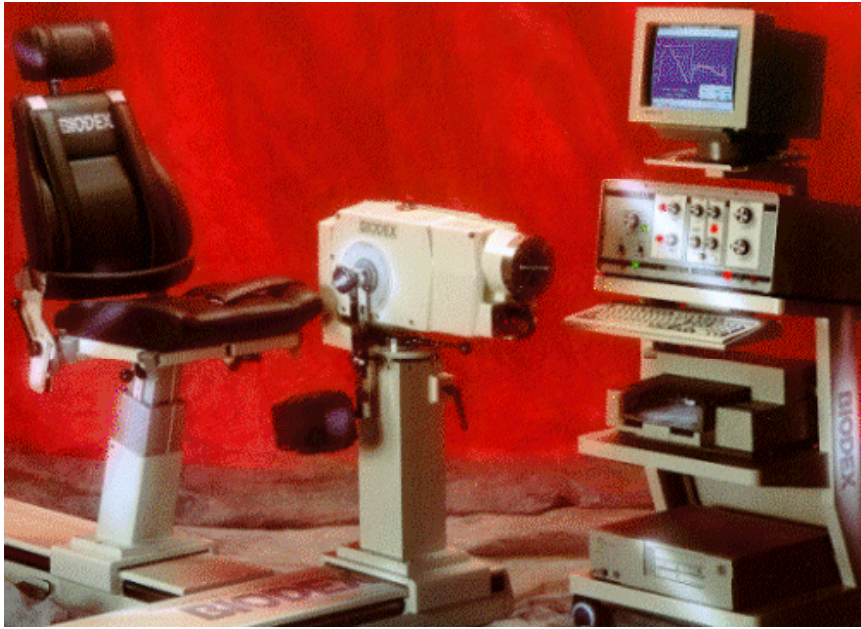
- Introduction
- Mechanical Basis of Isokinetic Dynamometry Measurements
- Different types and operation of Isokinetic Dynamometers



