



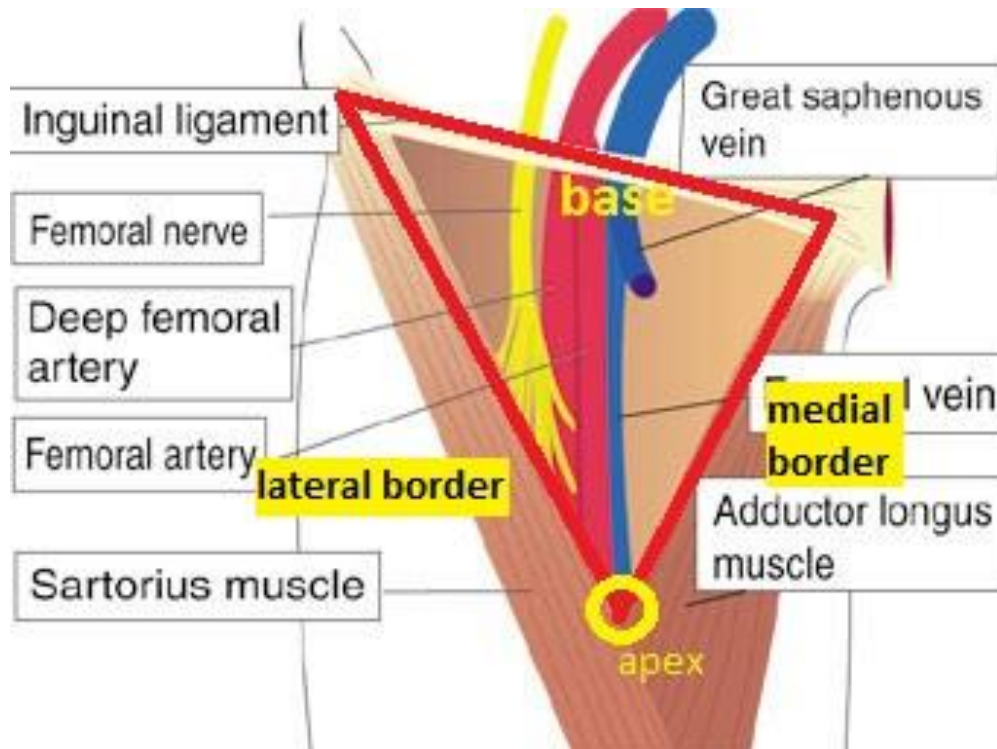
....Fun again! Hey, when's the next lab?

BI 199 APWT Discussion 14

- I. Announcements Poster comments update. Q?
References: Peer-reviewed, accurate, reliable!
NB: 10 total, ≤ 5 web-based, .edu, .org, .gov
- II. Review of Anatomy Lab 3 Open Exploration
- III. Weight Training Exercise Systems Overview
- IV. Olympic Lifting
 - A. Clean & jerk
 - B. Snatch
- V. Information Cards + Discussion

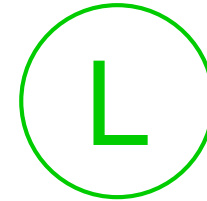
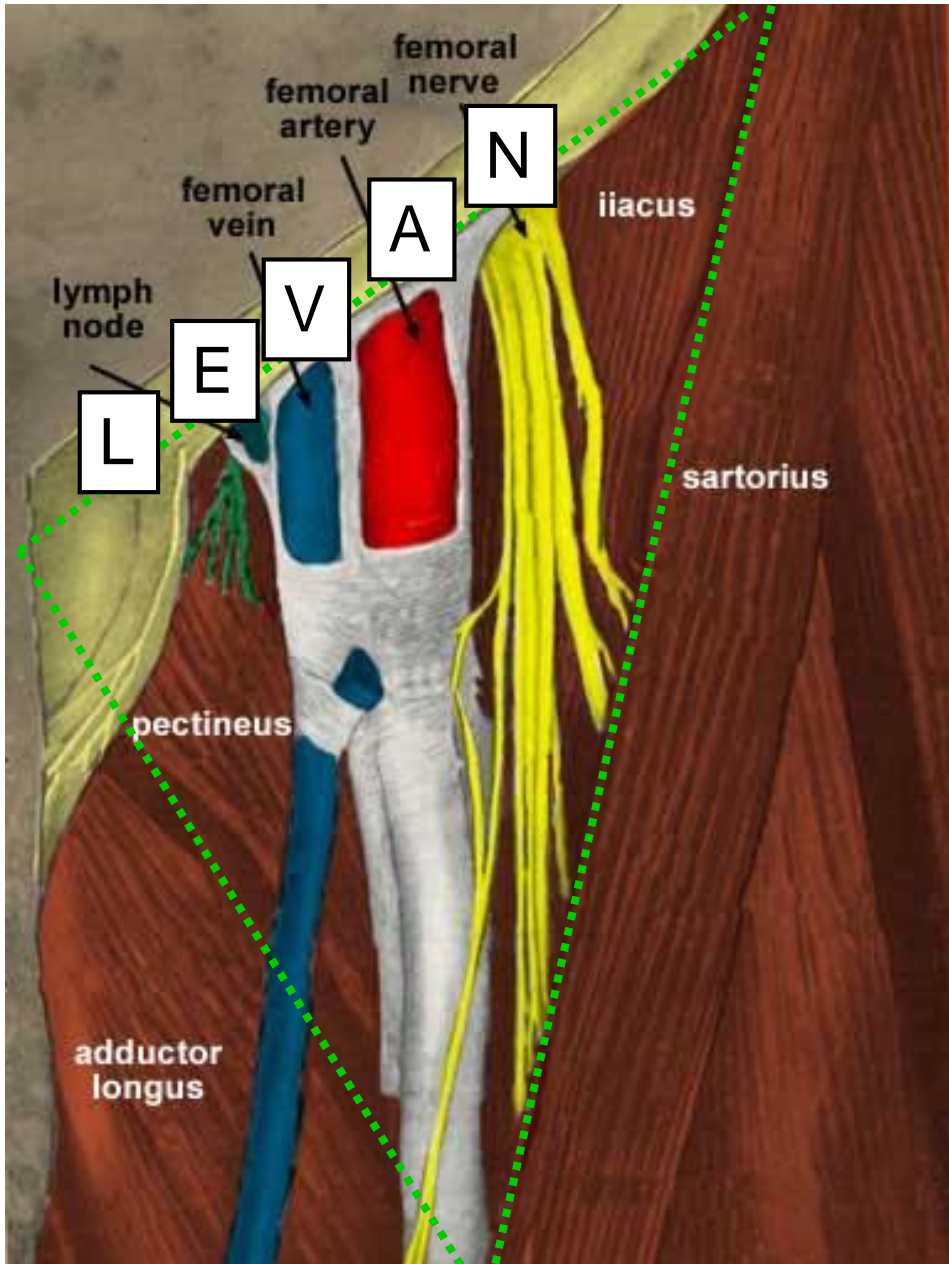
- **Femoral triangle** is 1st aid pressure point
- List in order from **lateral to medial**: arteries, empty, lymphatics, nerves, veins
- Does **1st letter** of each structure **spell a word**?
- Nerve or artery **injured** what **muscles** affected?

R



Which side? Mnemonic? Which muscles affected?

Gr. of memory!



N A V E L

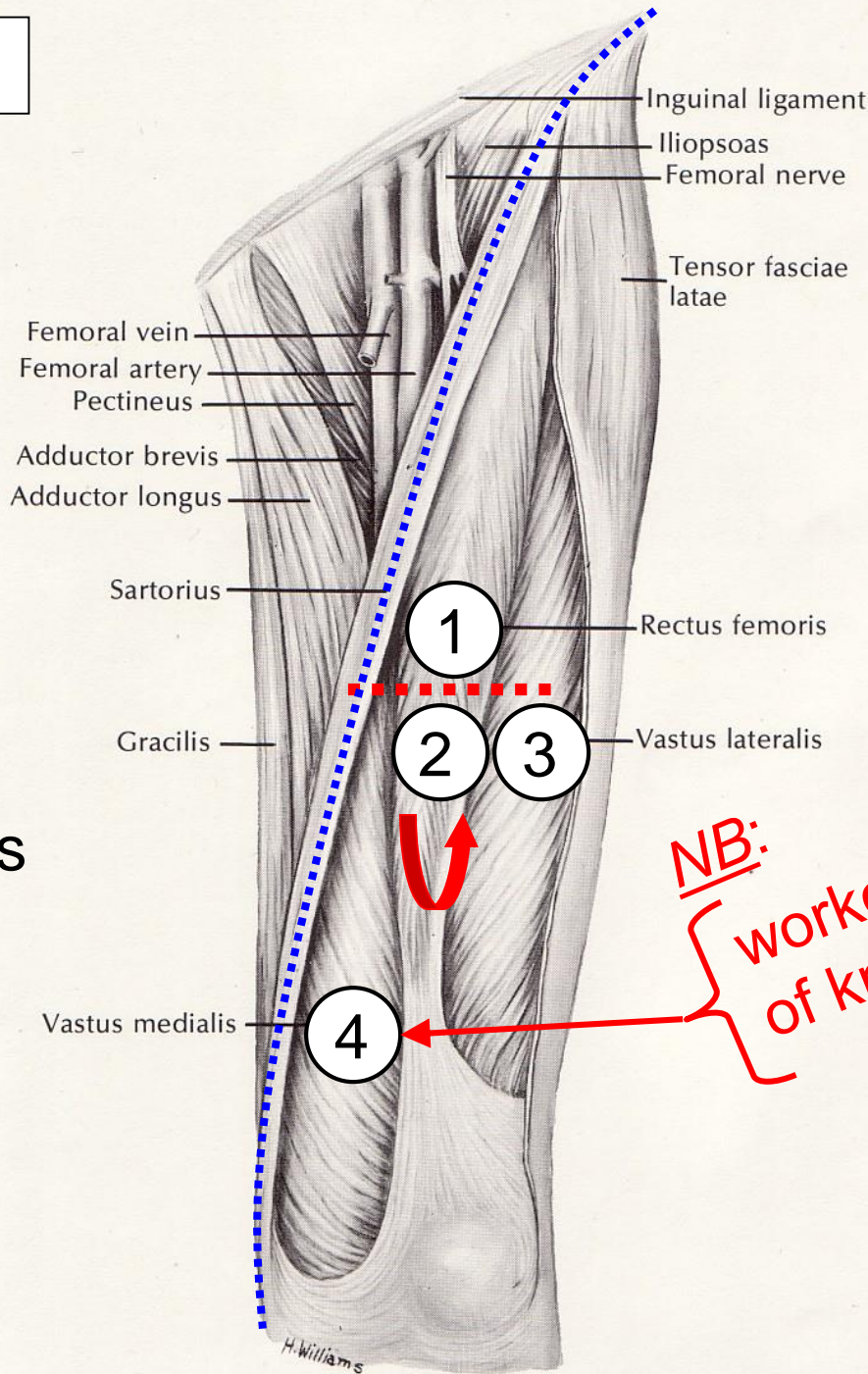
Thigh Muscles –
1^o Anterior

Hip Flexion & Knee
Extension Weakness!
+ Sensory Loss

http://www.dartmouth.edu/~anatomy/Lower_extremity/nerves/tutorial/femoral.htm

L thigh anterior

Q2



Quadriceps

- ① Rectus femoris
- ② Vastus intermedius
- ③ Vastus lateralis
- ④ Vastus medialis

Sartorius

NB:
worked last 10-15°
of knee extension

L thigh anterior
& medial

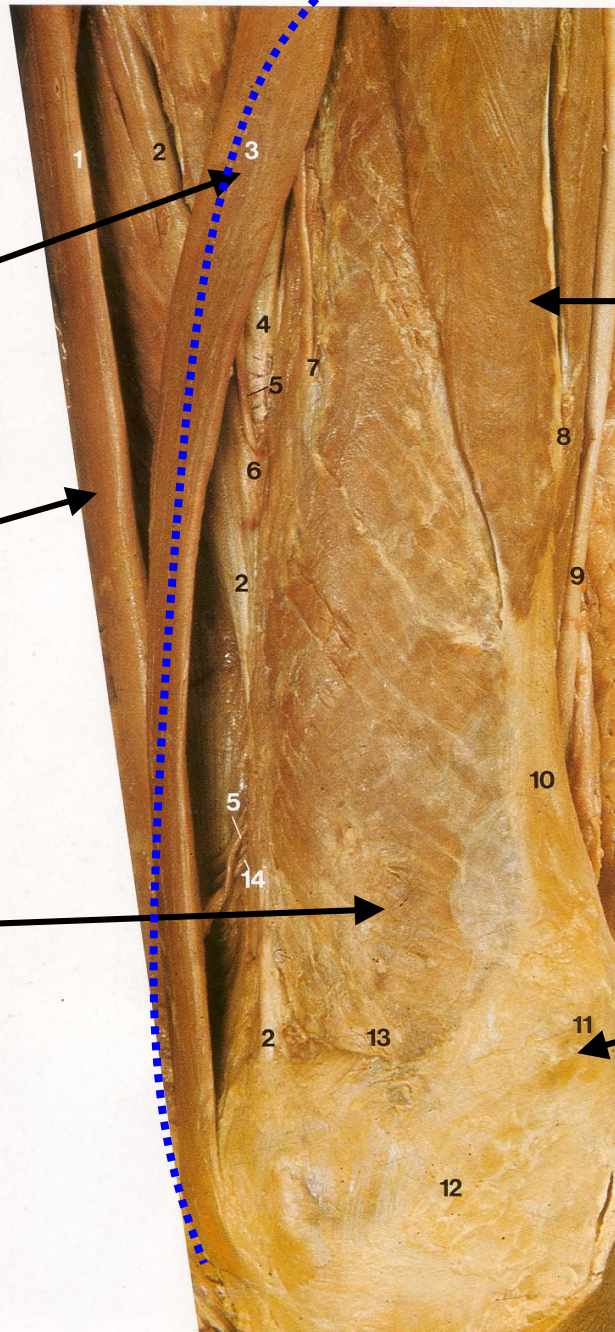
Sartorius

Gracilis
adductor

Vastus medialis

Rectus femoris

Patella/kneecap



Which sport or activity uses this muscle extensively?



