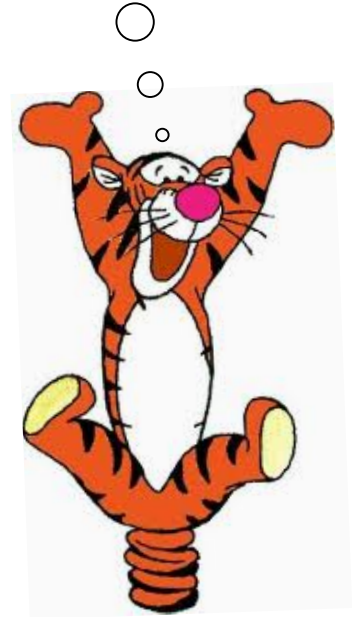
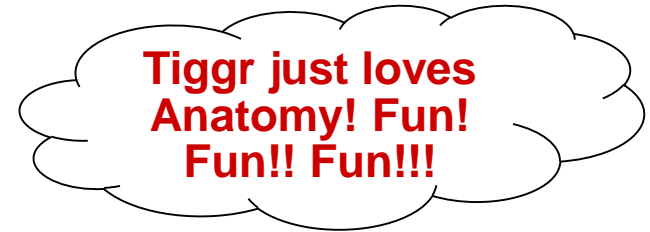




... This Thursday Upper Extremity Bones +
Drew Brandel from 1st Yr Programs visits.
Next Thursday 1st Annual Group Activity
Anatomy & Physiology Quiz Bowl!

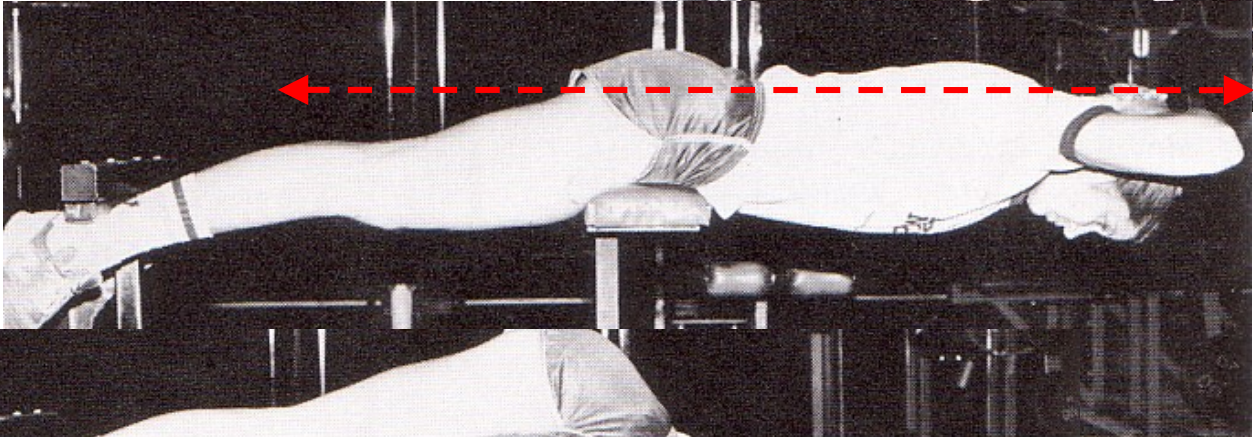
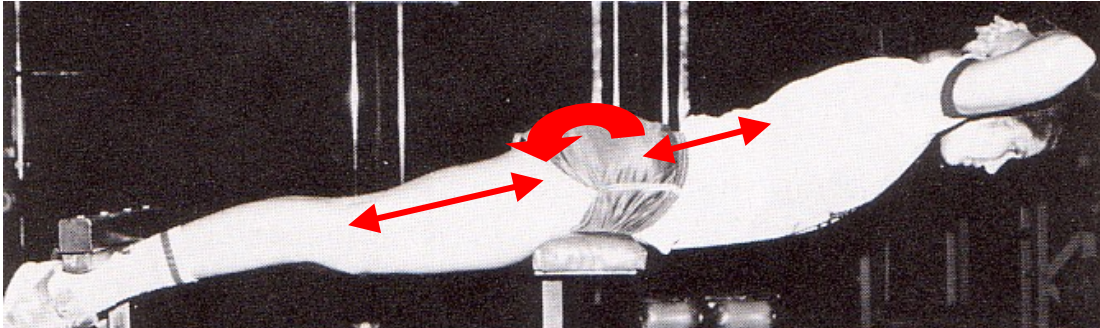
BI 199 APWT Discussion 8

- I. Announcements Update on poster outline feedback!**
- II. Lower Back & Hip Exercise Anatomy**
 - A. Back extension**
 - B. Lower back & hip anatomy**
 - C. Russian dead lift vs. good morning?**
- III. Advantages of Dumbbells**
- IV. Abdominal Exercise Anatomy (Review)**
- V. Exercise Classification Systems**
Isometric, isotonic, DAR, isokinetic
- VI. Group Overview of Presentations**

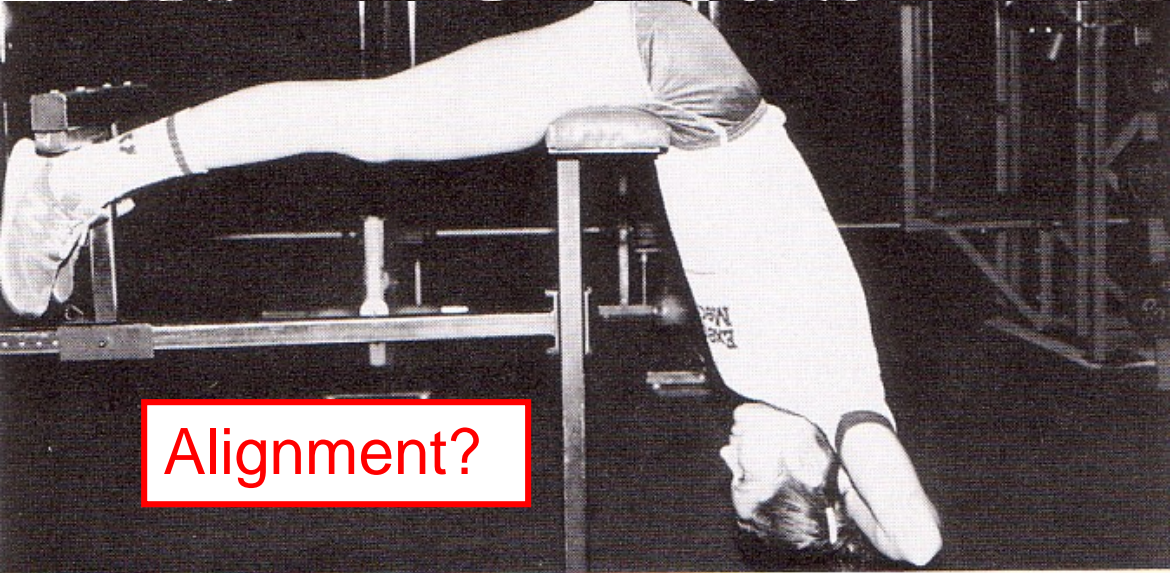


Back Extension

Lower back
Hip
Back of thigh



Beginners
beyond here?