1970: CYBEX I

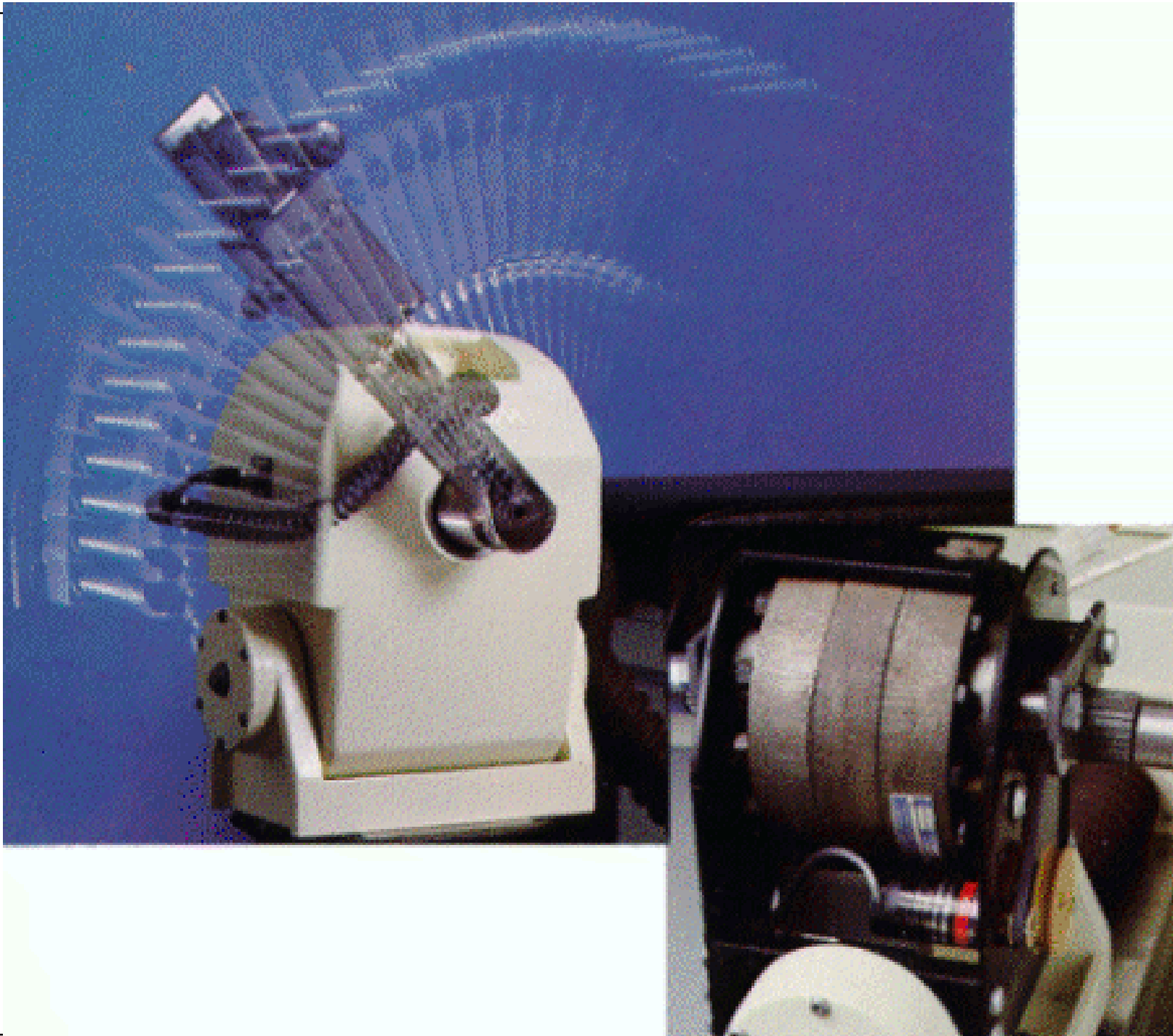


1984: CYBEX II+

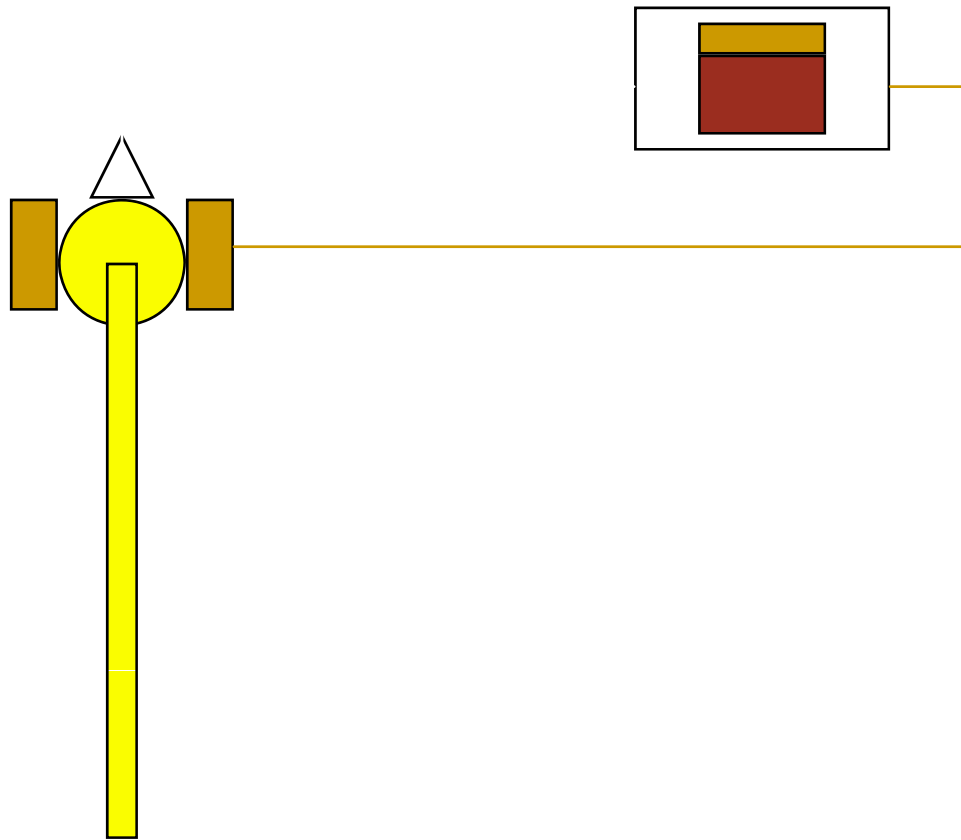


Isokinetic Dynamometry: Single Joint Testing