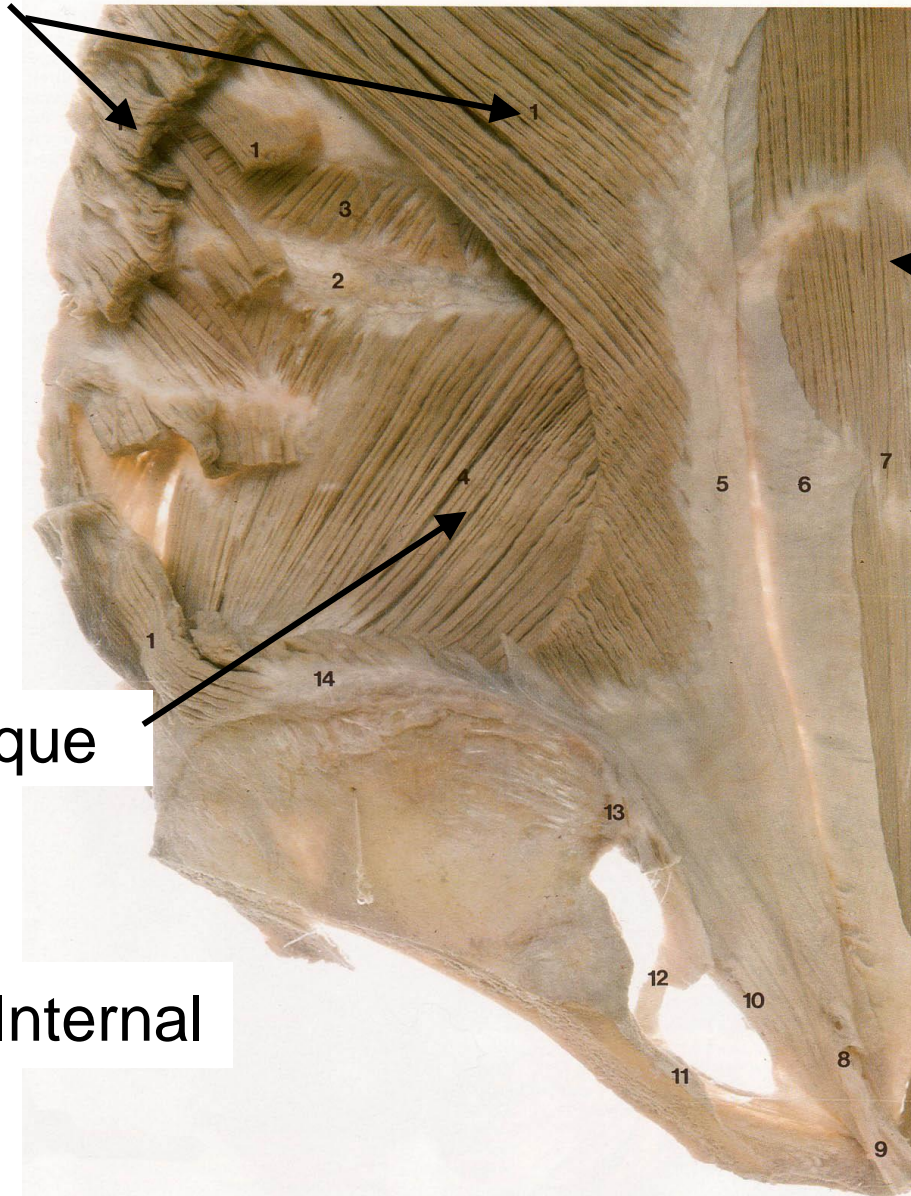
Svetlana Zakharova
Bolshoi Ballet
Leah Rankine, Medical
College of Wisconsin
<http://dancingsurgeon.blogspot.com/>

Abdominal muscle layers?

Q3

External oblique

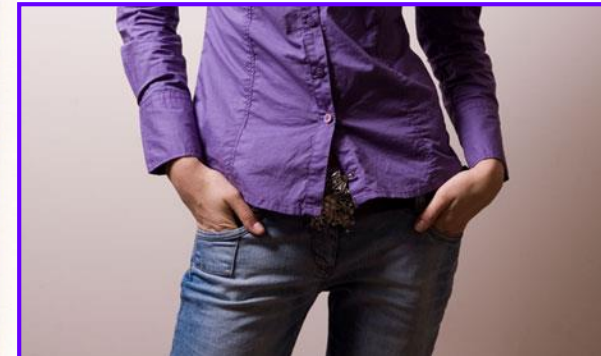
(R)



Rectus abdominis

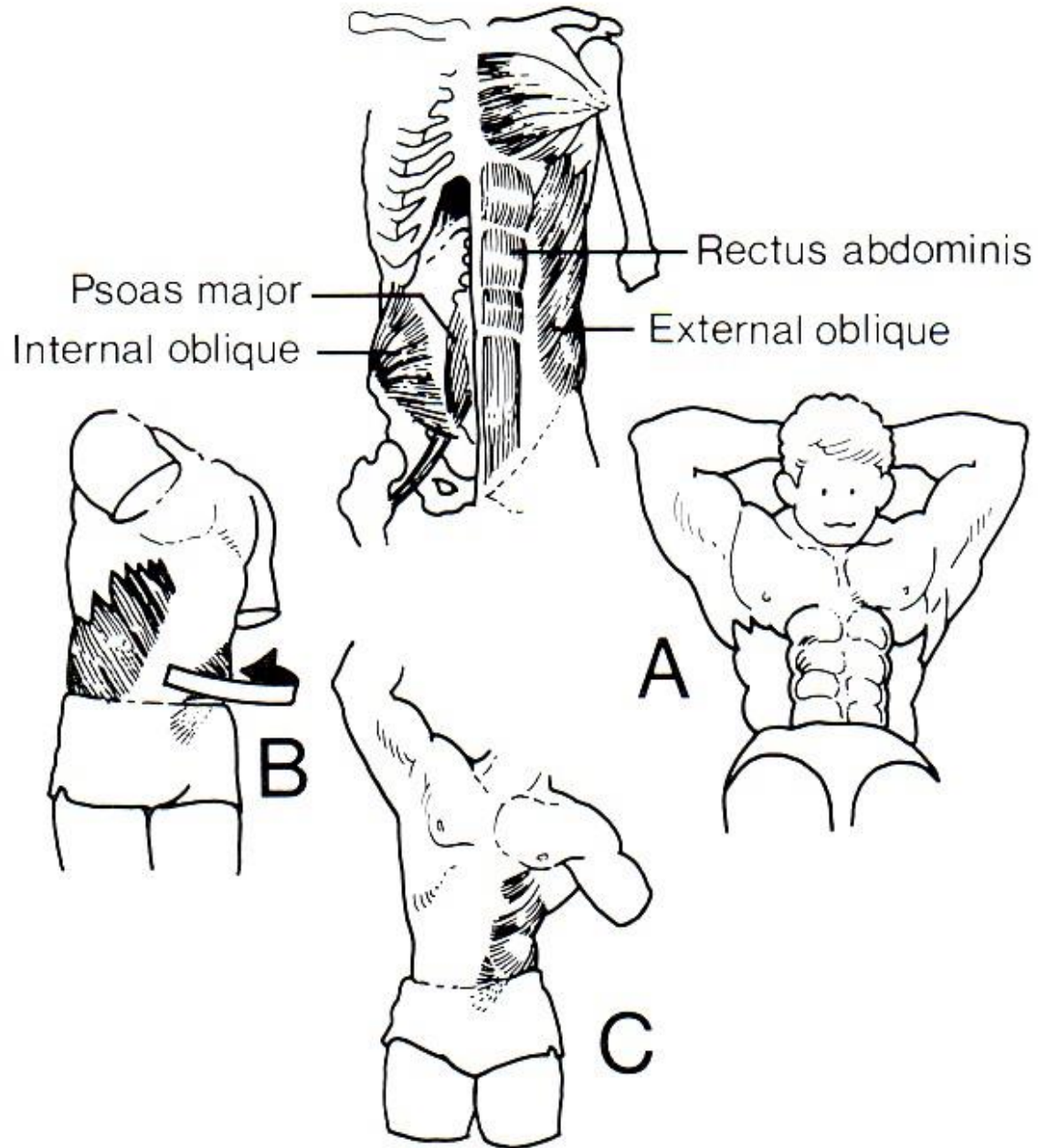
Internal oblique

External \perp Internal

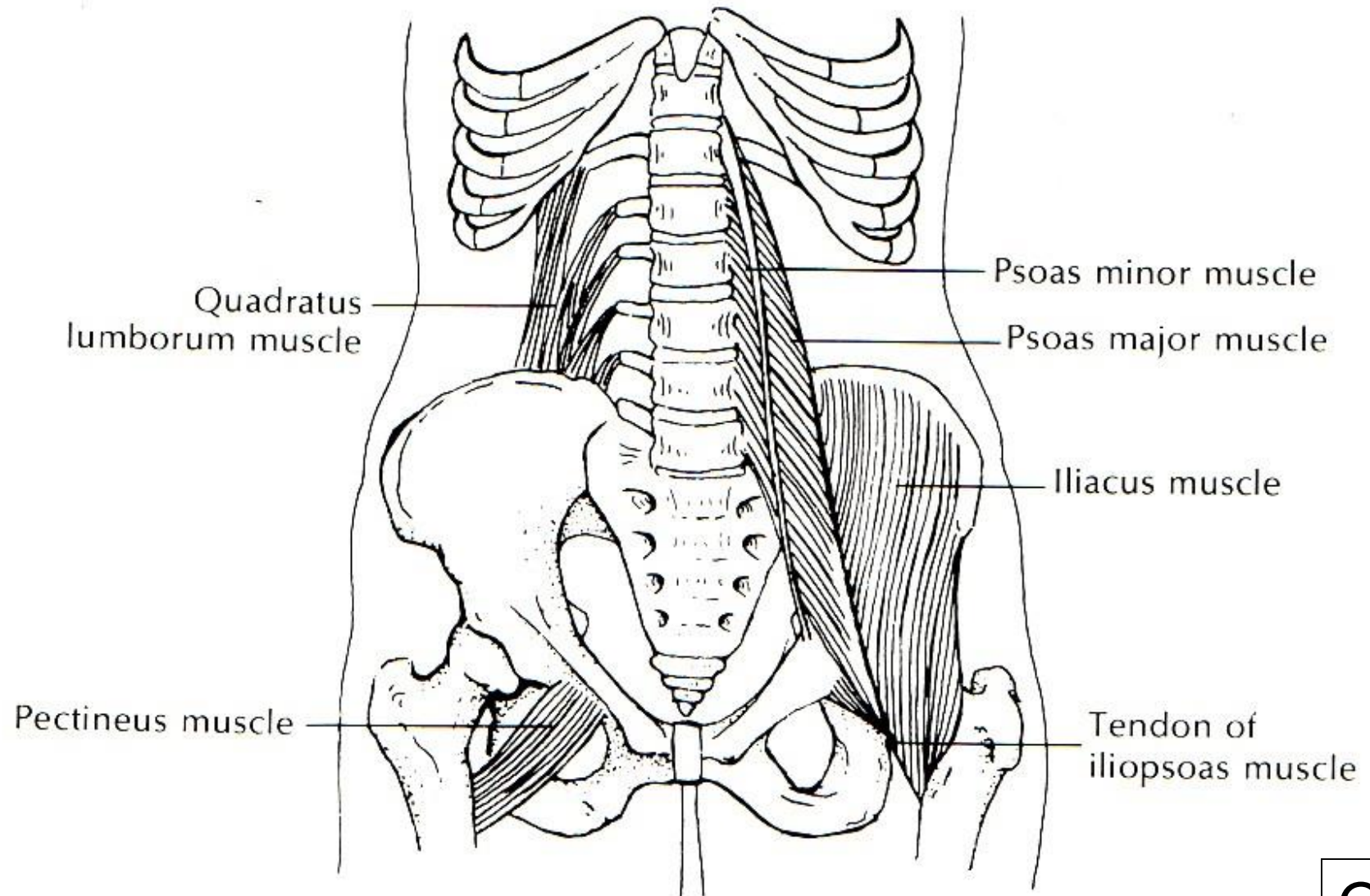


External \rightarrow
Hands in pockets!

Counter-clockwise motion?

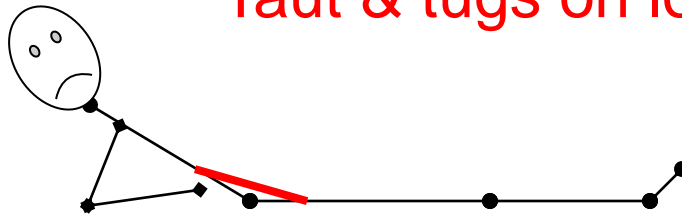


Hip flexors? Iliopsoas? Why flex hips & bend knees?



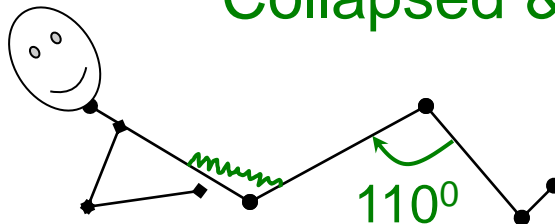
Iliopsoas with *Knees Straight* vs. *Bent*?

Taut & tugs on lower back!



