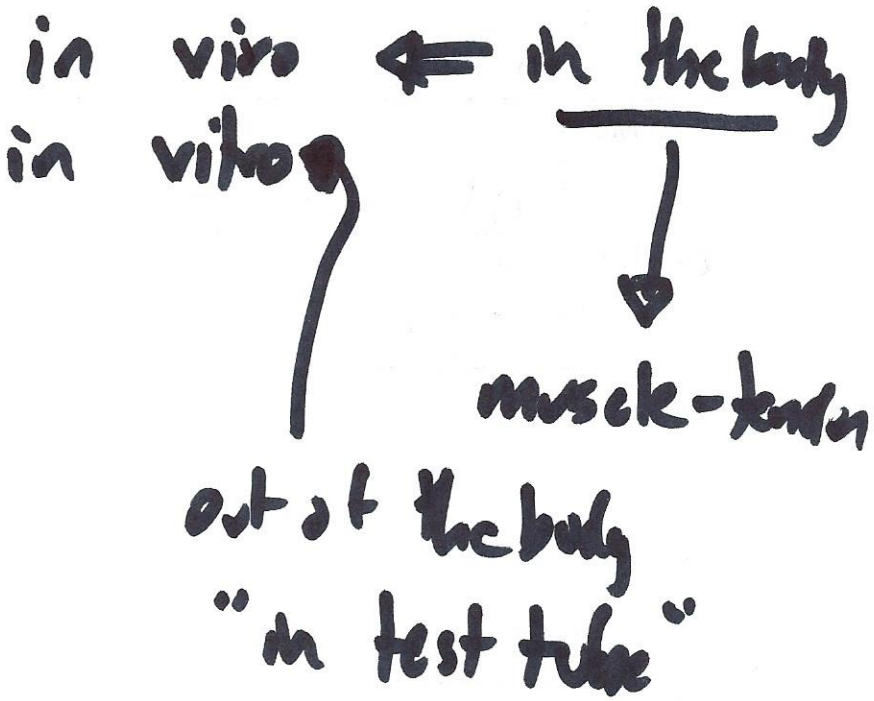
Isokinetics

Concentric Muscle contraction

- Muscle generates force and muscle shortens.



Eccentric Muscle Contraction

- muscle generates force (to try to shorten) but lengthens

Isometric

- muscle generates force but no change in length.

Isotonic

- Same force applied to the muscle.

"Free weights"
The weight is constant

Iso kinetics

- muscle generates a force and the result is <u>constant velocity</u>.

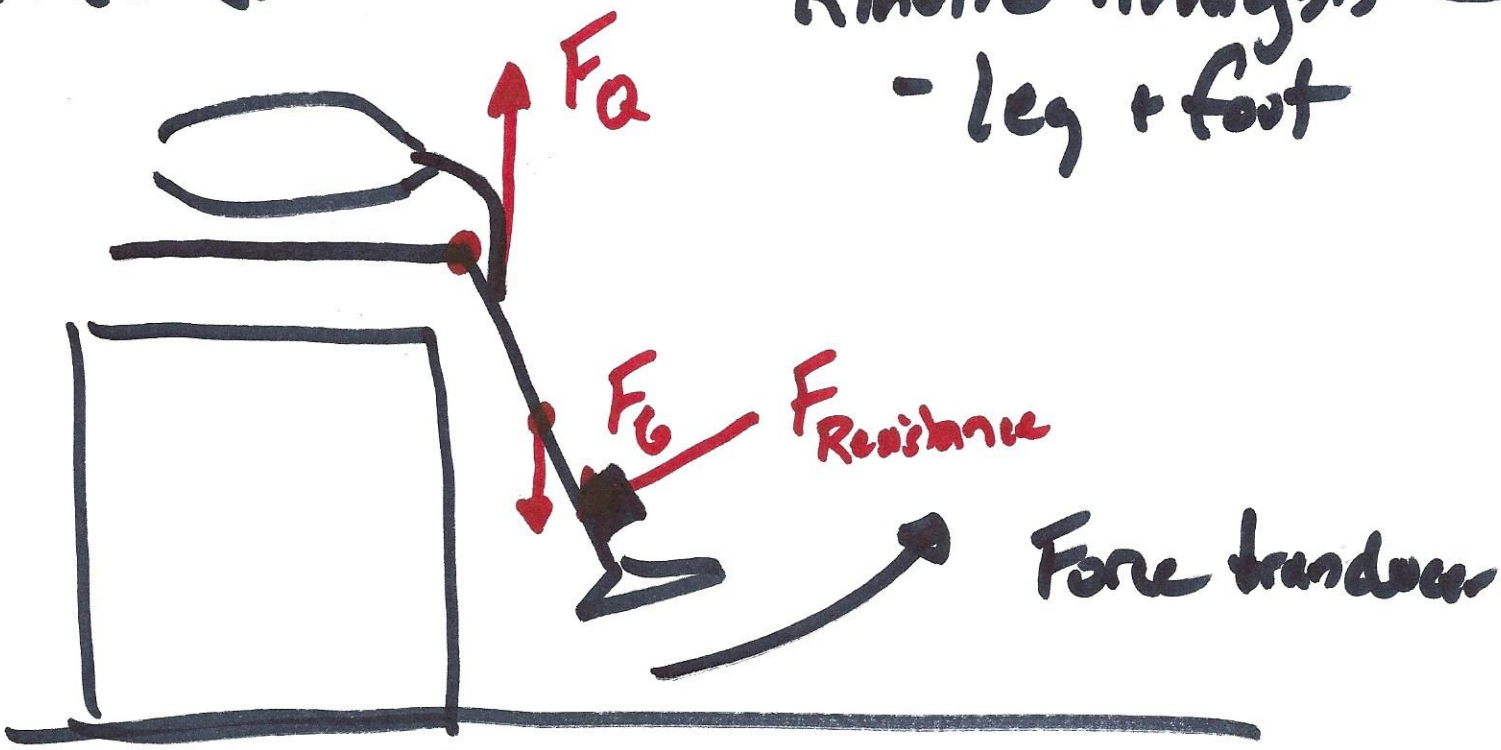
"same force" acting on a limb.

→ ω is constant

∴ $\alpha = 0$ rad/s²

Knee extension

Kinetic Analysis - leg + foot



Angular kinetics

$\Sigma T = I\alpha$

Pushing against a machine (training device)

Torque : $T = Fd_\perp$ units: Nm

I : Moment of inertia $I = \Sigma mr^2$ Kgm^2

α : angular acceleration $\alpha = \frac{\Delta w}{\Delta}$ rad/s^2

$$\Sigma T = I\alpha$$

Isokinetics

$$\Sigma T = 0 \quad \text{N·m}$$

Torque due to F_Q $= T_Q$

Torque due to Gravity $= T_G$

Torque due to Machine $= T_R$

$$T_Q = +(F_Q \, d_{\perp Q})$$

$$-T_G = -(F_G \, d_{\perp G})$$

$$-T_R = -(F_R \, d_{\perp R})$$

$\Sigma T = I\alpha = 0$ Nm (b)

$T_a + (-T_G) + (-T_R) = 0$ Nm

$T_a = (T_G + T_R)$

T_a: muscle torque

$(T_G + T_R)$: Resistance torque

Resistance torque: measure

$=$

Isokinetics

→ ω = constant

$\alpha = 0$ rad/s²