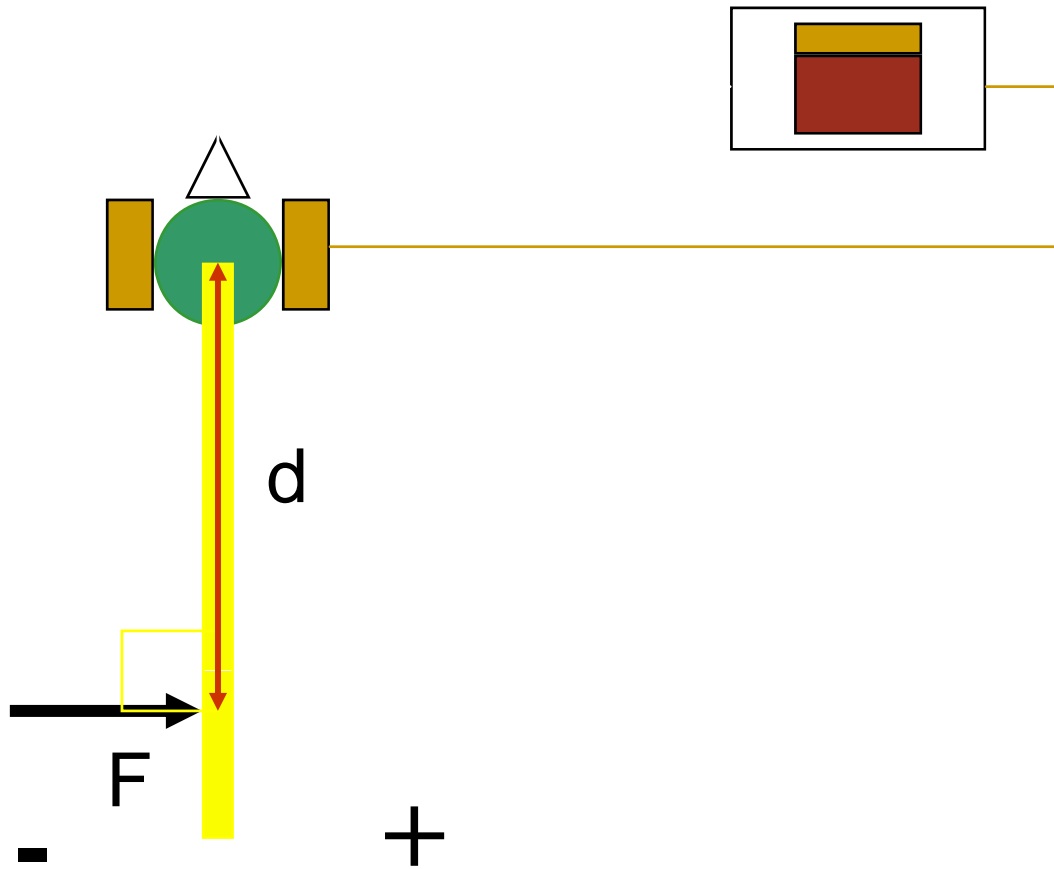


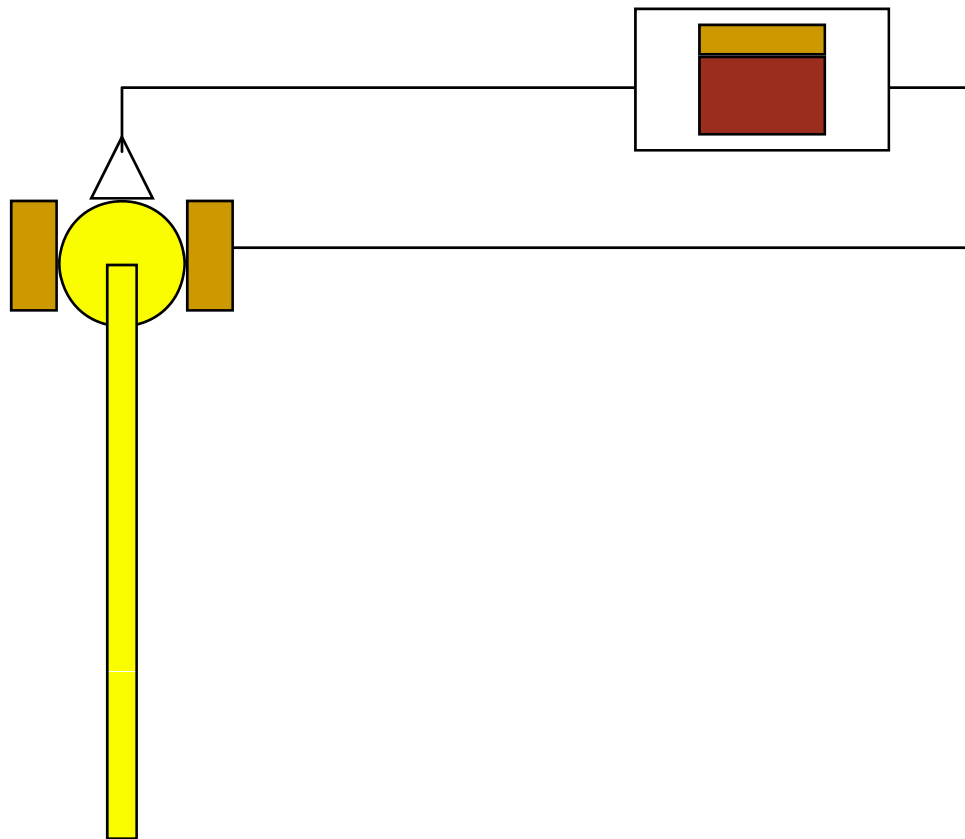


Feedback system to maintain the velocity constant and equal to the required test velocity