Knees Straight

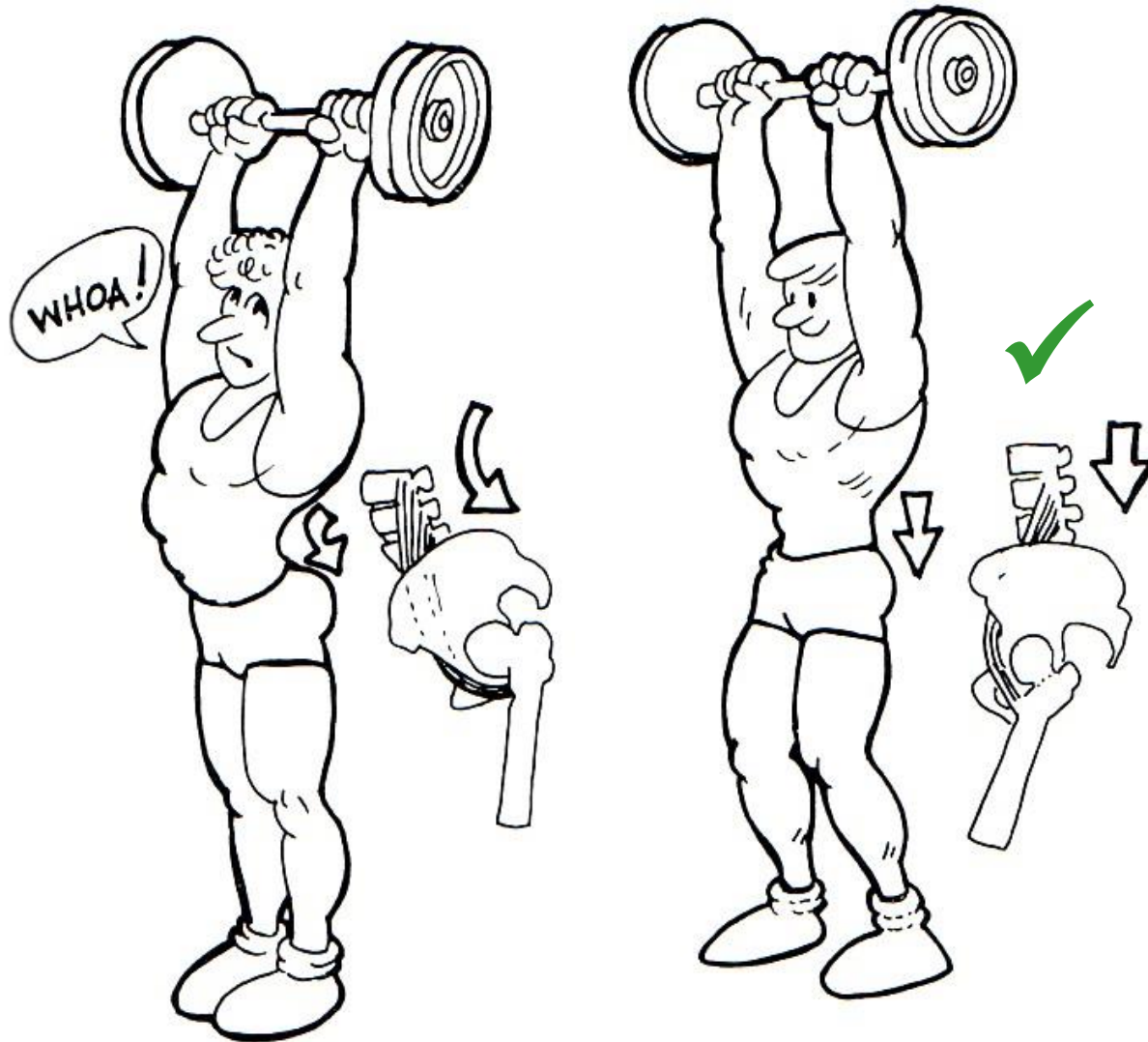
Collapsed & relieves stress!



Knees Bent

Hip Flexors? *Iliopsoas, rectus femoris, sartorius*
Feet Anchored vs. *Unanchored*? *Unanchored*

**Contract abdominals, bend knees,
widen stance to reduce back stress!**

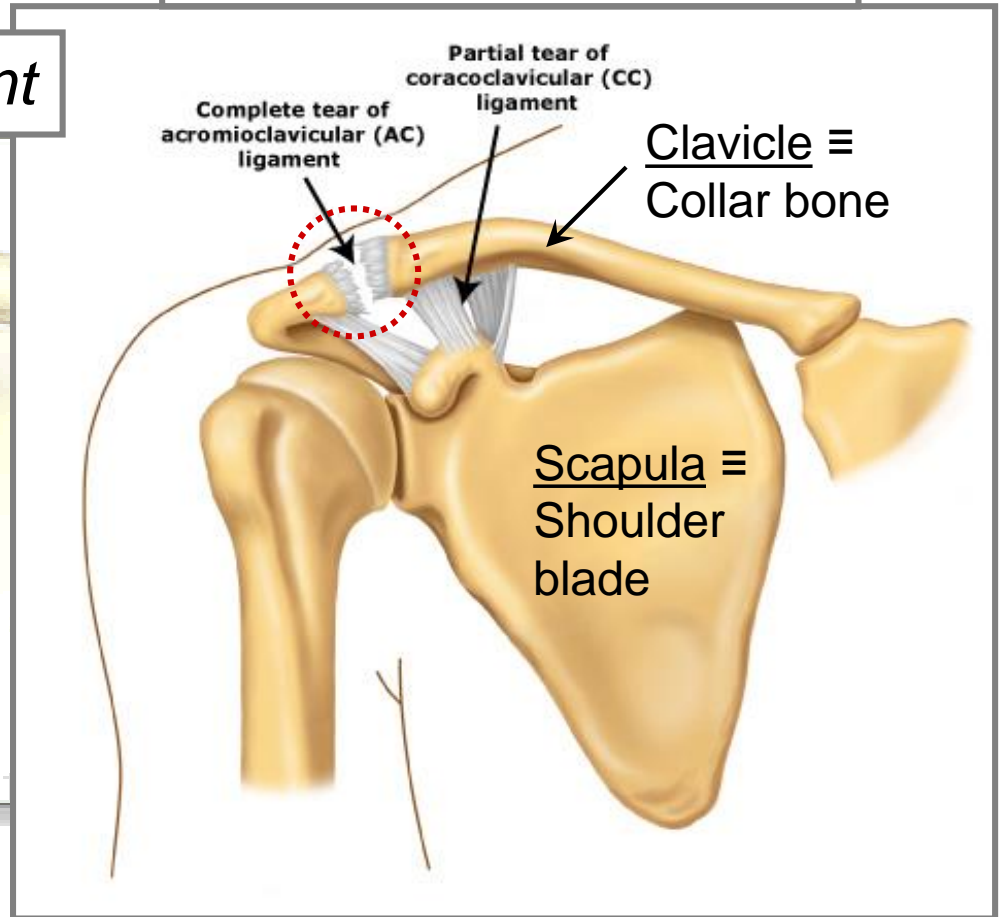
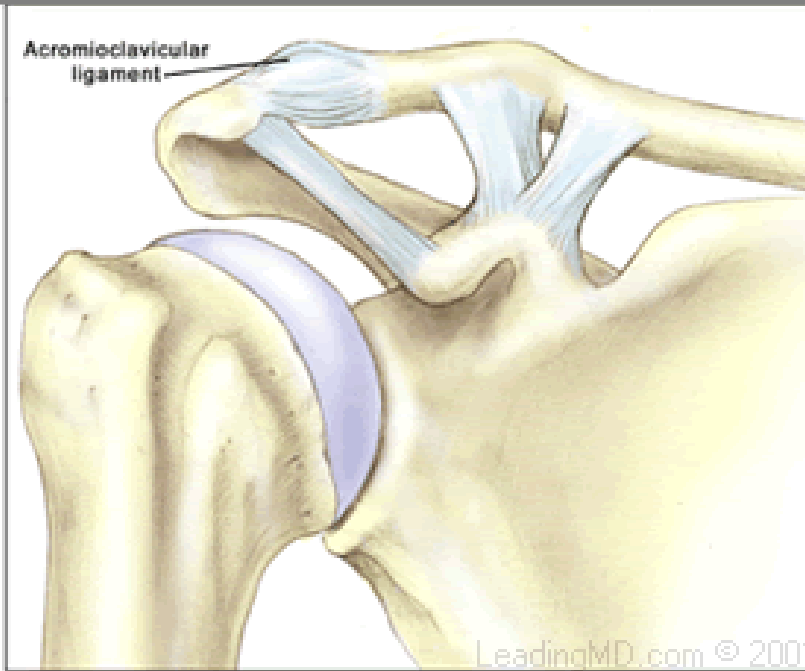


ID + what bones make up AC, SC joints?

Q5

Acromioclavicular Tear

Normal Acromioclavicular Joint



AC Separation: X-ray & Combined Surface Anatomy

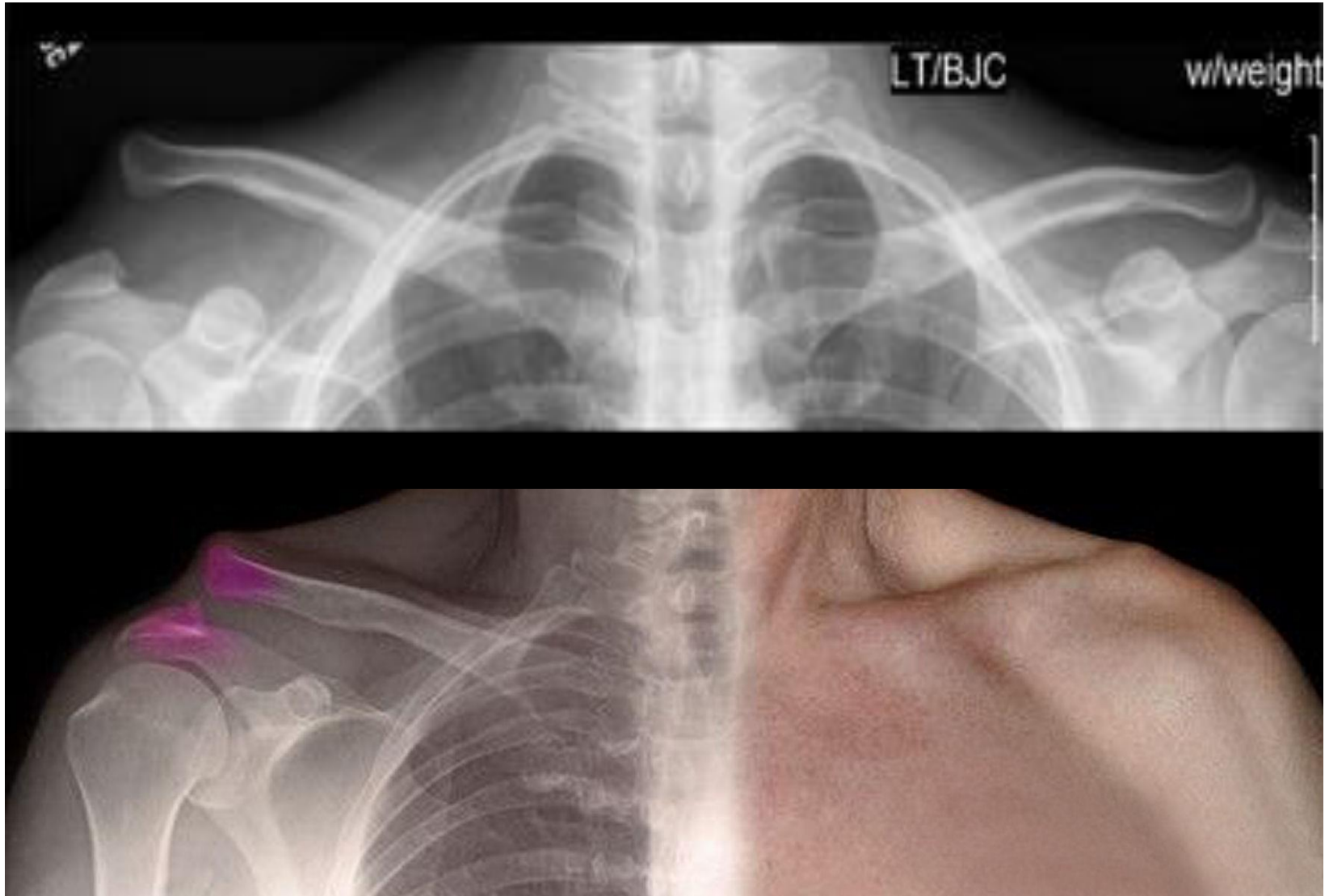


Image Sources: <http://johnpostmdsblog.blogspot.com/>, <http://www.sportsmed.org>,
<http://deepvisual.webs.com>