Erector spinae
Gluteal group
Hamstring group

Russian/Straight Leg (Knee) Dead Lift (RDL)

NB: Best bent or soft knee!



SOURCE: www.fitworkz.com

Use Dumbbells to:

1. Start w/↓ weight
2. ↑ control, *cf.* COG
3. ↑ balance
4. ↑ small incremental resistance

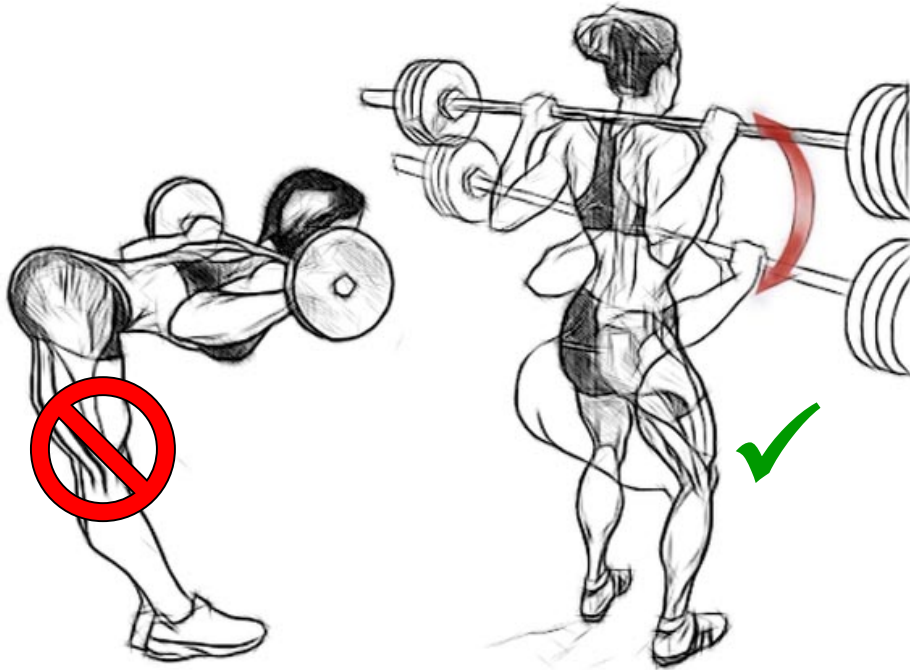


NB: Want curved or tip up!

Dumbbells enable independent, unilateral, multi-planar, resistance exercise, more akin to daily life movements!

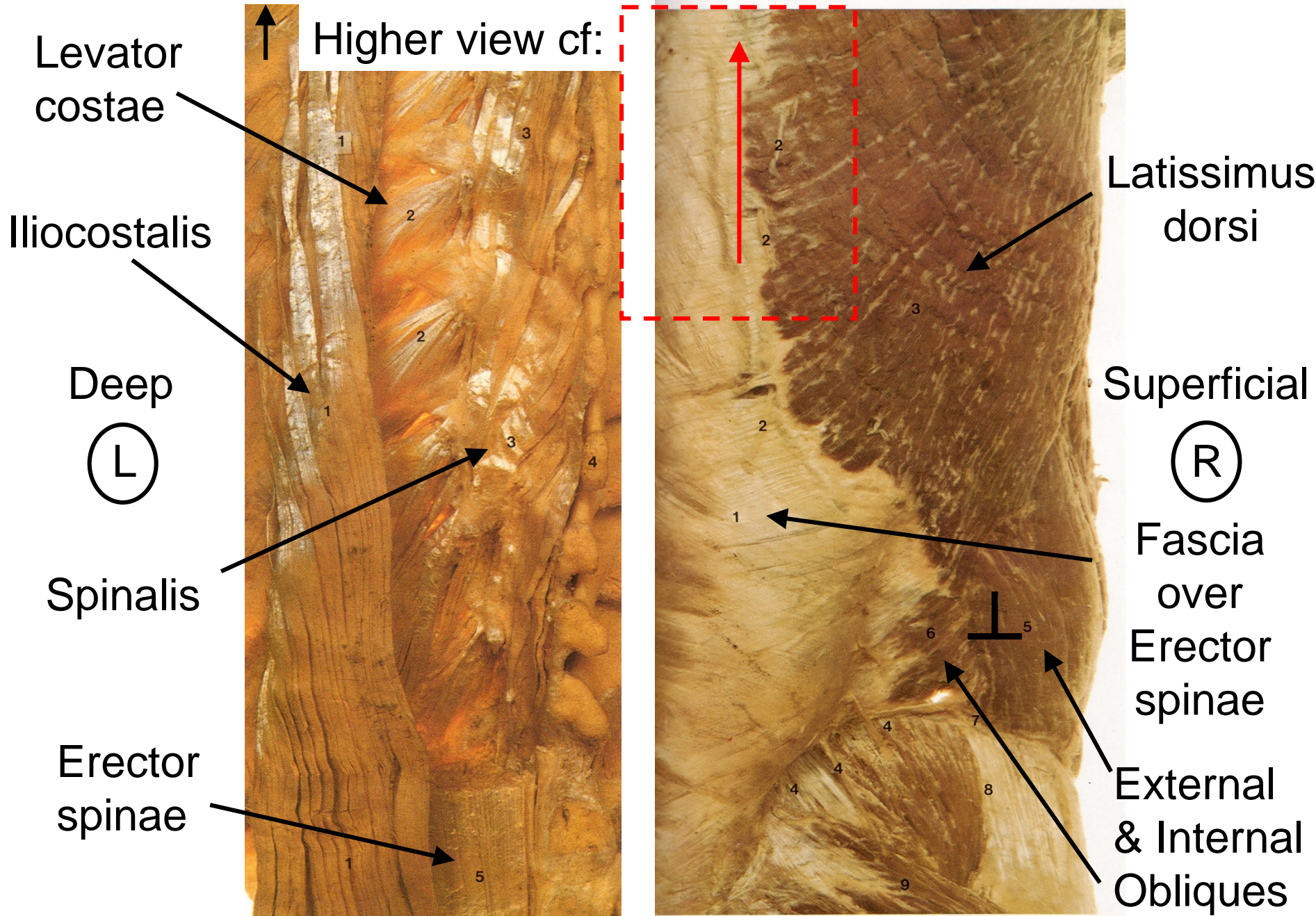


Good morning?