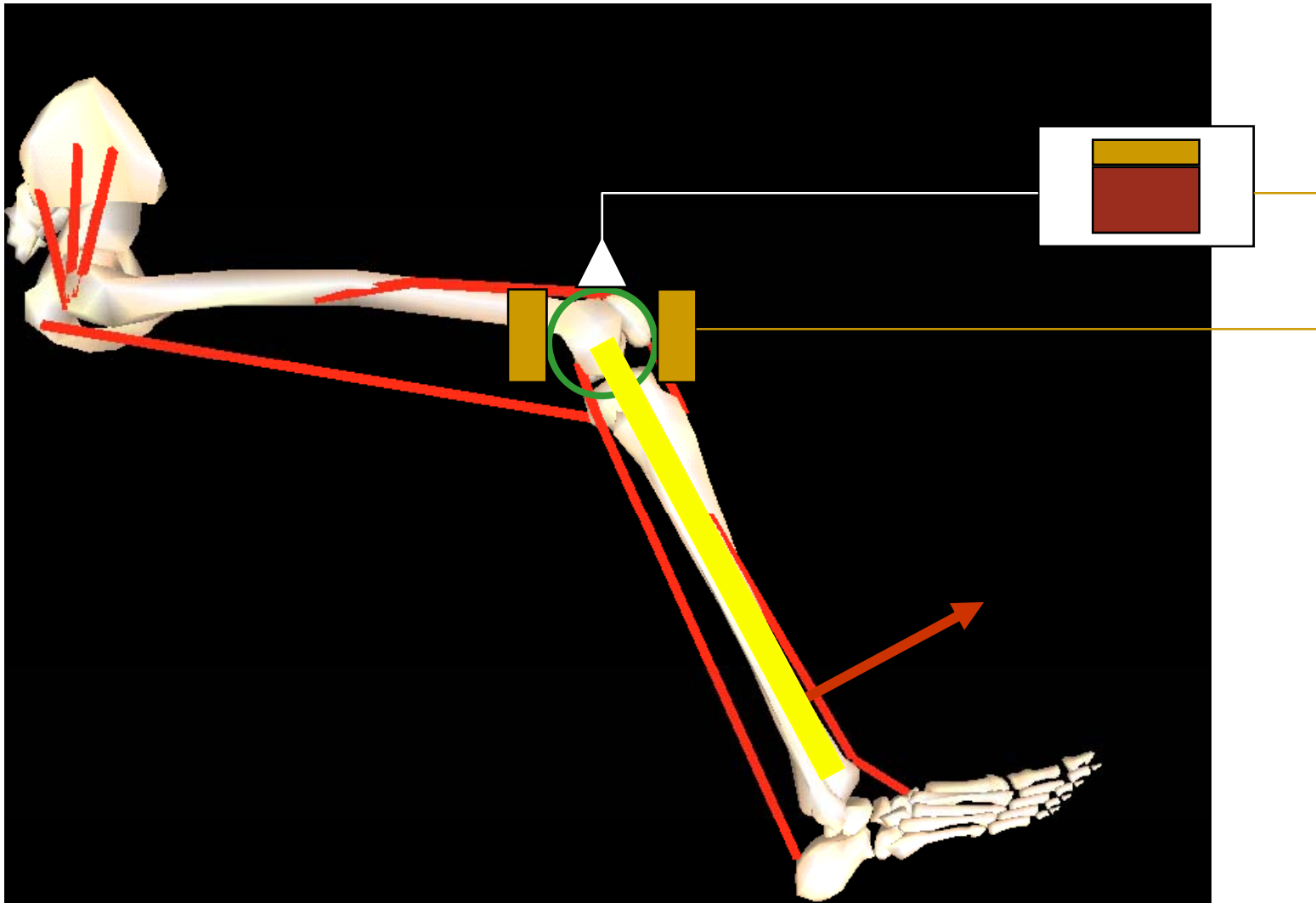


Moment of Force: $M=d \times F$

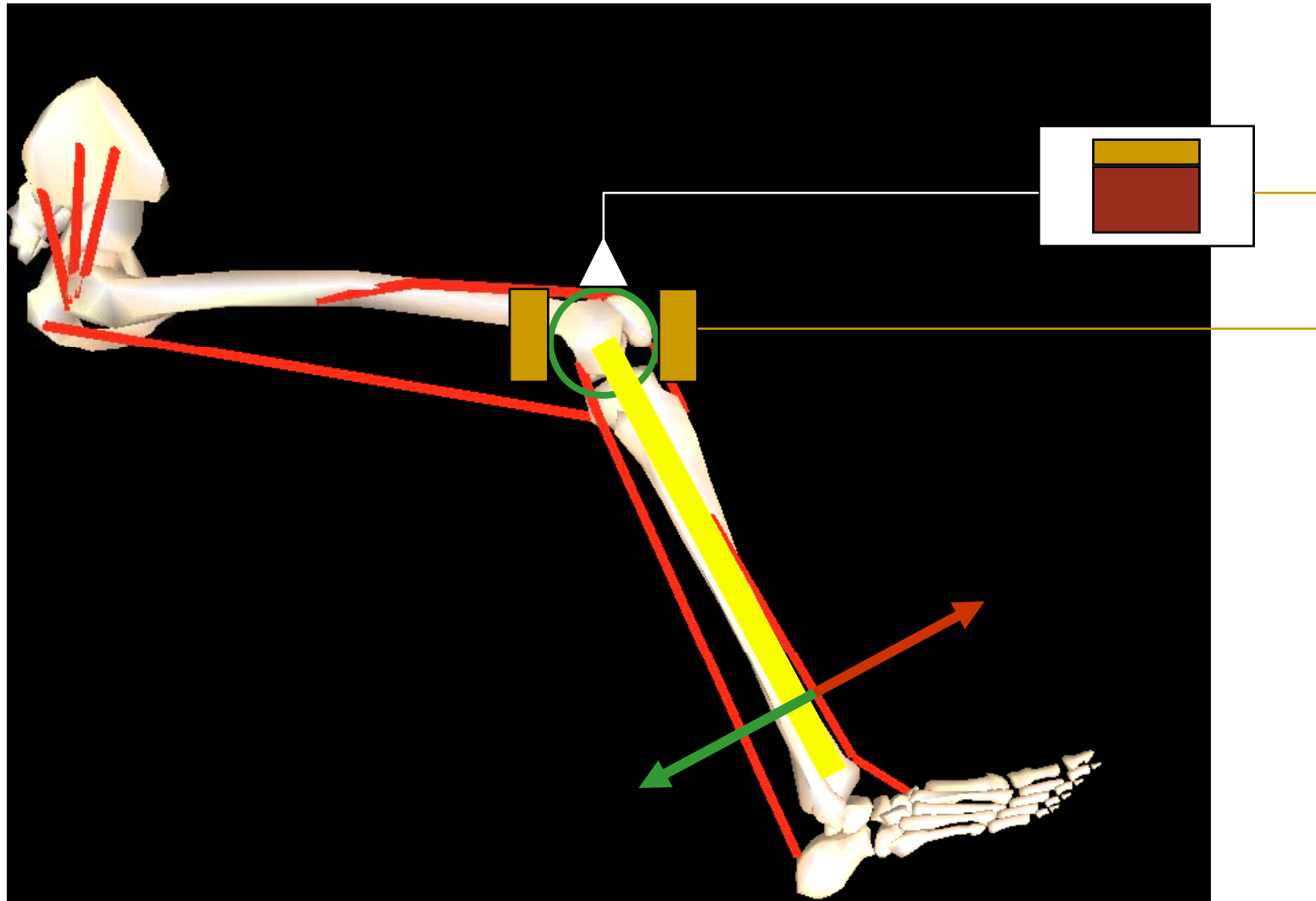




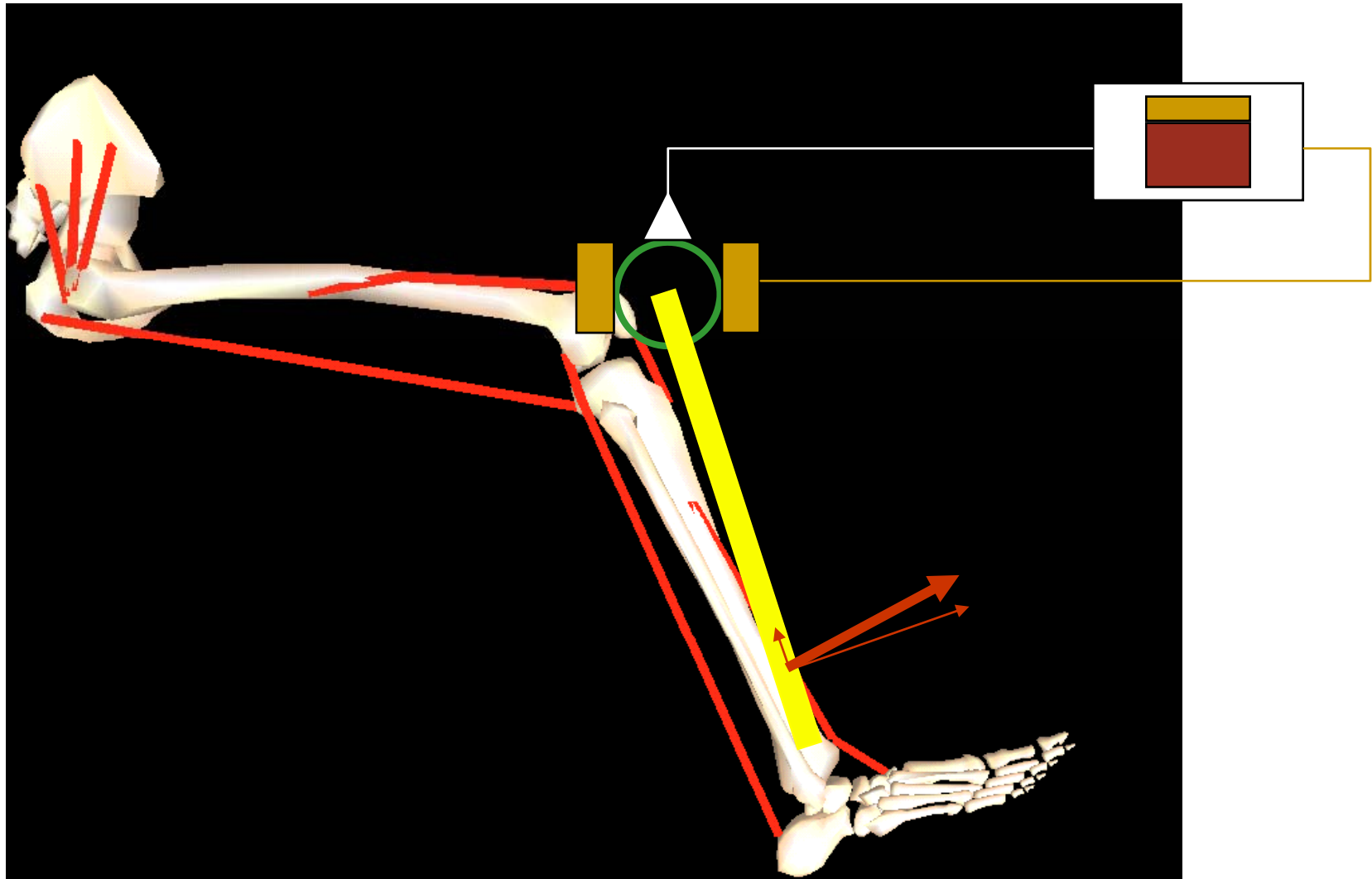
Isokinetic Dynamometry: Constant Joint Angular Velocity