Sternoclavicular or SL Joint

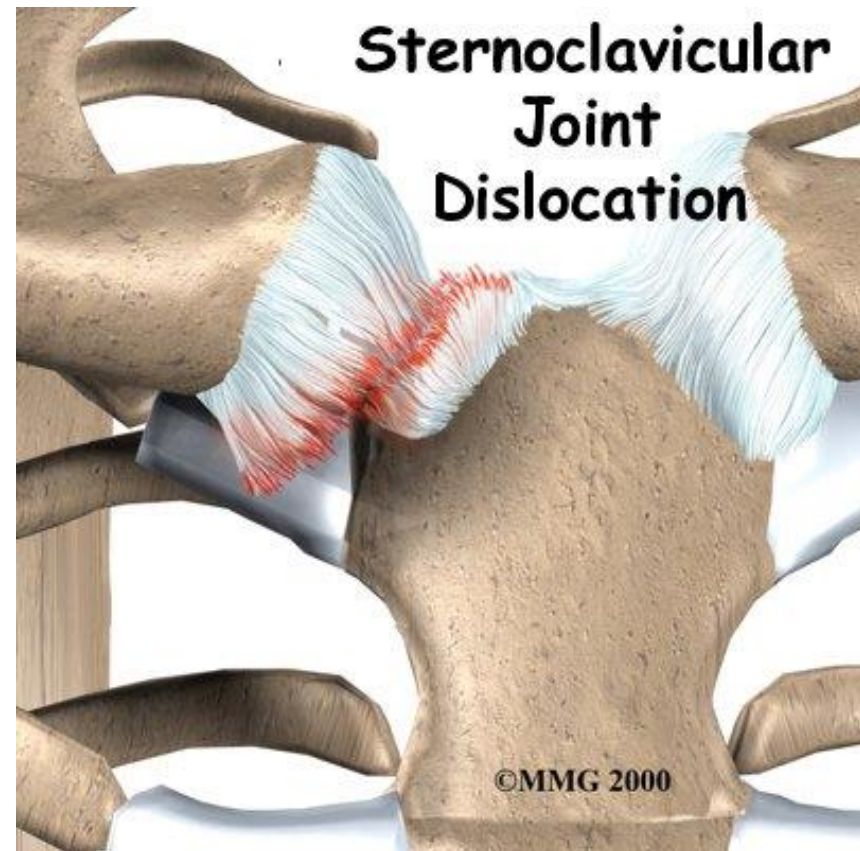
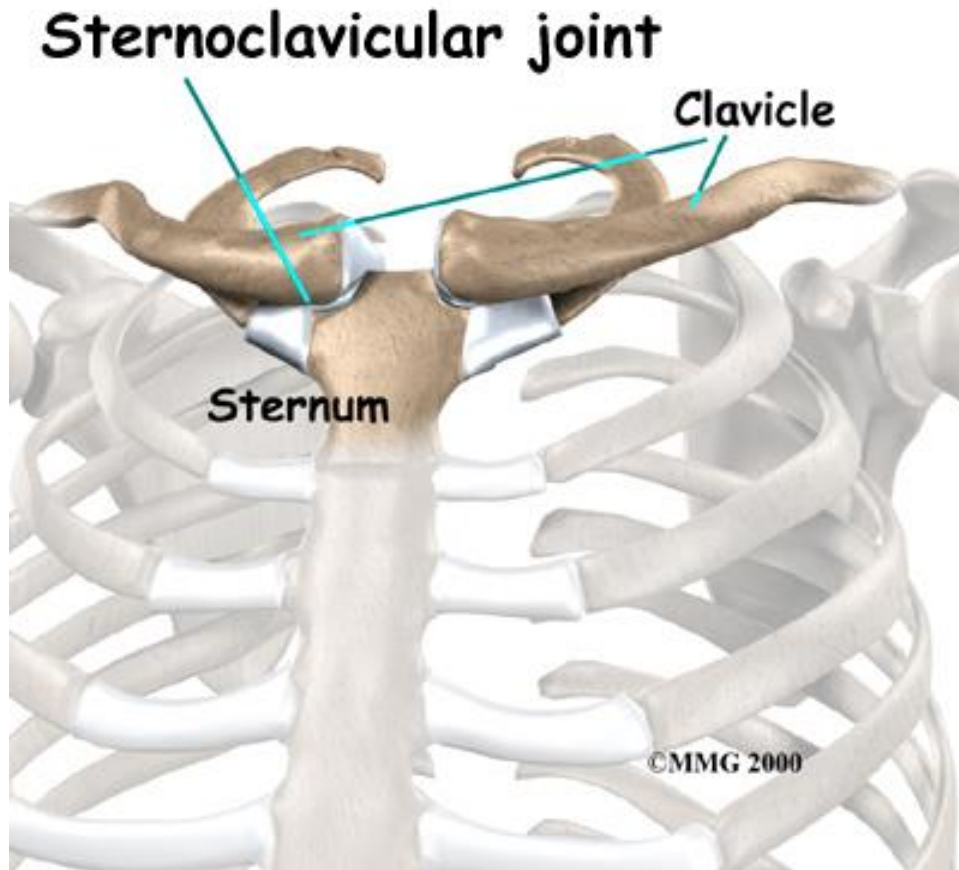
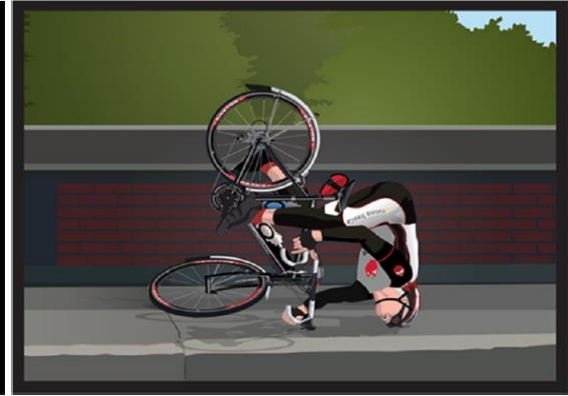
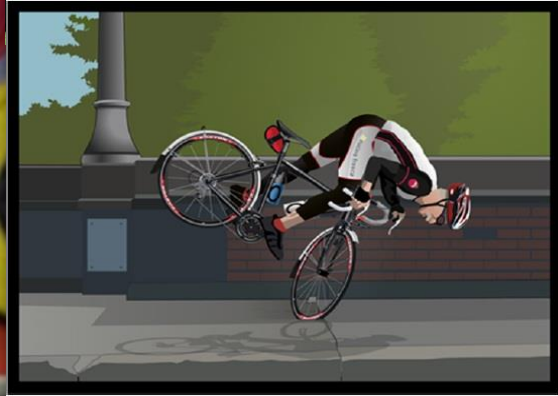


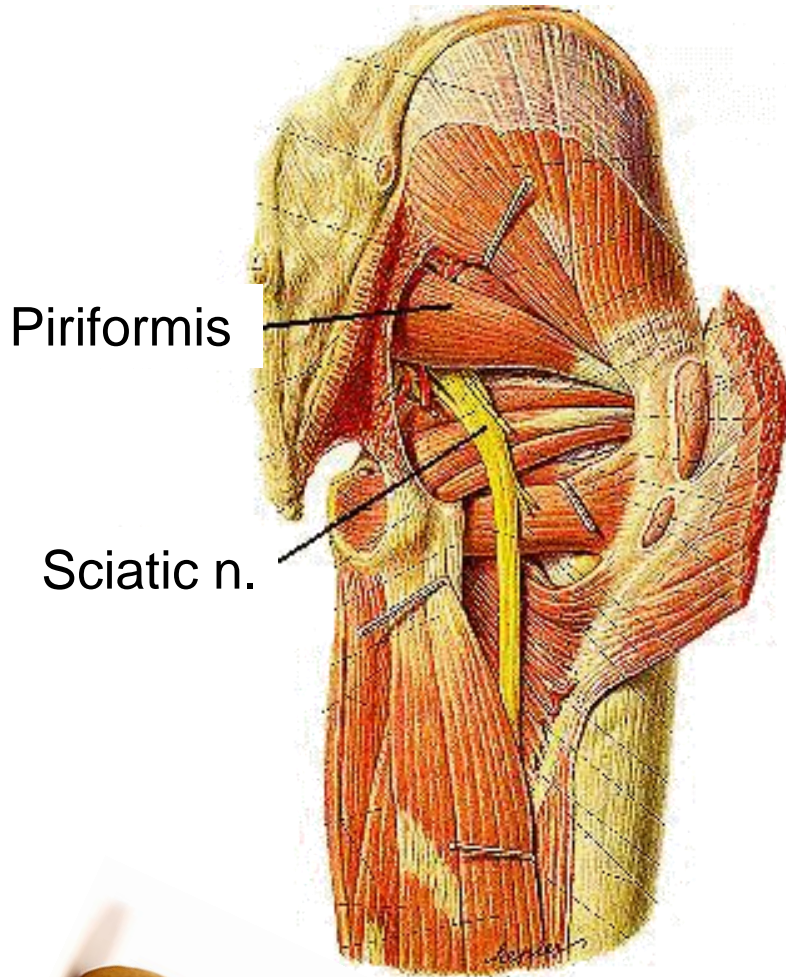
Image Sources: www.eorthopod.com, www.kneeandshouldersurgery.com

Which weight training, sports, activities?



Sciatic nerve, distal muscles, proximal joints, L. name?

Q6



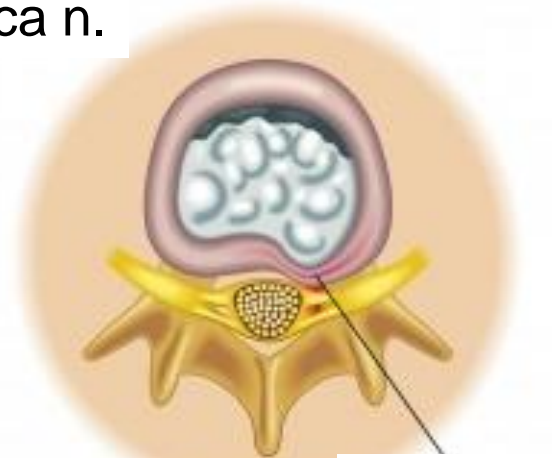
(R)

Piriformis ≡ L. pear-shaped

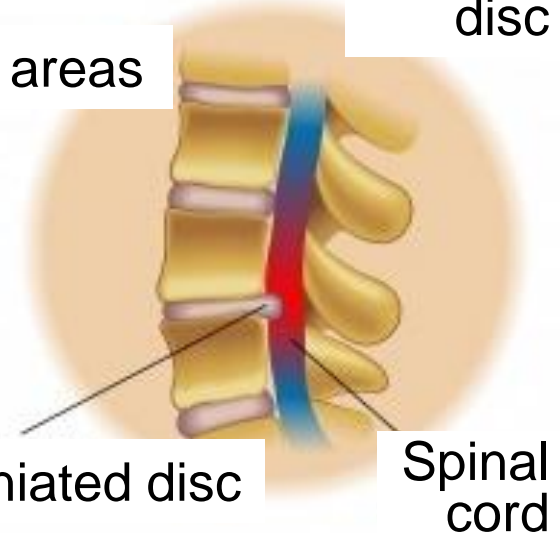
Sciatica



Most common cause!



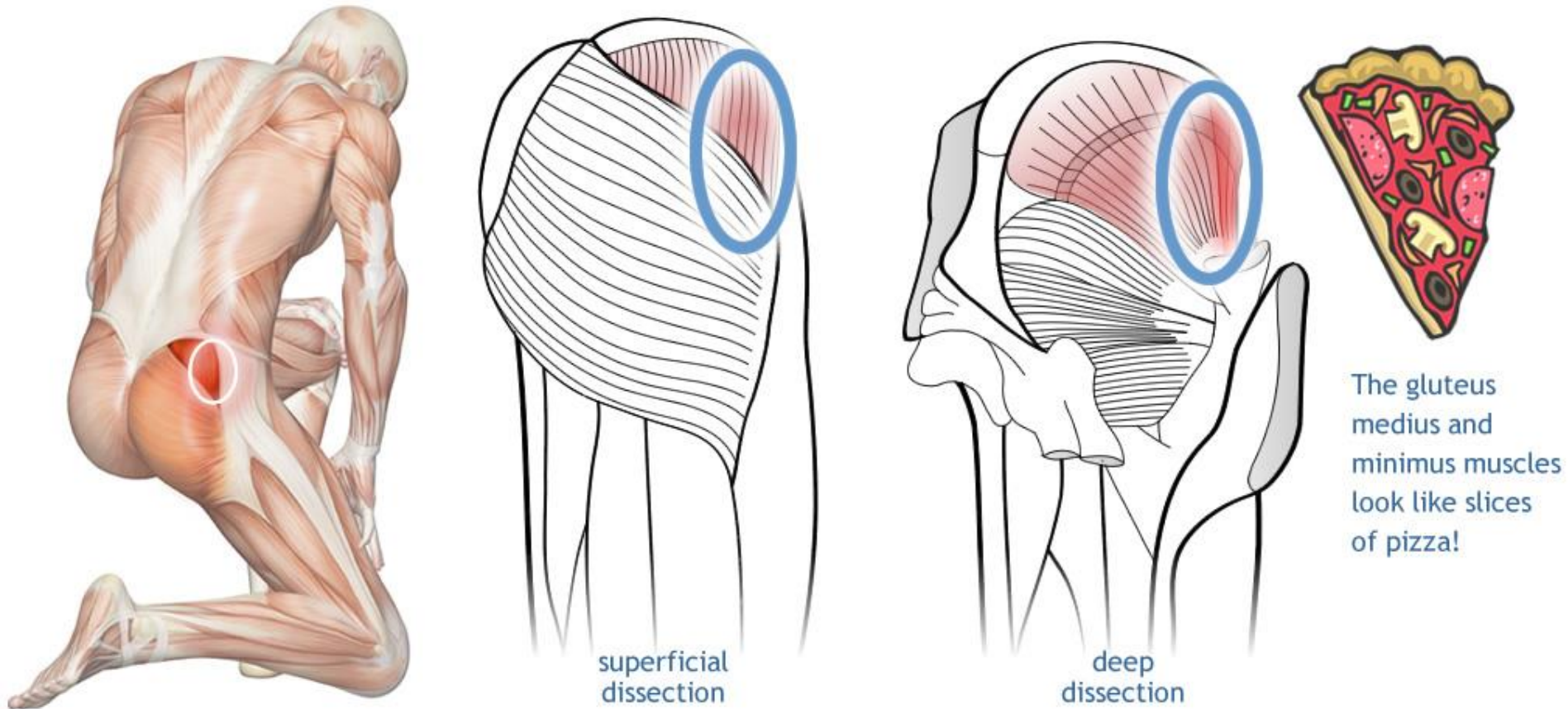
Pain areas



Herniated disc

Spinal cord

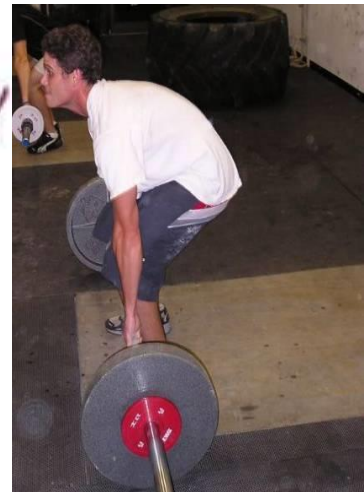
Deeper Gluteal Muscles Look Like Pizza Slices!! Superficial to Deep: *Maximus, Medius, Minimus*!