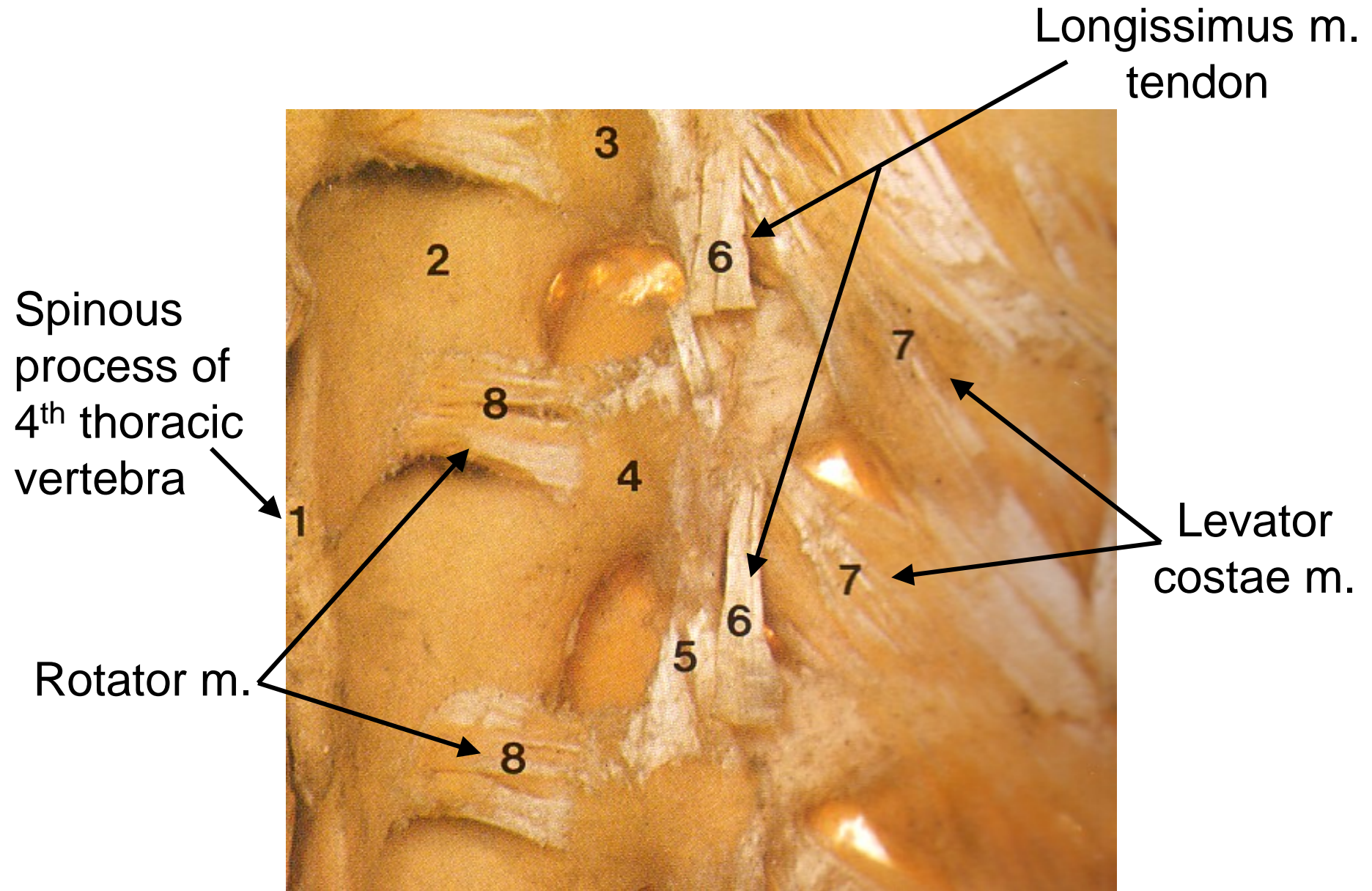


Always soft knees!

Lower Back Muscles

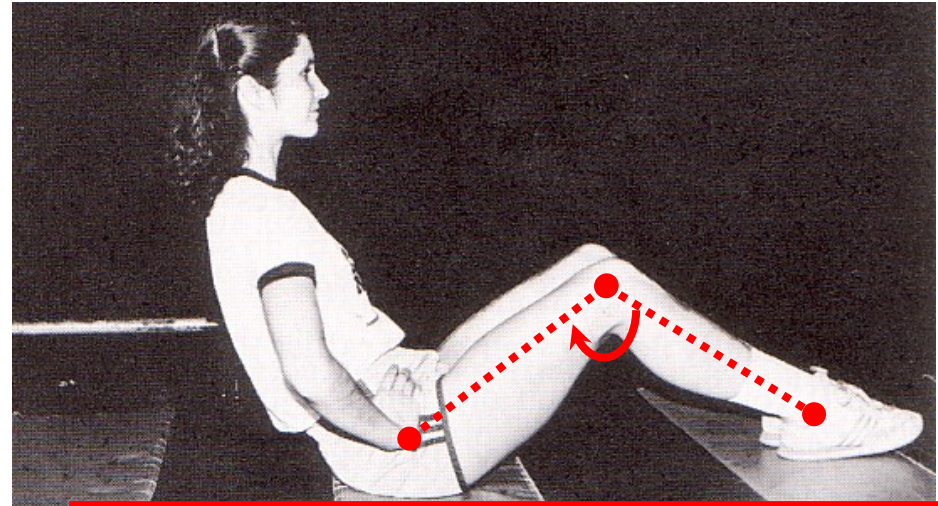


Deep Upper Back Muscles, (R) Thorax/Chest



Sit up or Curl up

1. Feet unanchored
2. Chin to chest (gently)
3. Trunk up to only 35-45°, otherwise activate iliopsoas
4. To keep feet down, activate hamstrings so inhibit quadriceps, thus ↑ abdominal activation!