Alignement of axes of rotation



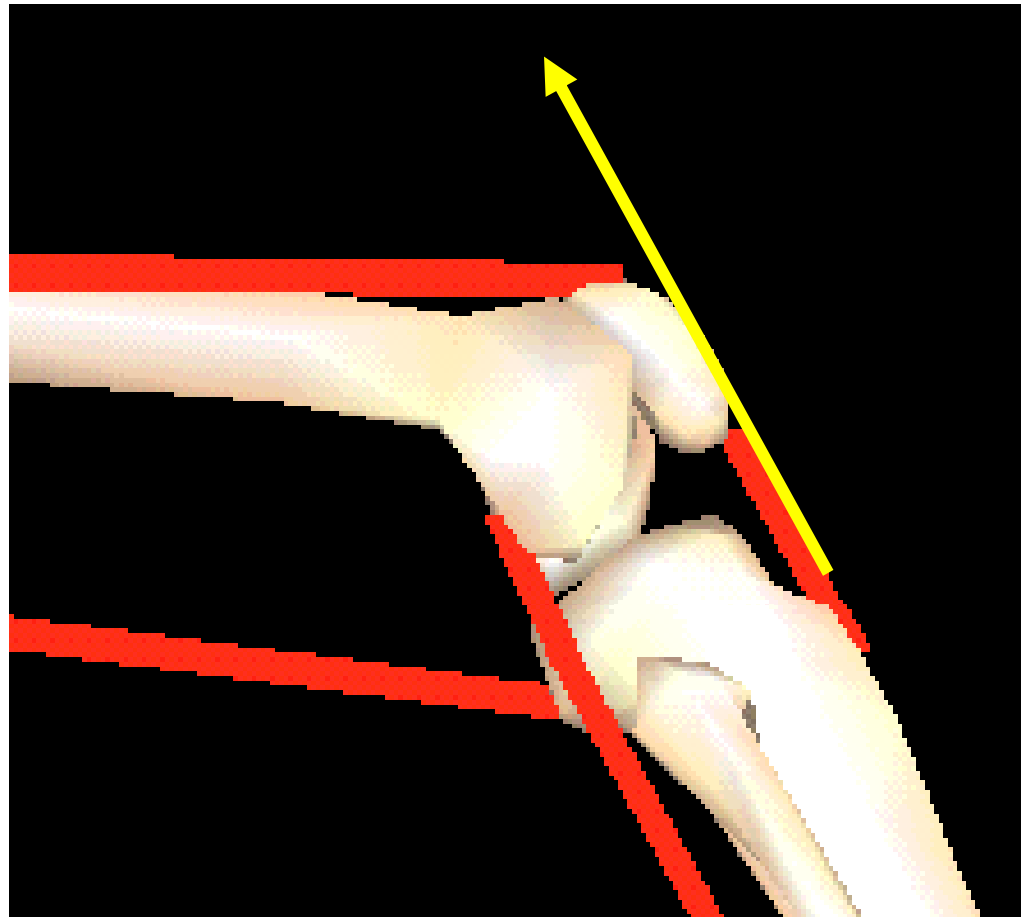
Misalignment of axes of rotation



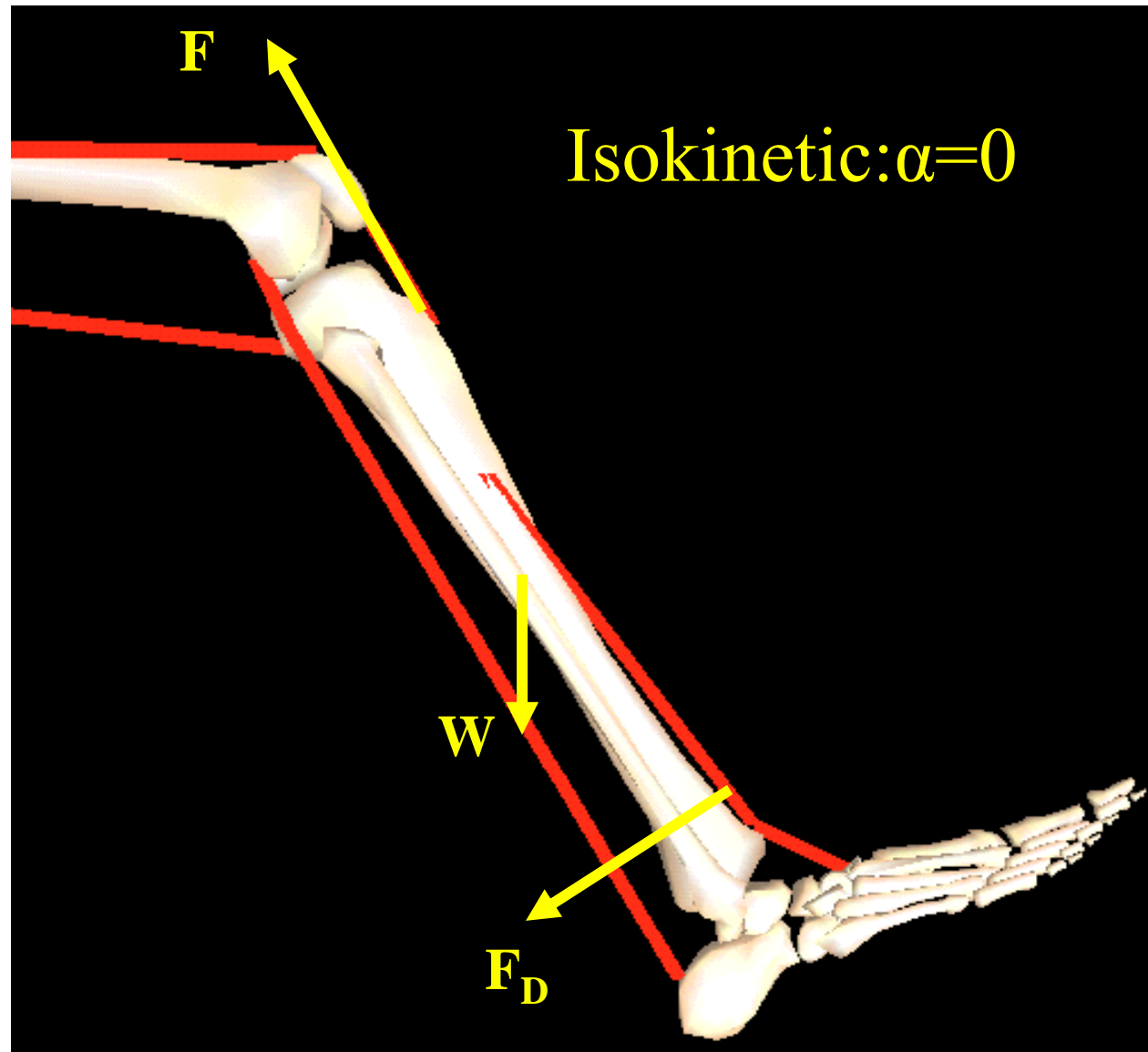
Newton's Laws of Motion

Second Law (Rotational Movement)