http://www.anatomyexpert.com/structure_detail/5715/

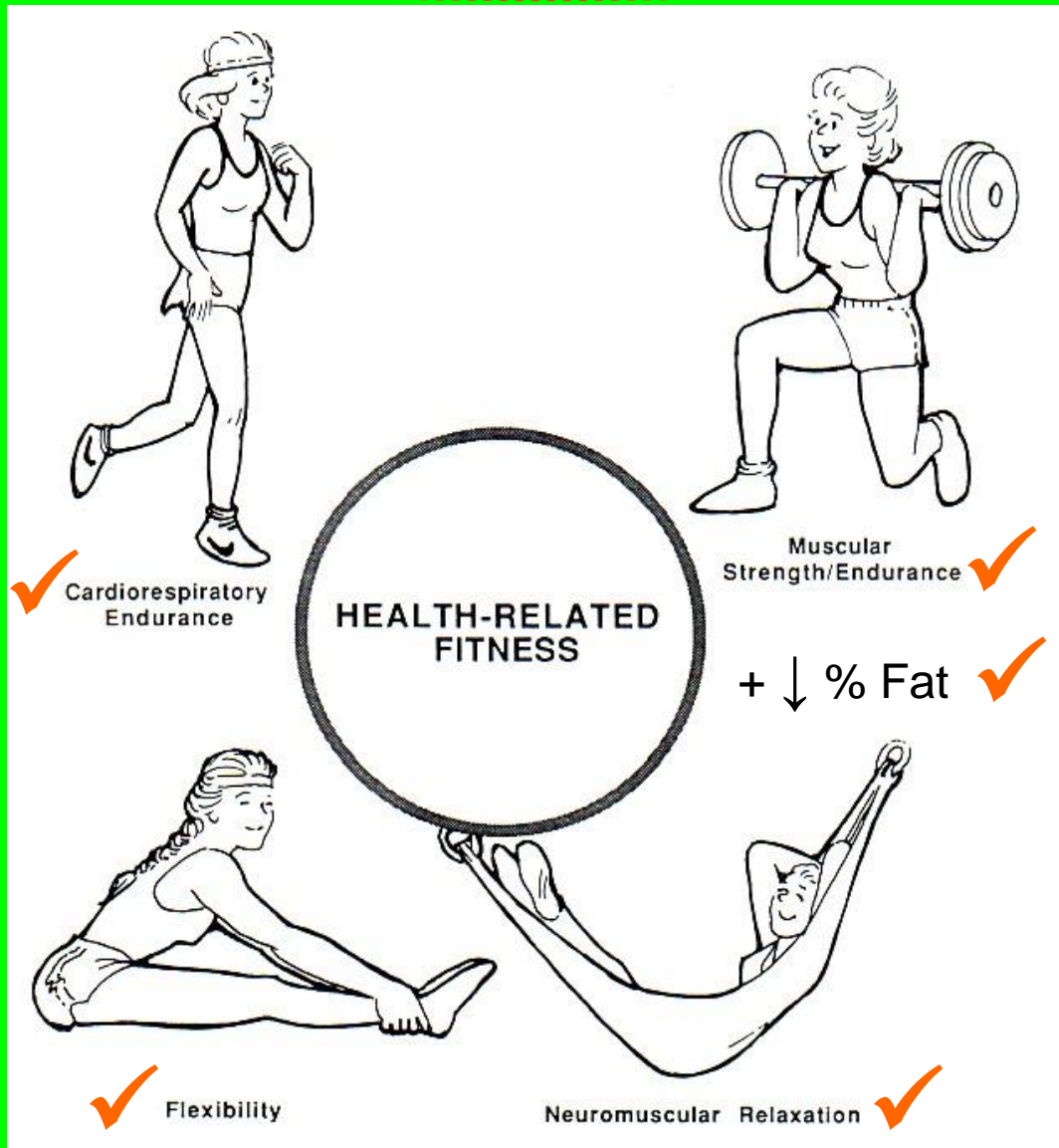
Image Source: <http://saveyourself.ca/articles/spot-06-gluteus-medius.php>

Which weight training, sports, activities?



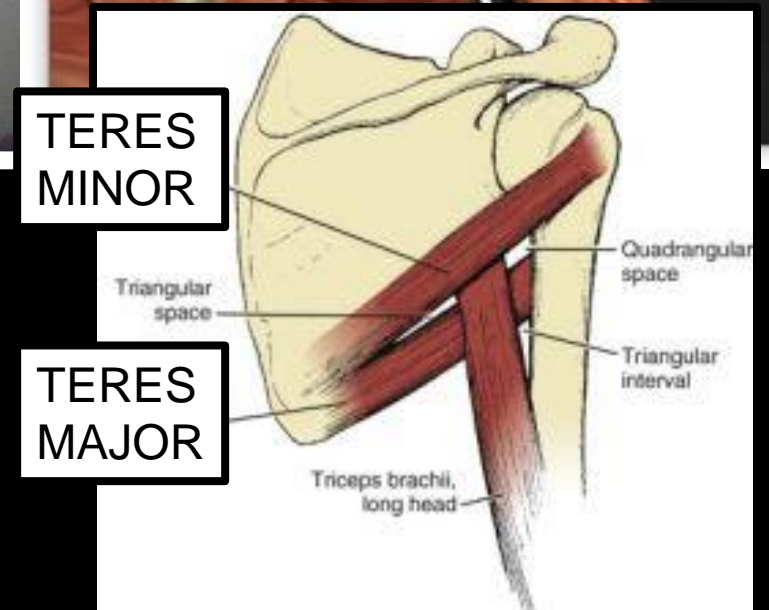
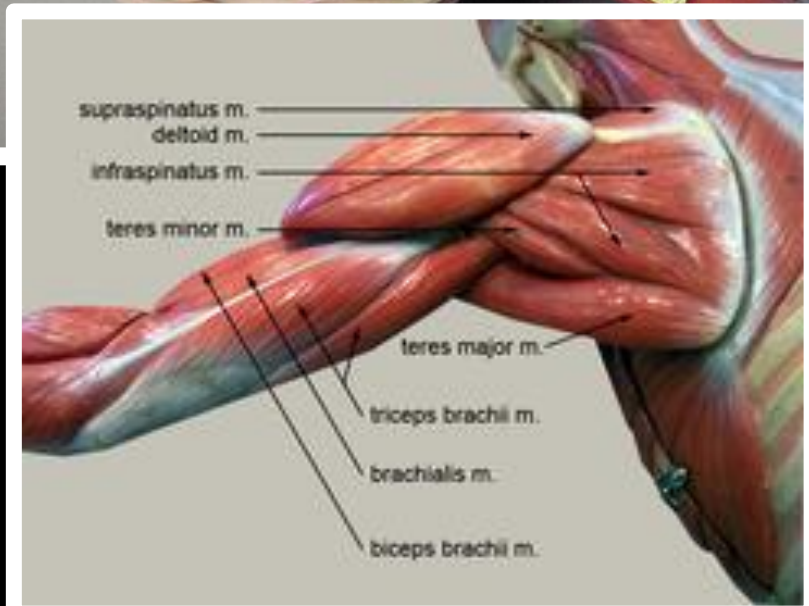
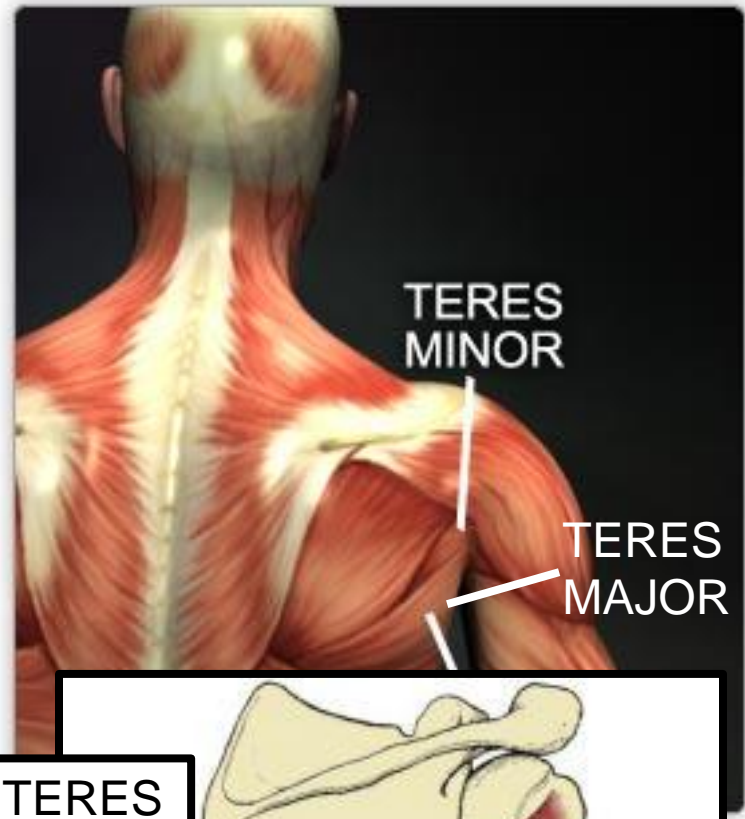
Weight Training is Non-competitive

Goal: Improve Life Time Fitness!



Teres Minor above the Major!

Q7





AAHPERD
American Alliance for Health
Physical Education
Recreation and Dance



AMERICAN COLLEGE
of **SPORTS MEDICINE**
www.acsm.org

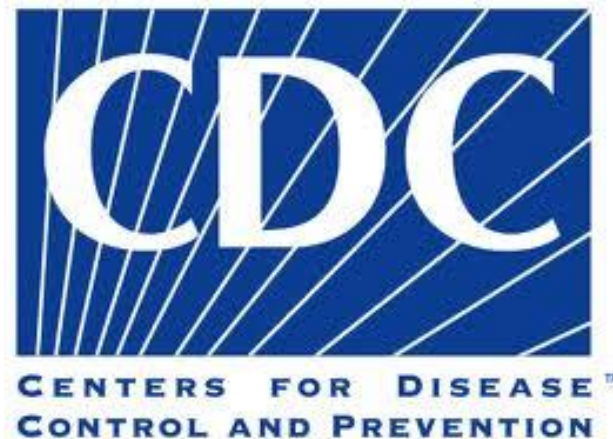
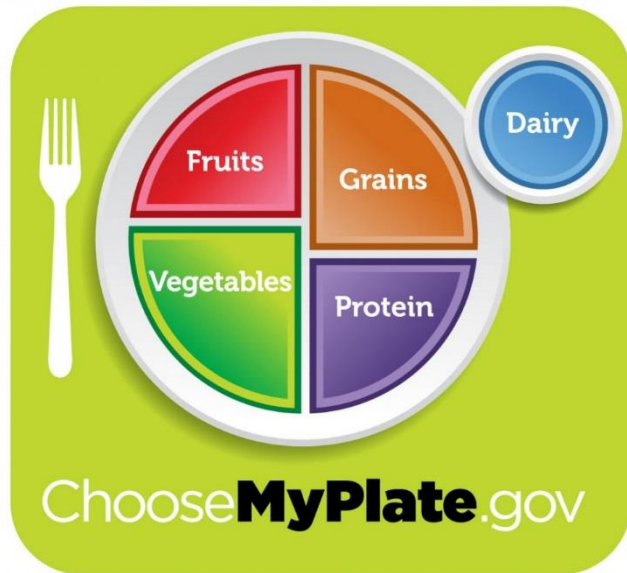


Table H.1 Sample Exercises for Major-Minor, Agonistic-Antagonistic, and Superior-Inferior Programs

Program Type	Muscular Regions	Sample Exercises
Major-Minor (M-M) ^a	Chest and lower extremity	Bench press and accessory chest; squat and accessory thigh and leg exercises.
	Back, shoulder, and arm	Lat pull, military press, biceps curl, triceps extension, and accessory SJA exercises ^d
Agonistic-Antagonistic (A-A) ^b	Chest, shoulder, and triceps	Bench press and accessory chest; military press, triceps extension, and accessory SJA exercises
	Lower extremity, back, and biceps	Squat and accessory thigh and leg exercises; lat pull and accessory back exercises
Superior-Inferior (S-I) ^c	Chest, shoulder, back, and arm	Bench press and accessory chest; military press, lat pull, biceps curl, triceps extension, and accessory SJA exercises
	Lower extremity	Squat and accessory thigh and leg exercises

Agonistic-Antagonistic (A-A)^b

NB: Some bodybuilding routines push-pull over separate days.

*Weight Training Like Life Is About Balance! Squat – Push – Pull!
Inferior – Superior & Posterior – Anterior Balance
Multi-Joint-Action vs. Single-Joint-Action
Center of Gravity vs. Periphery
Free Weight vs. Machine Emphasis*

Front/Back Squat¹ – Bench Press⁵ – Bent-Over Row⁶

Leg Press¹ – Chest Fly⁵ (db) – Lat Pull⁶/Pull Up⁶

Lunge² – Military Press⁷ – Pull Up/Rowing Variations⁶

Leg (Knee) Extension² /Leg Curl³ – Dip⁸ – Upright Row⁸

Calf Raise⁴ (Straight/Bent-Knee) – Triceps⁹ – Biceps¹⁰

Back Extensions¹¹/Abdominals¹²

Squat – Push – Pull in 1 exercise! Clean & Jerk & Snatch!

¹⁻¹² The Basic Dozen Beginning Weight Training Exercises. VP Lombardi,
Beginning Weight Training: The Safe & Effective Way. Dubuque, IA: Wm. C.
Brown Company Publishers, 1989.

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.

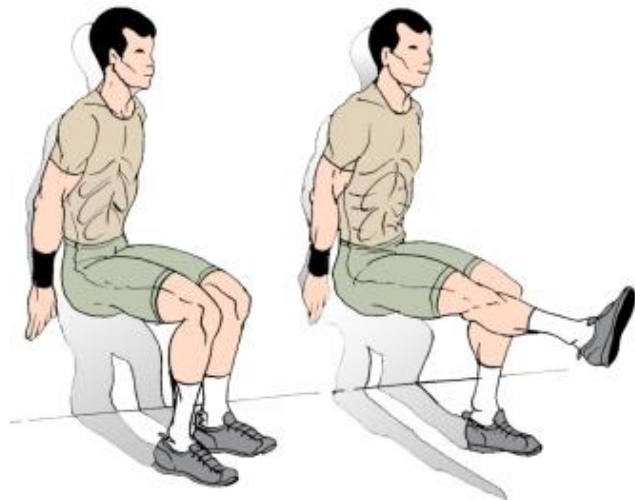
^cFor isotonic dynamic accommodating resistance (DAR) devices.