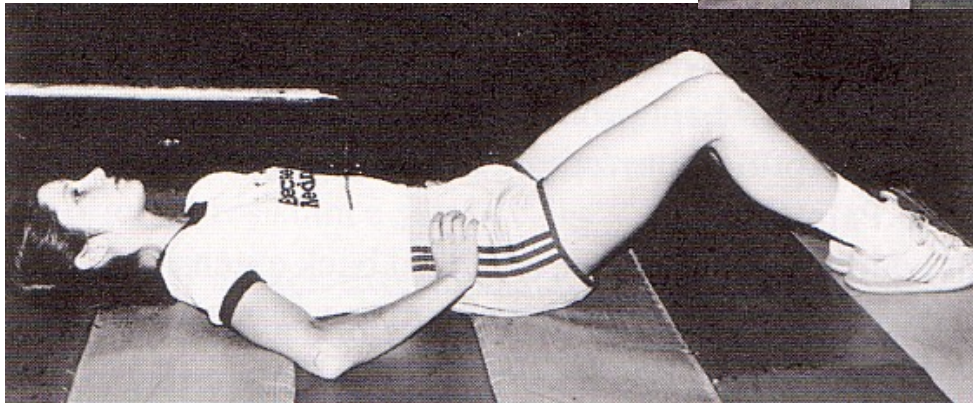


Optimal Knee Joint $\leq 110^\circ$

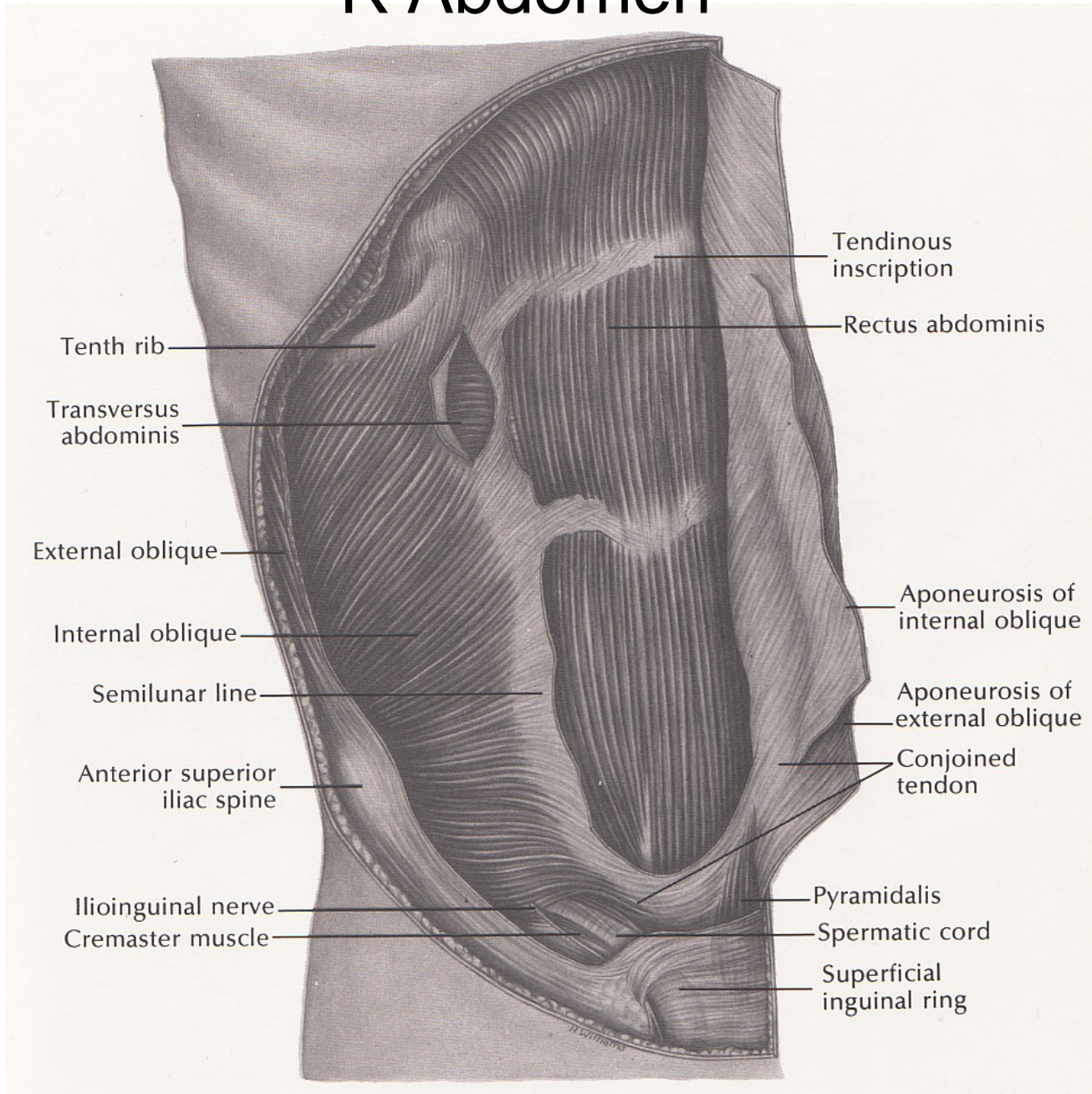


Hands @ side
to ↓ resistance.

Hands overhead
to ↑ resistance!