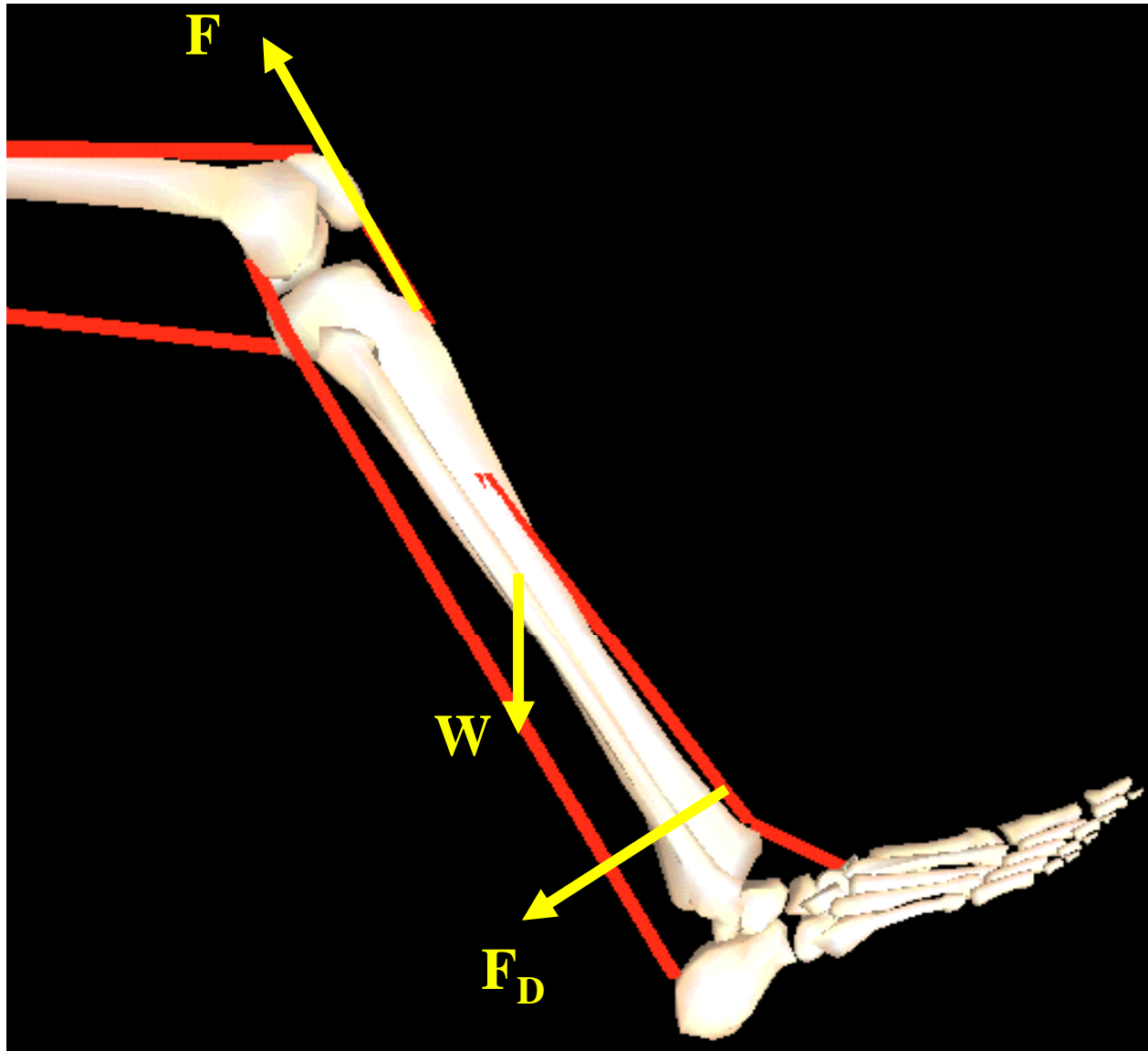
$$\Sigma M = I\alpha$$



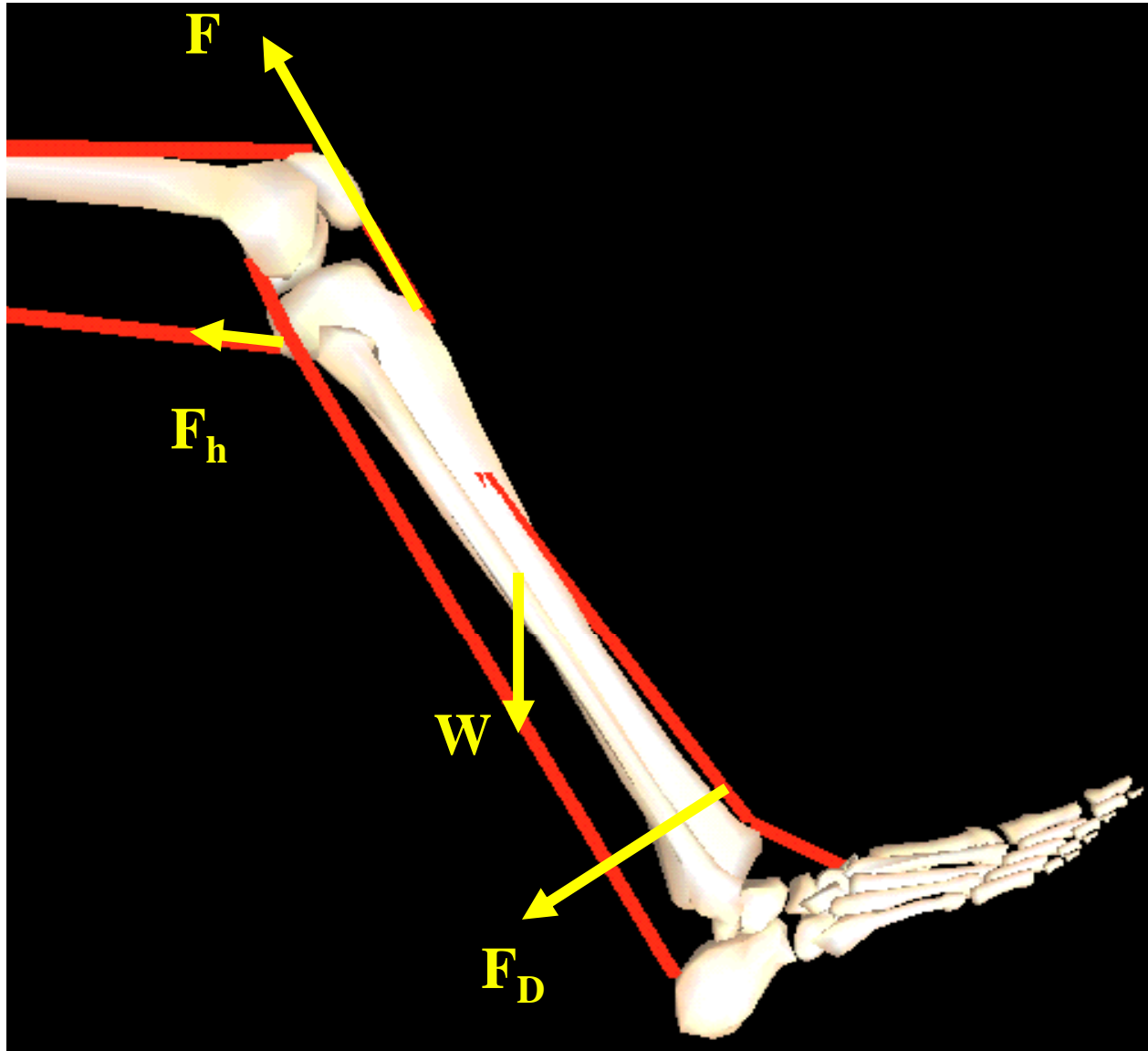
$$M_F - M_D - M_w = I\alpha \Rightarrow M_F = M_D + M_w + I\alpha$$