^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



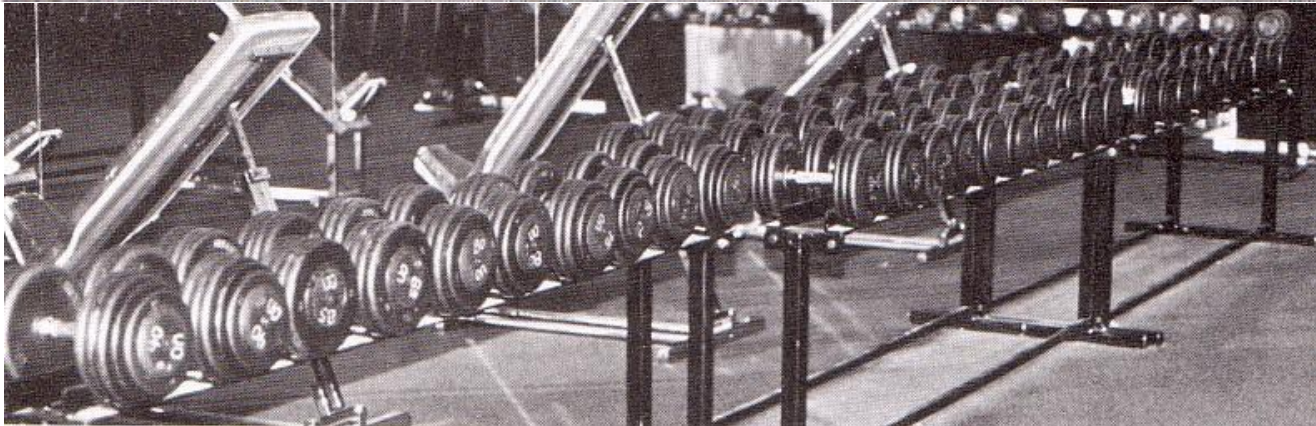
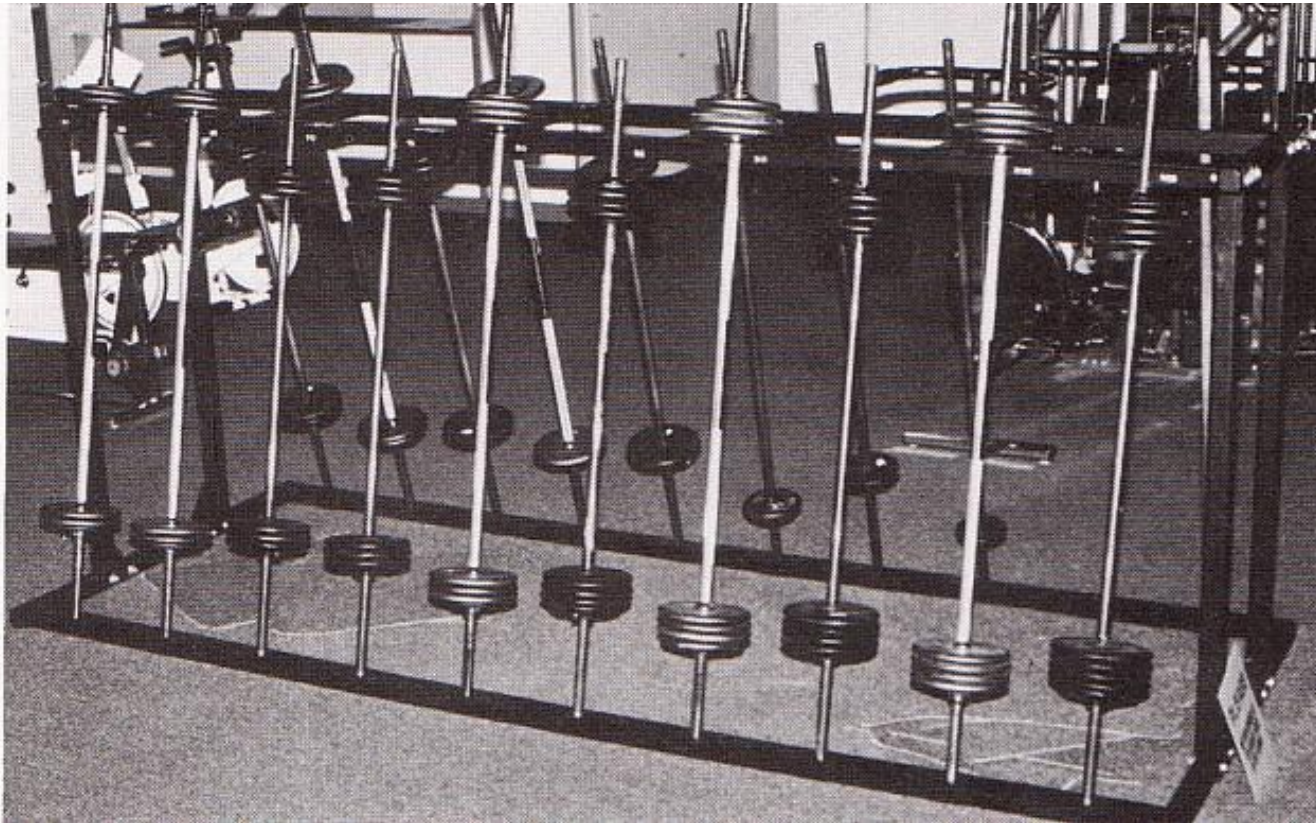
NB: $\approx 5-10^\circ$
around set \leftarrow ,
 \rightarrow limited
functionality!



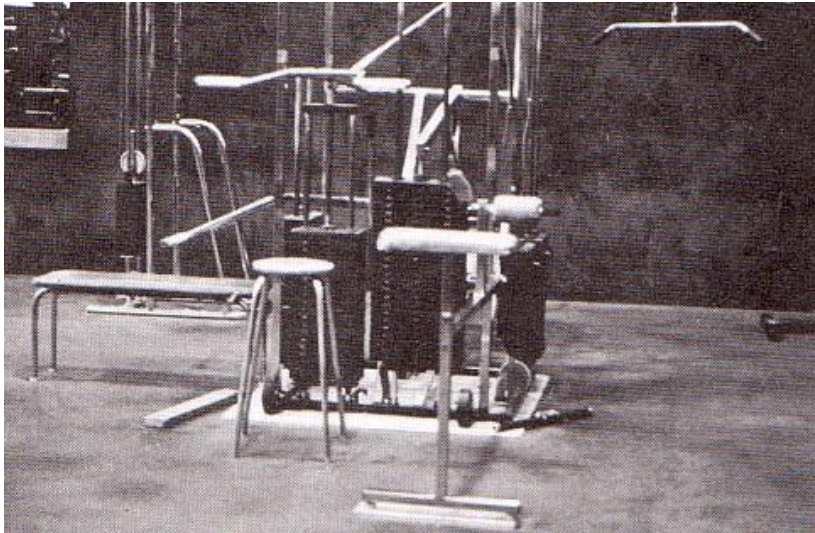
Functional isometrics at an early age!