R Abdomen



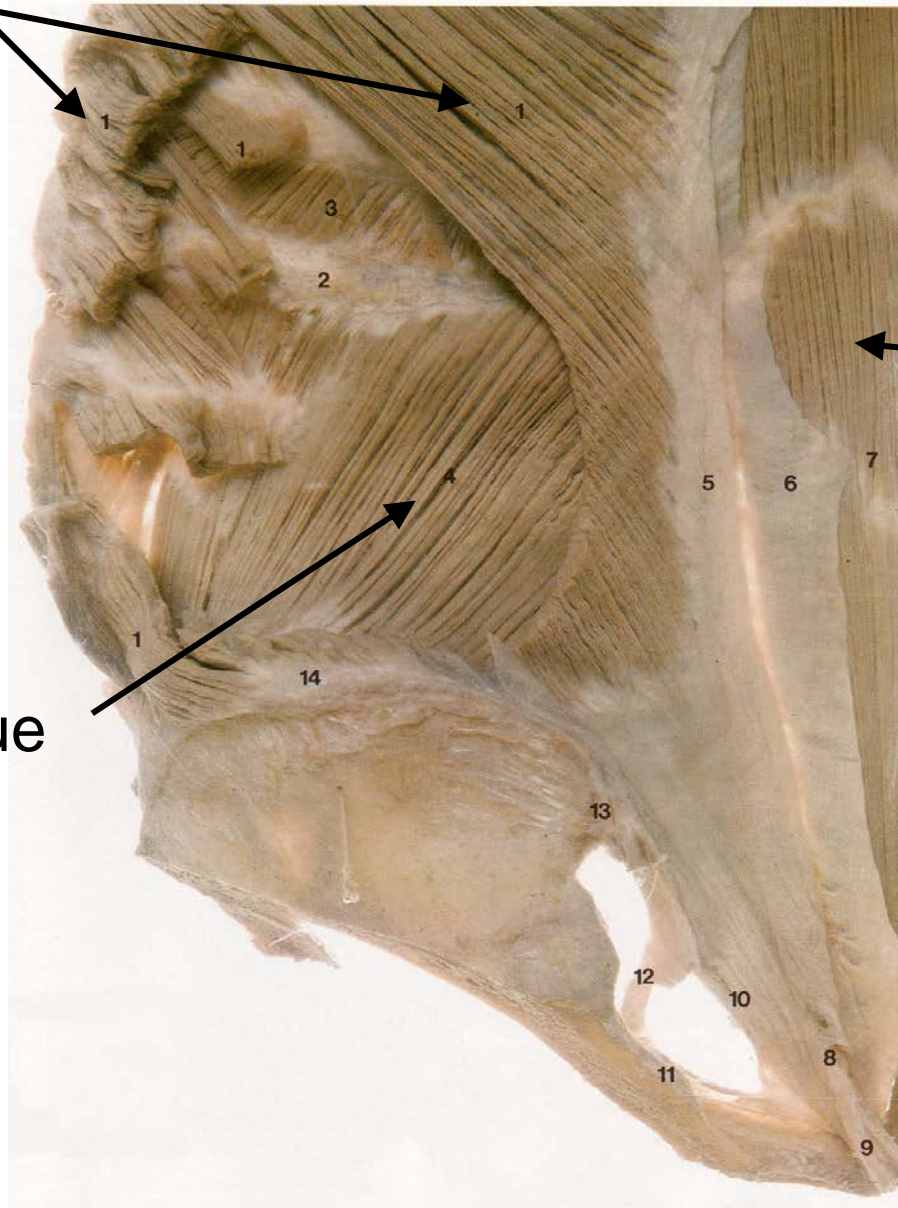
R Lower Abdomen

External oblique



Internal oblique

Rectus abdominis



Discussion

+ Q?

Table 3.1 Characteristics of Weight Training Exercises and Systems

Characteristic	Exercise or System		
	Isometric	Isotonic	Isokinetic
Type of Contraction/ Synonym	Static	Dynamic	Dynamic ^a
Relative Expense	None or low	Low ^b to high ^c	High
Maintenance	None or low	Low ^b to moderate ^c	Moderate to high
Portability	Not required	Easy ^b to difficult ^c	Moderate to difficult
Concentric loading	Yes	Yes	Yes
Eccentric loading	No	Yes	No ^d
Accommodation	No	No ^b /Yes ^c	Yes
Intramuscular tension	Low to high?	Moderate ^b to high ^c	Moderate to high
Potential for delayed muscle soreness	Low	High	Low
Potential for rehabilitation	Limited	Moderate to high	High

^aSince the velocity on isokinetic devices may be set to zero, static contractions are also possible.

^bFor free-weight barbells, dumbbells, and most other constant load devices.

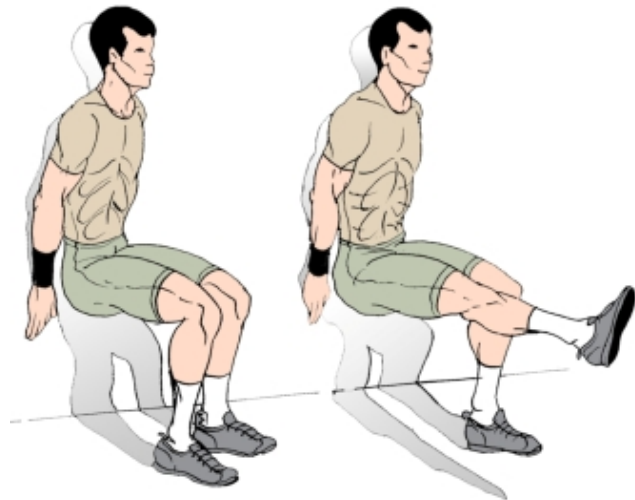
^cFor isotonic dynamic accommodating resistance (DAR) devices.

^dNew isokinetic devices by Chattecx (Kincom) and Loredan (Lido) have built-in options for constant velocity eccentric loading. These are exceptions to typical isokinetic machines.