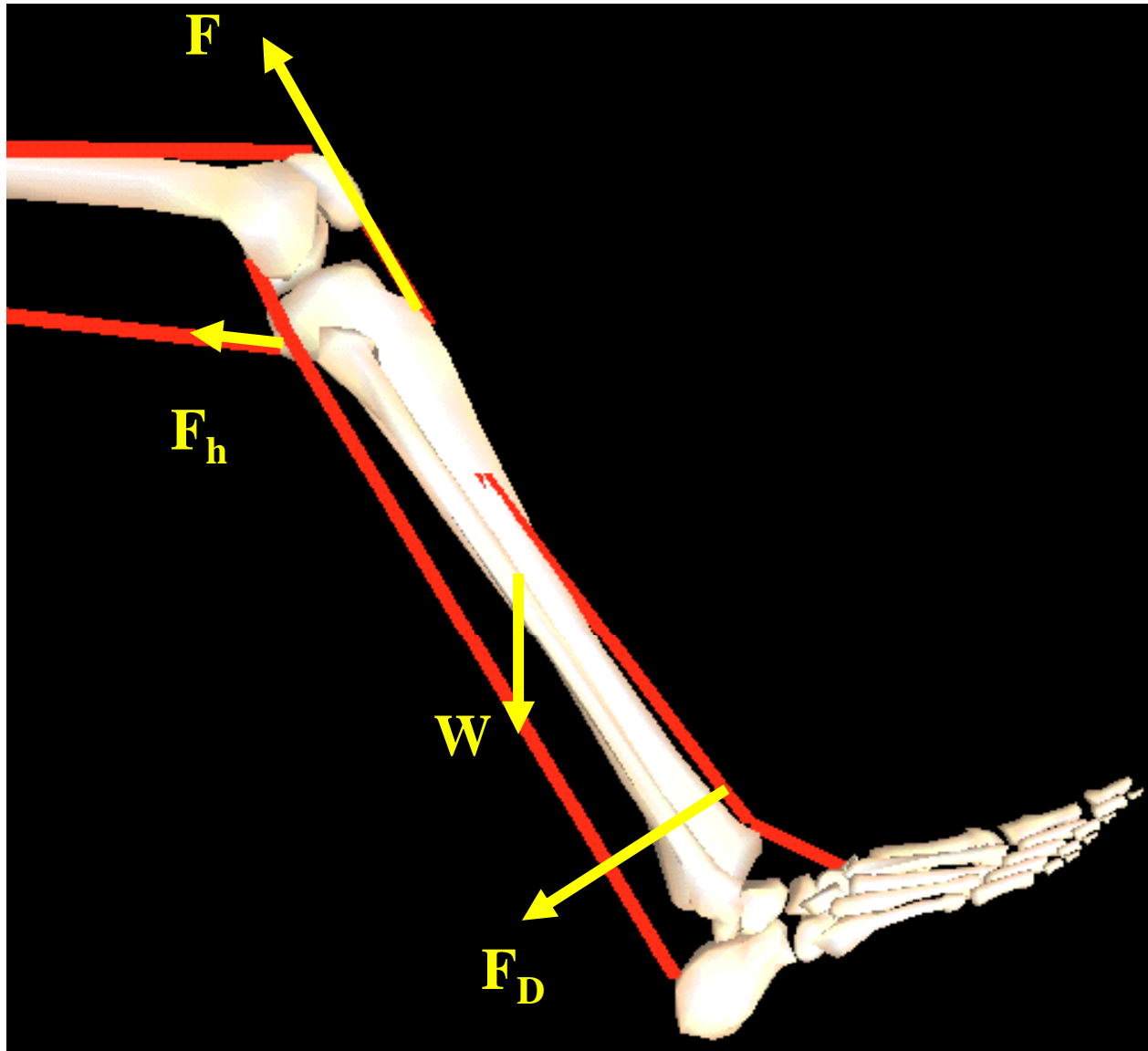
$$M_F = M_D + M_w$$



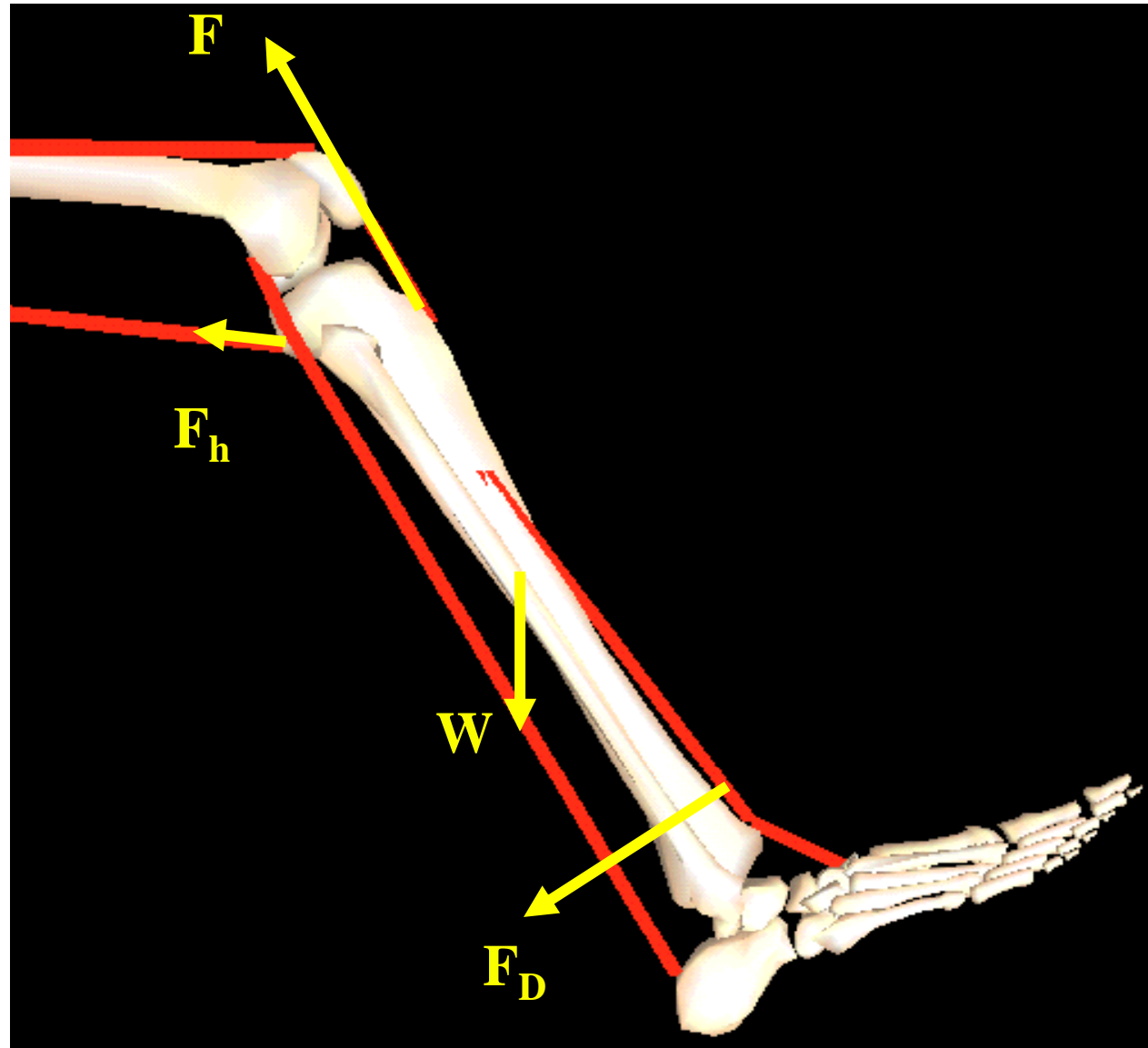
$$M_F - M_h = M_D + M_w$$



$$M_i = M_D + M_w$$



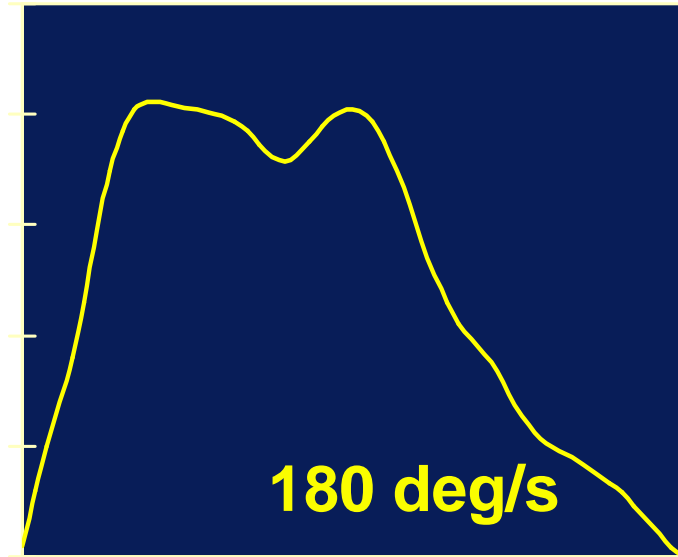
With Isokinetic Dynamometers we can measure total Joint Moments only (not muscle forces)