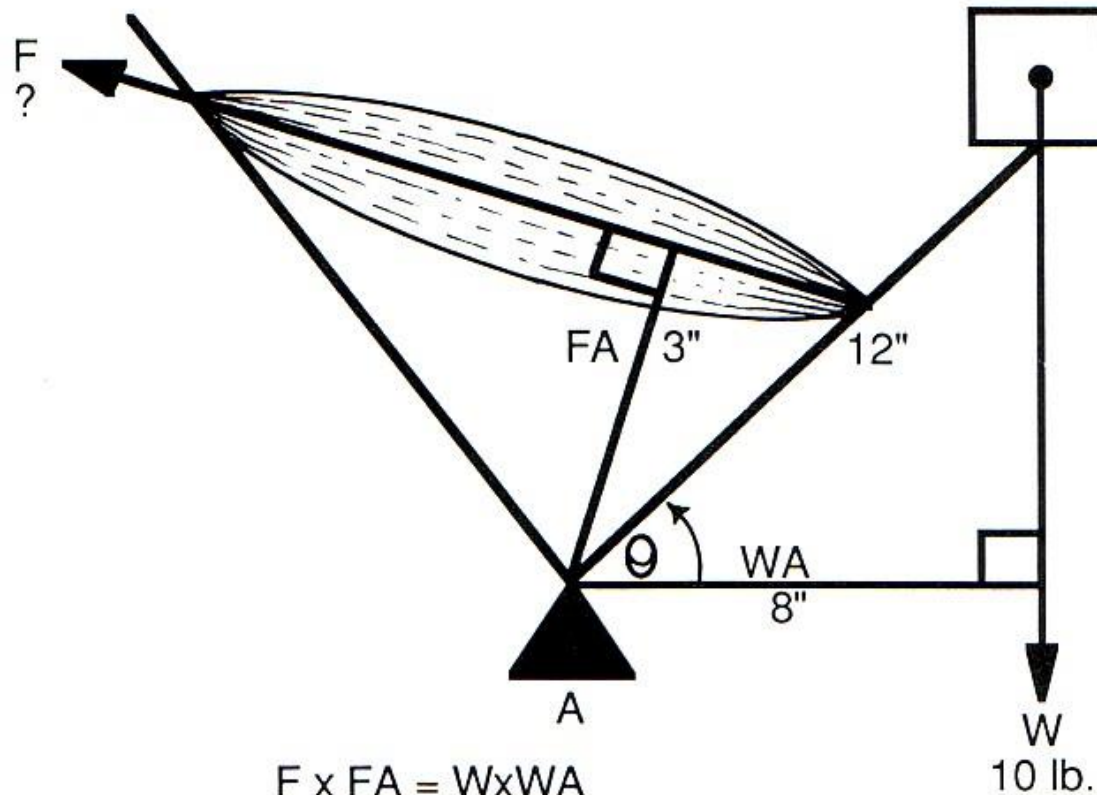
Isotonic Barbells & Dumbbells



Most CWT Machines & WT Equipment Isotonic



Force x Force Arm = Weight x Weight Arm



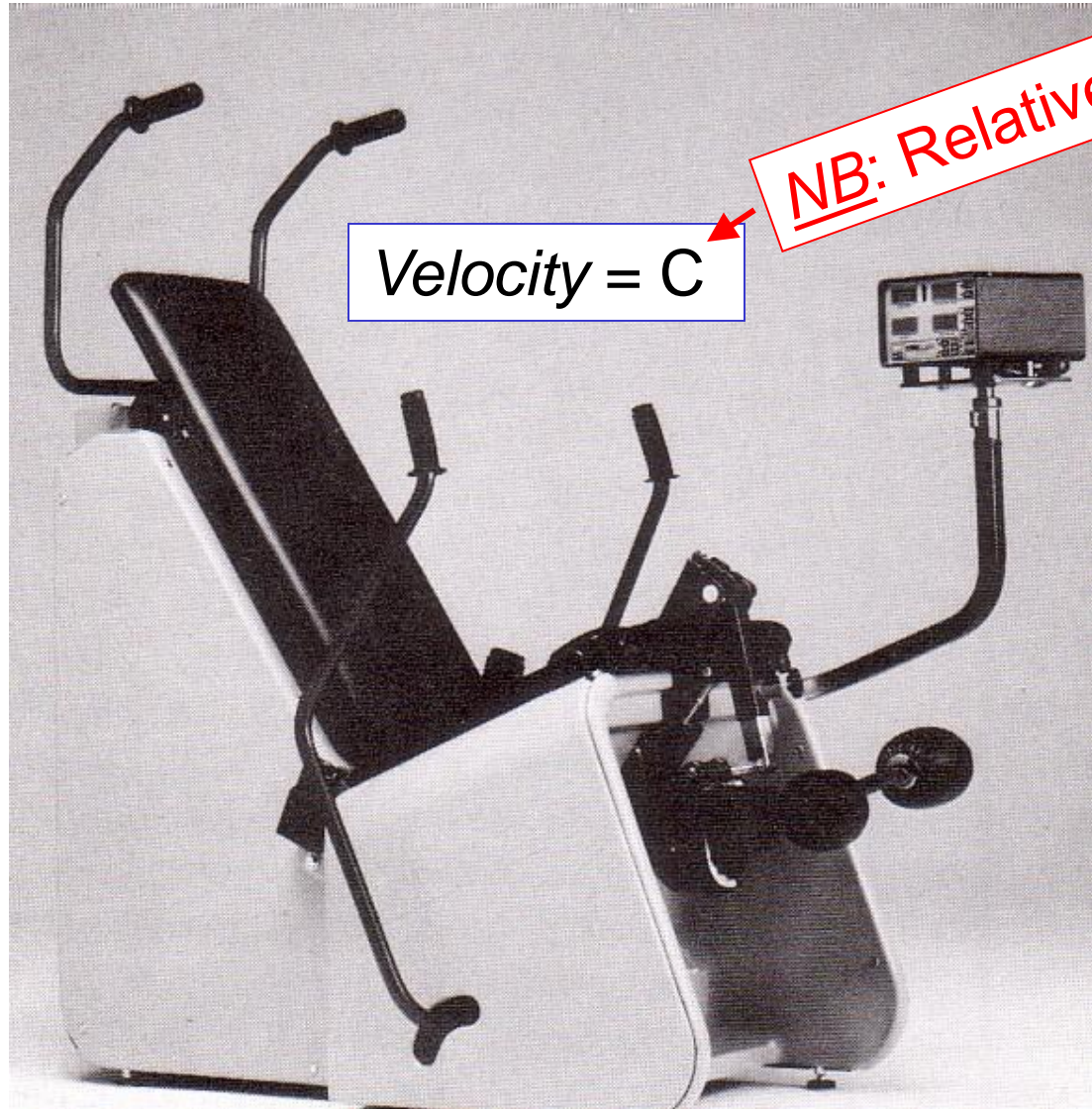
$$F \times FA = W \times WA$$

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

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

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

Isokinetic Omni-tron: Concentric-Concentric



$Velocity = C$

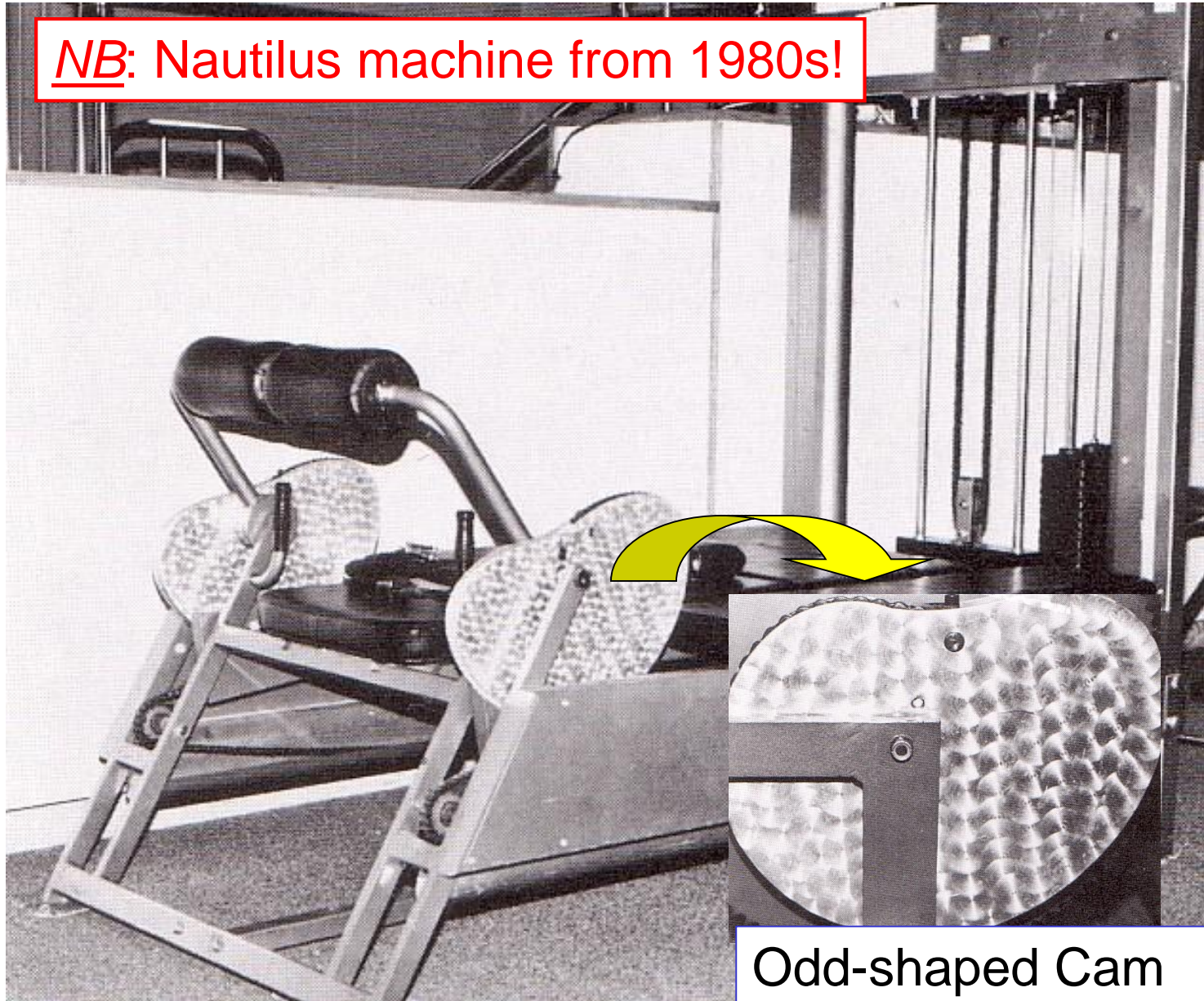
NB: Relatively constant!

**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)

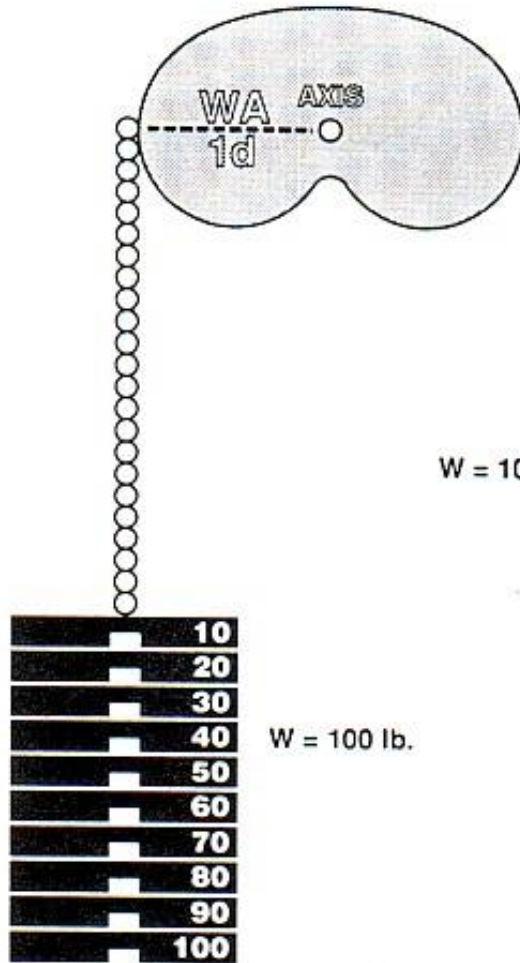
NB: Nautilus machine from 1980s!



Odd-shaped Cam

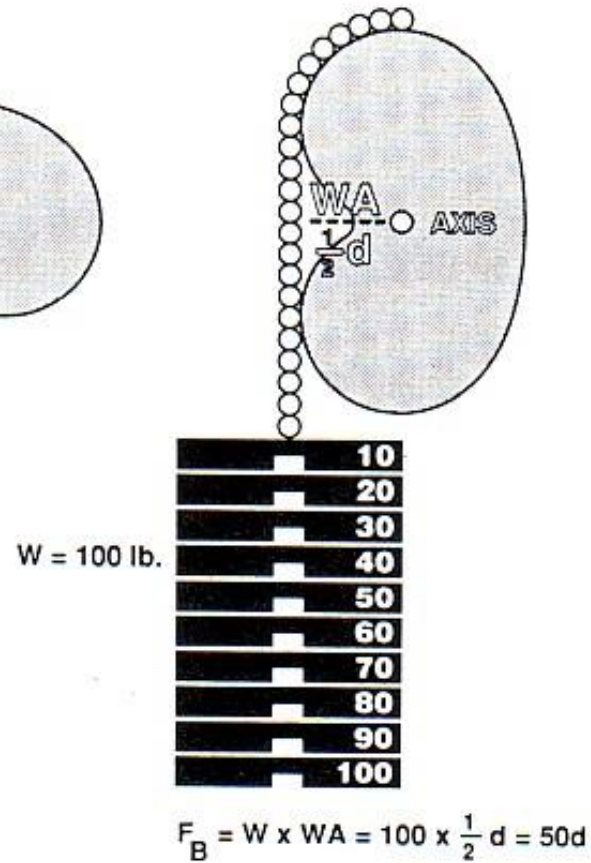
Simplified Cam System

A. Start



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

B. Finish



$$F_B = W \times WA = 100 \times \frac{1}{2}d = 50d$$



Olympic Lifts

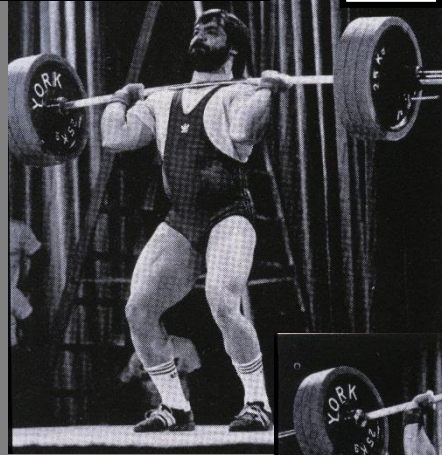
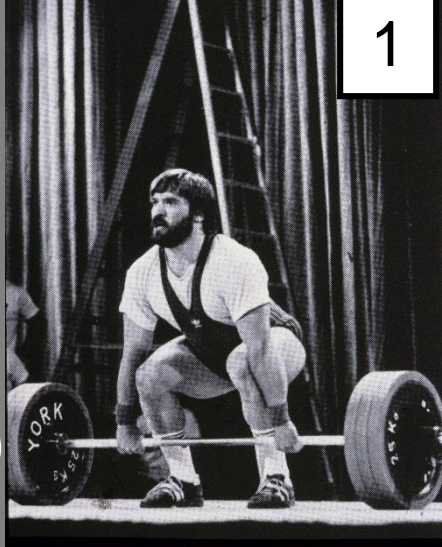
1. Clean & Jerk