Isometric Squat Works Very Limited Range, But Can Help with Sticking Points



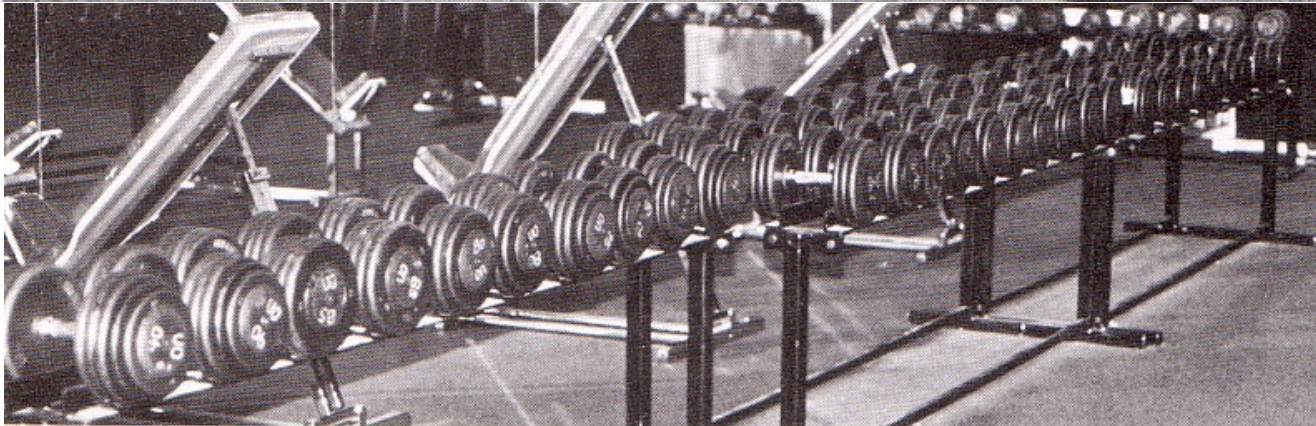
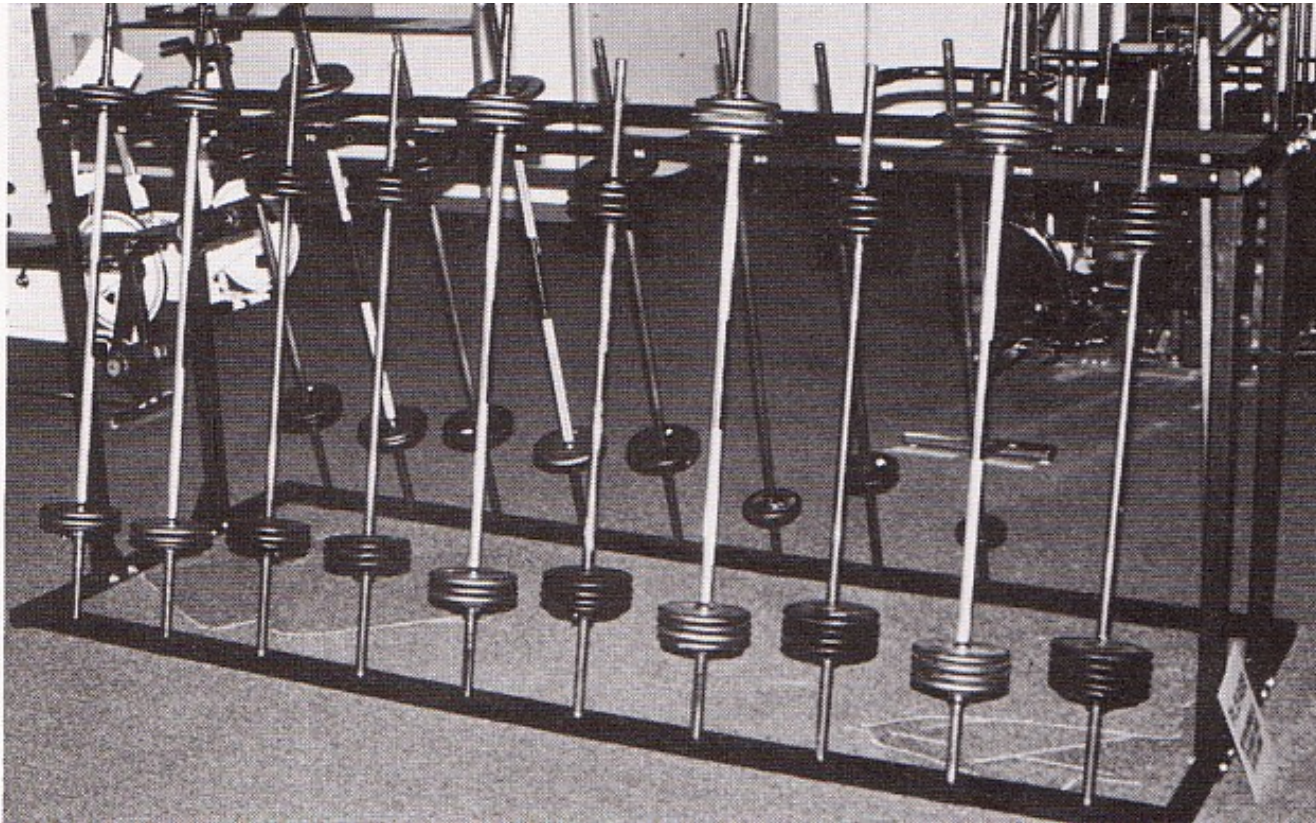
NB: $\approx 5-10^\circ$
around set \leftarrow ,
 \rightarrow limited
functionality!



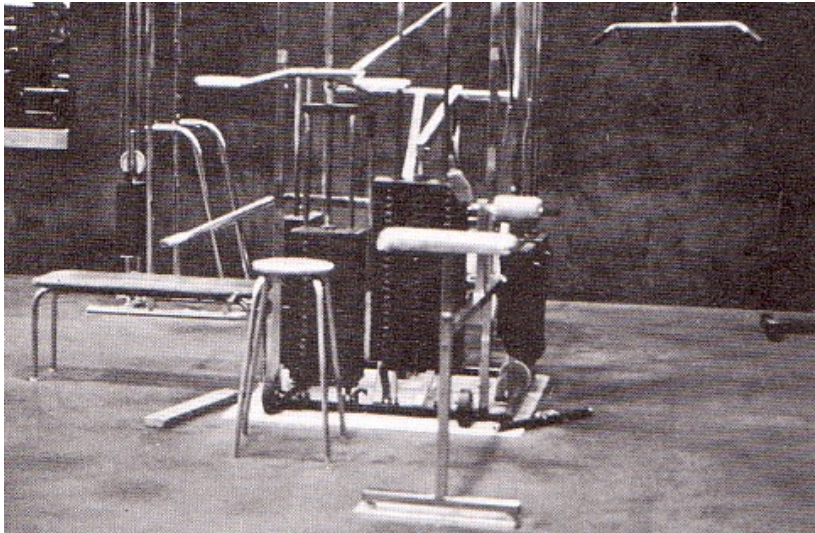
Functional isometrics at an early age!