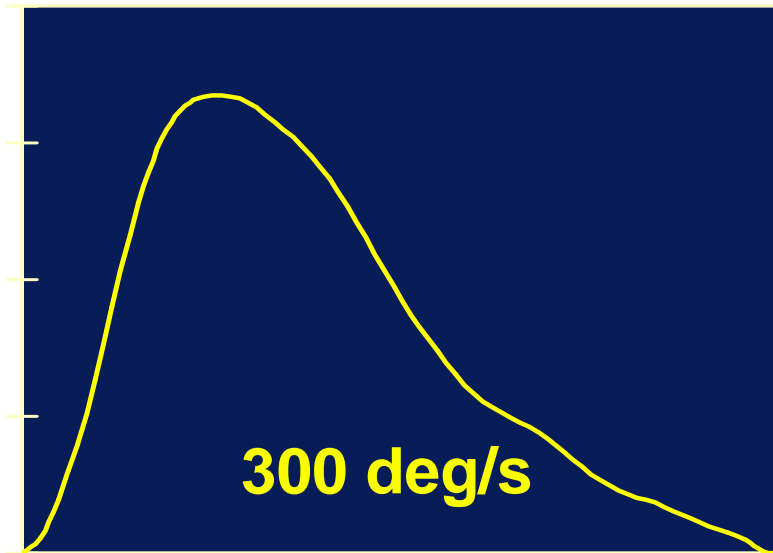




60 deg/s

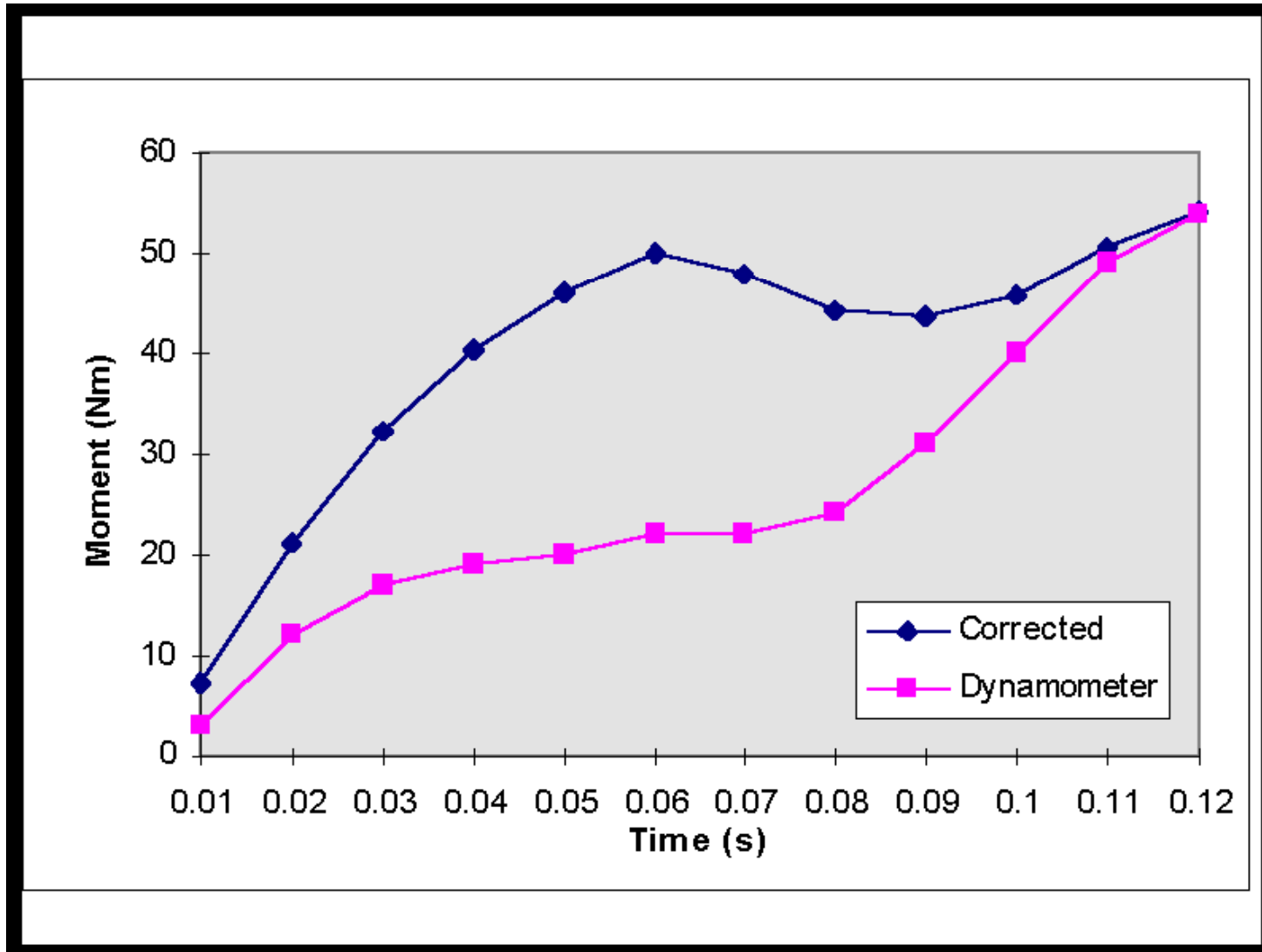


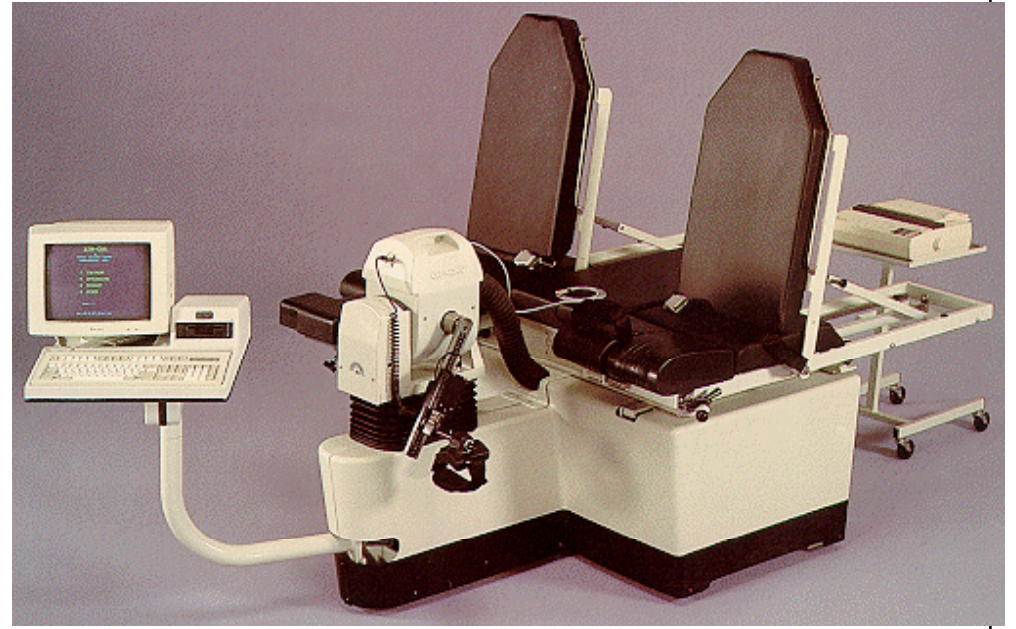
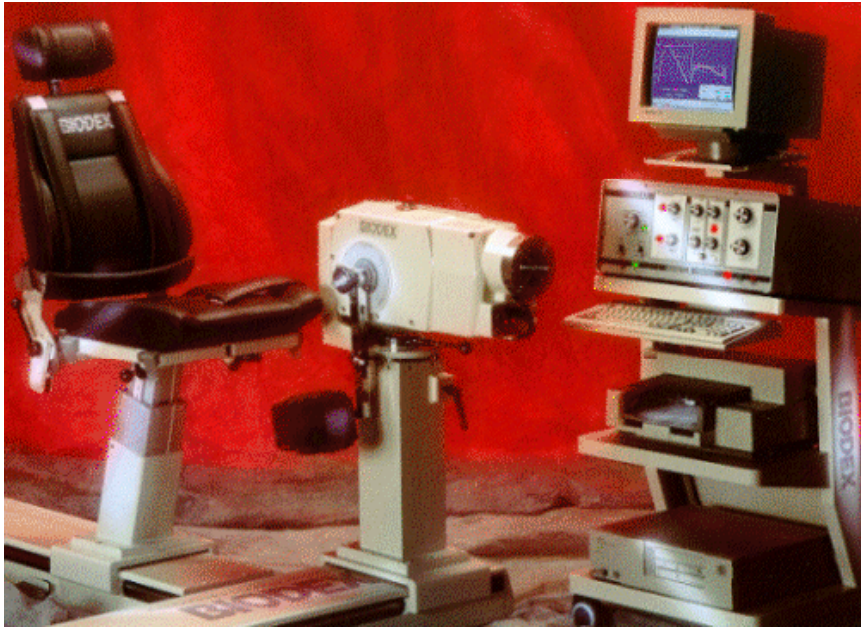
180 deg/s



300 deg/s

Corrected moment during the acceleration period





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