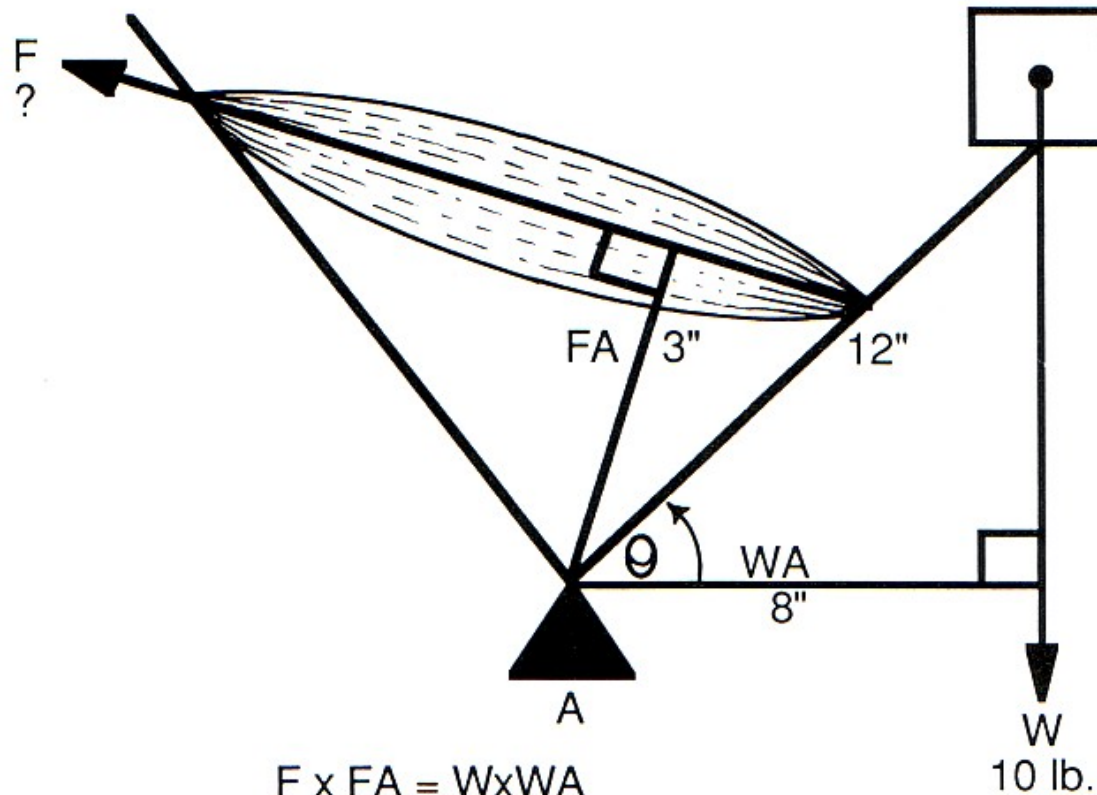
Isotonic Barbells & Dumbbells



Most CWT Machines & WT Equipment Isotonic



Force x Force Arm = Weight x Weight Arm



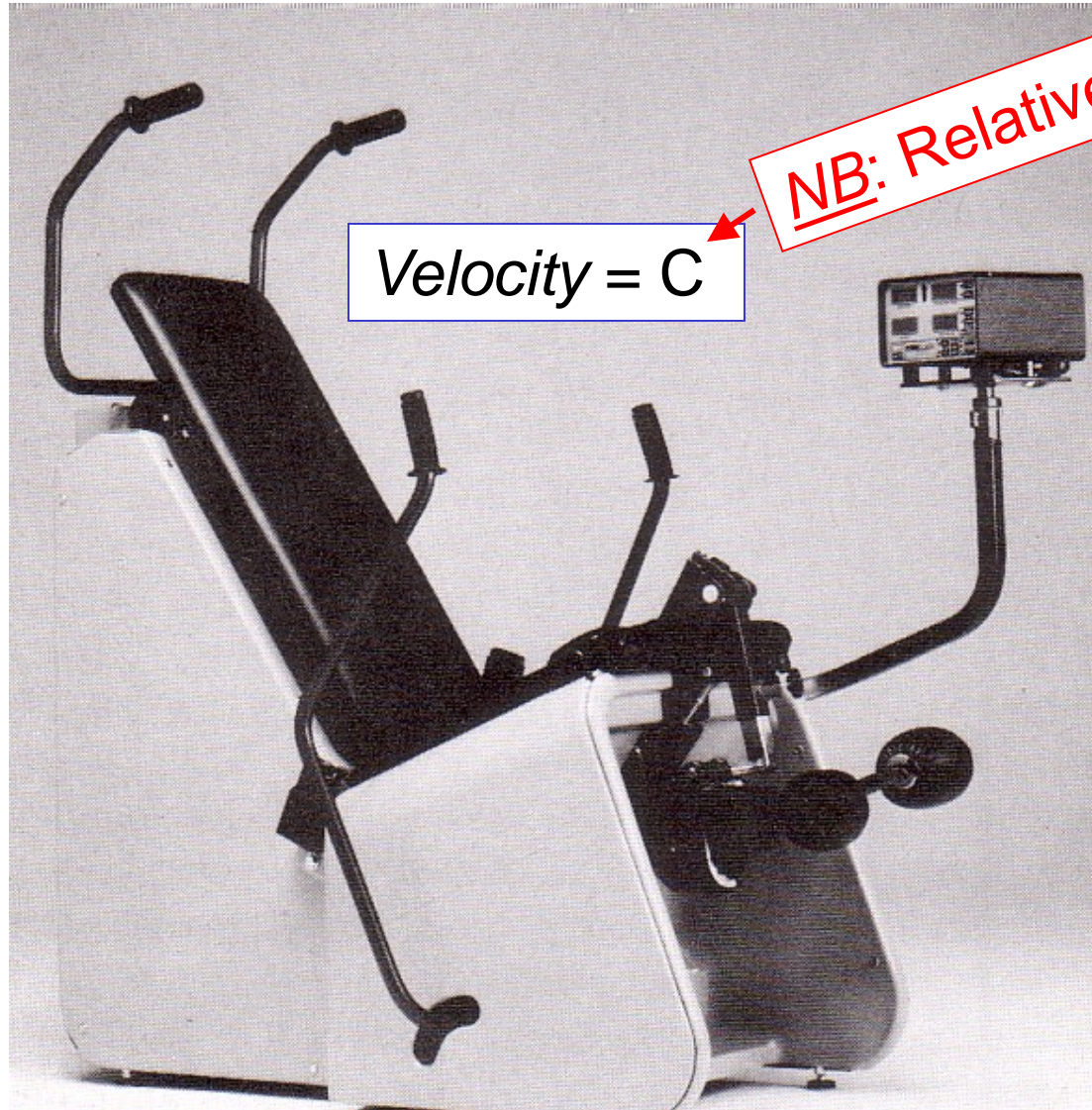
$$F \times FA = W \times WA$$

$$F = \frac{W \times WA}{FA}$$

$$F = \frac{10 \text{ lb.} \times 8''}{3''}$$

$$F = 26.67 \text{ lb.}$$

Isokinetic Omni-tron: Concentric-Concentric



$Velocity = C$

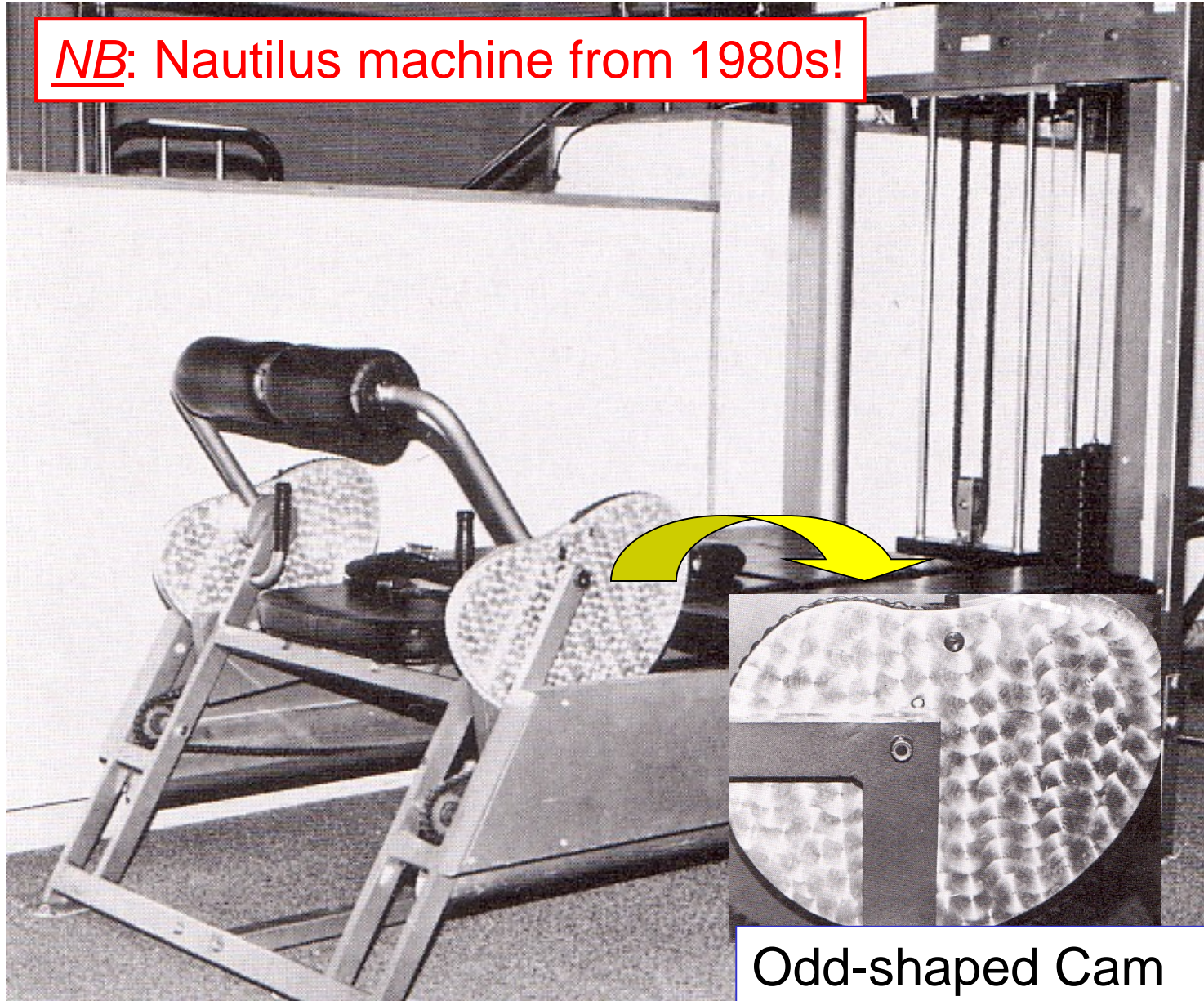
NB: Relatively constant!

**Can these also evolve
into Isometric?**

**Yes, if you handle more
weight than you can
overcome or set $\vec{v} = 0!$**

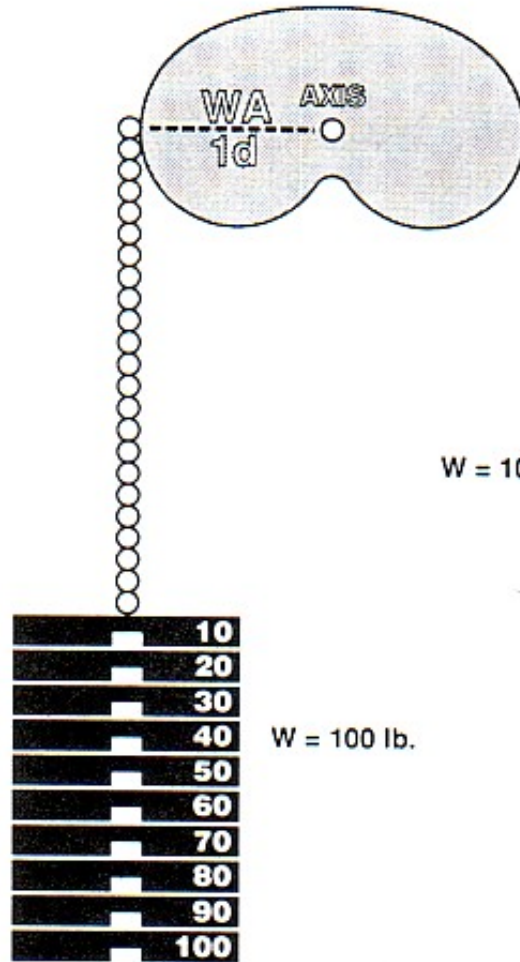
Dynamic Accommodating Resistance (DAR)

NB: Nautilus machine from 1980s!



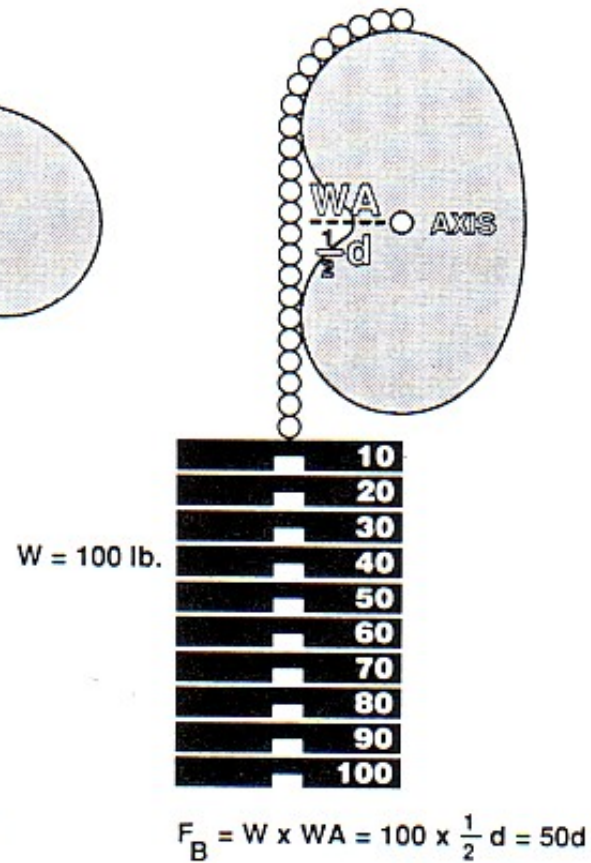
Simplified Cam System

A. Start



$$F_A = W \times WA = 100 \times 1d = 100d$$

B. Finish



Group Overview of Presentations