2. Snatch

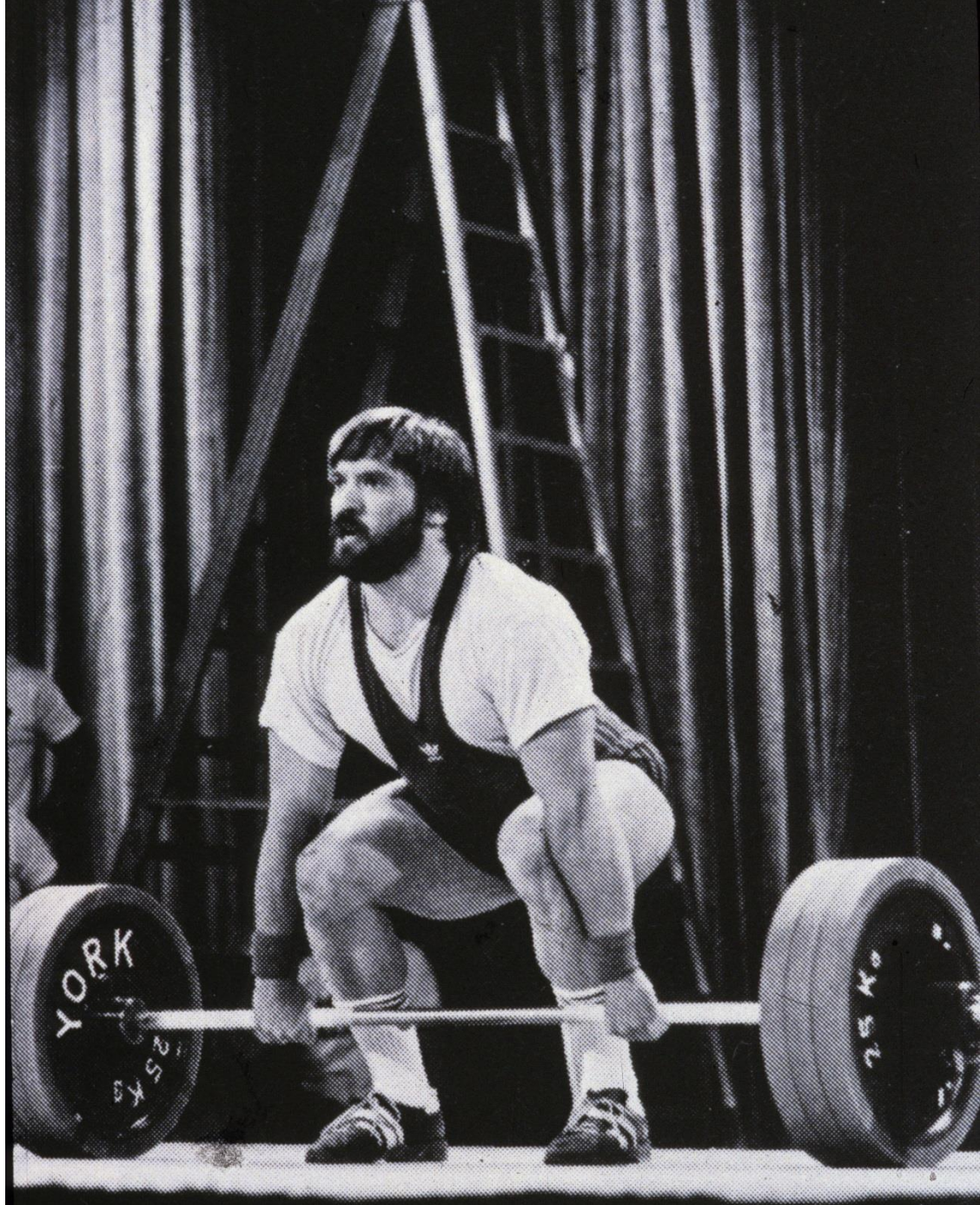


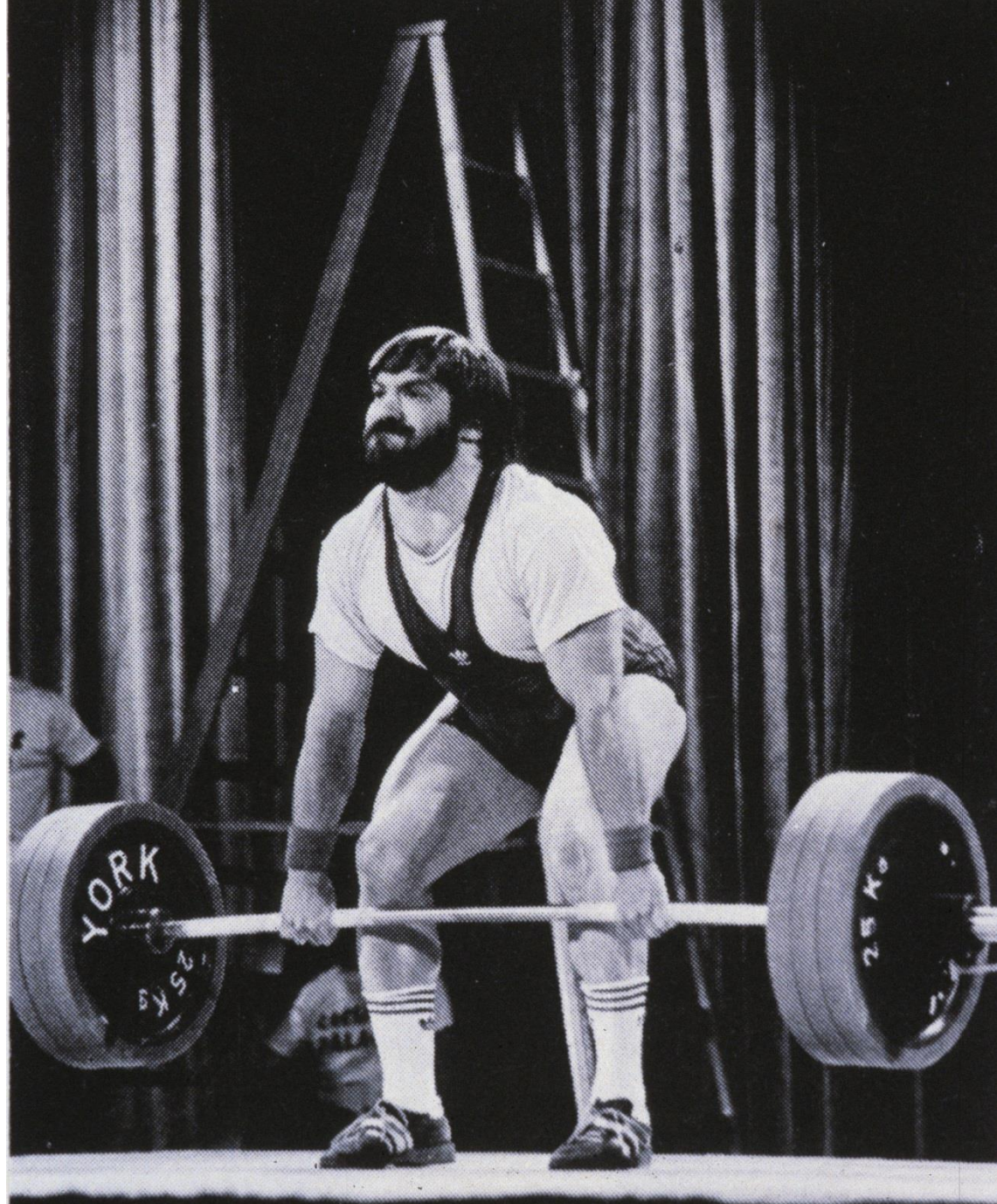
Clean & Jerk

Hip
Thigh front
back
(inside)
Back lower
upper
Neck
Shoulder
Arm front
back
Forearm front
back

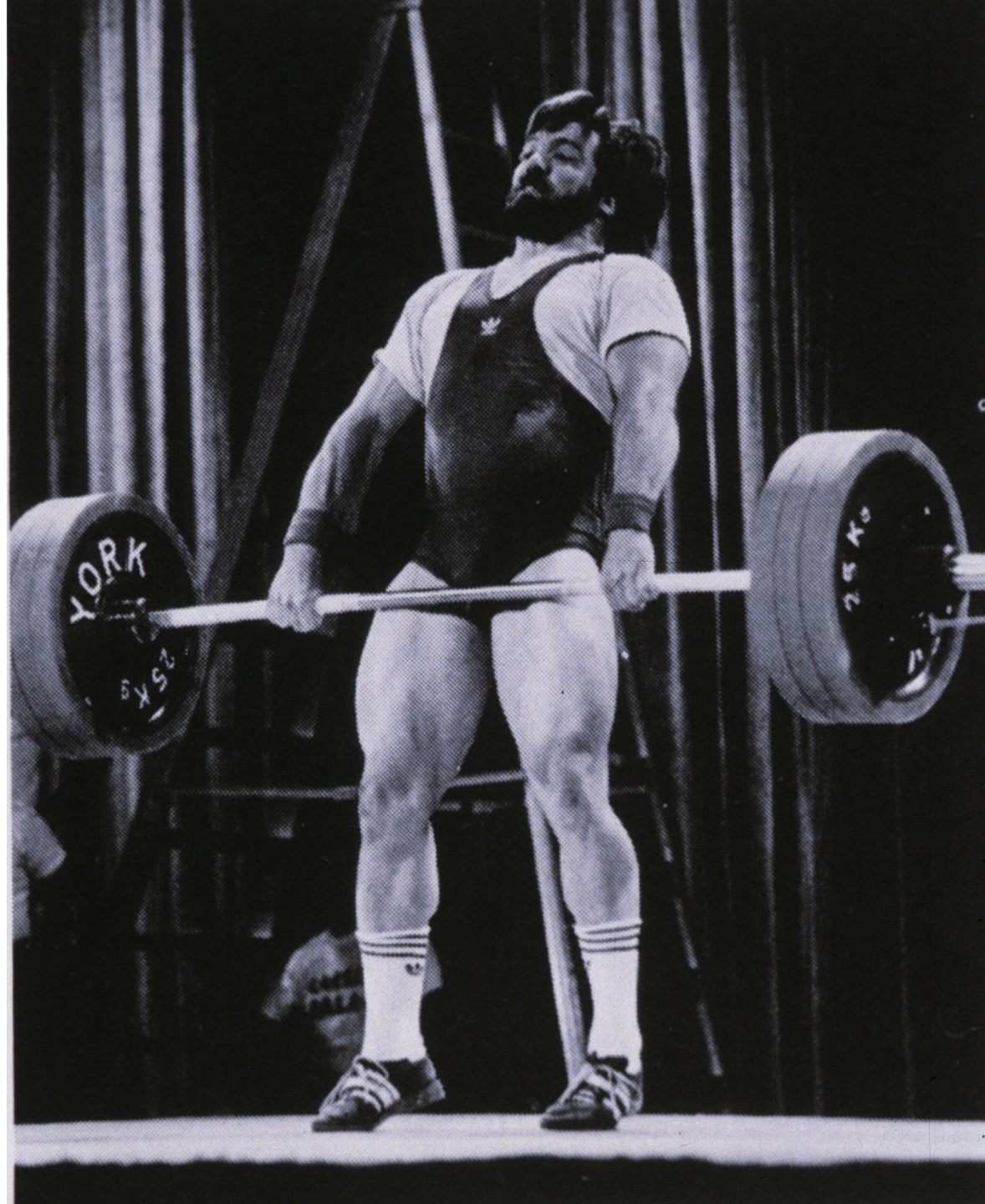


Gluteal group
Quadriceps
Hamstrings
(Adductors)
Erector spinae
Quadratus l+
Trapezius
Rhomboids
Levator s
Splenius c+
Deltoid
Biceps brachii
Triceps brachii
Brachioradialis+
Flexor digit+

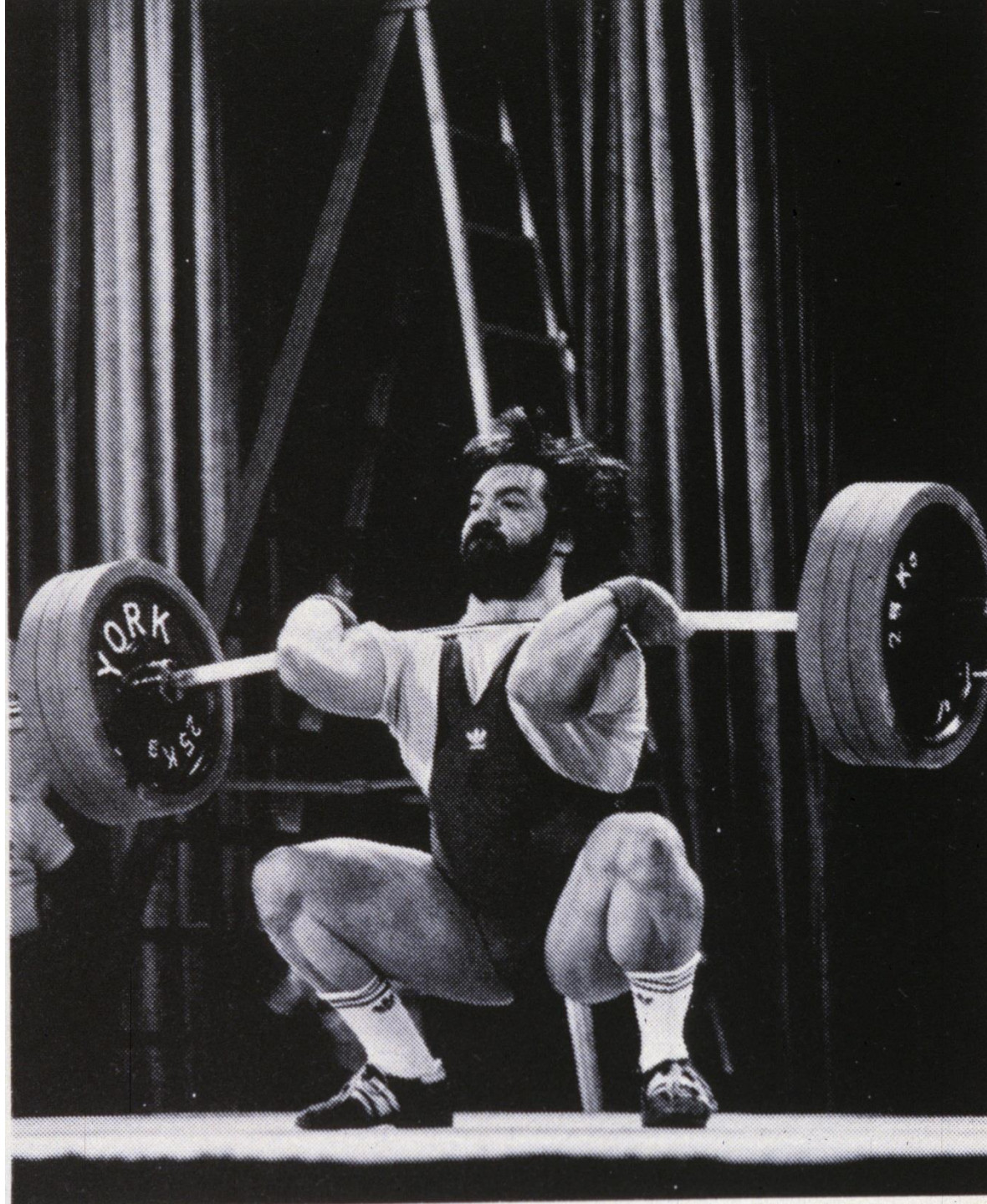




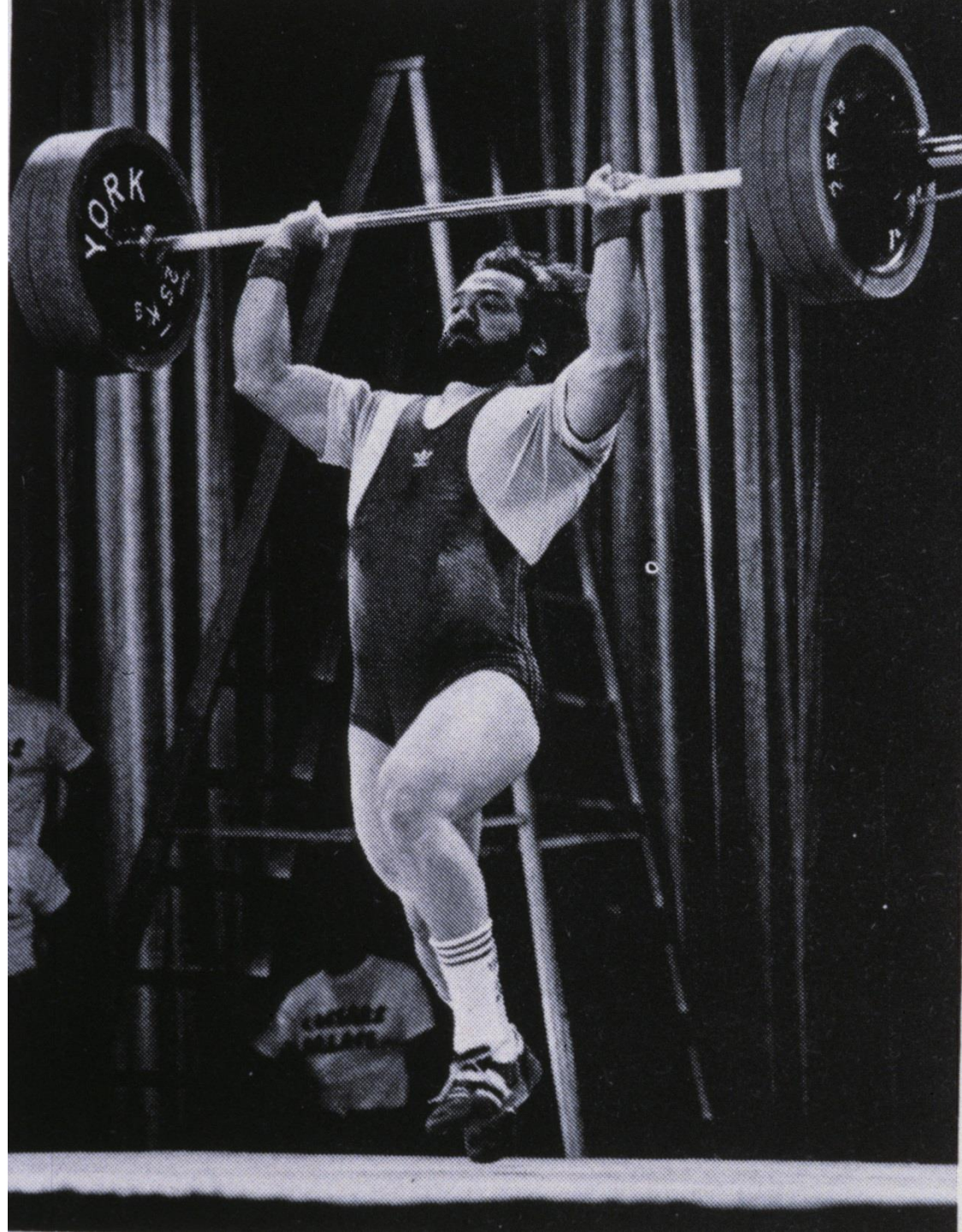








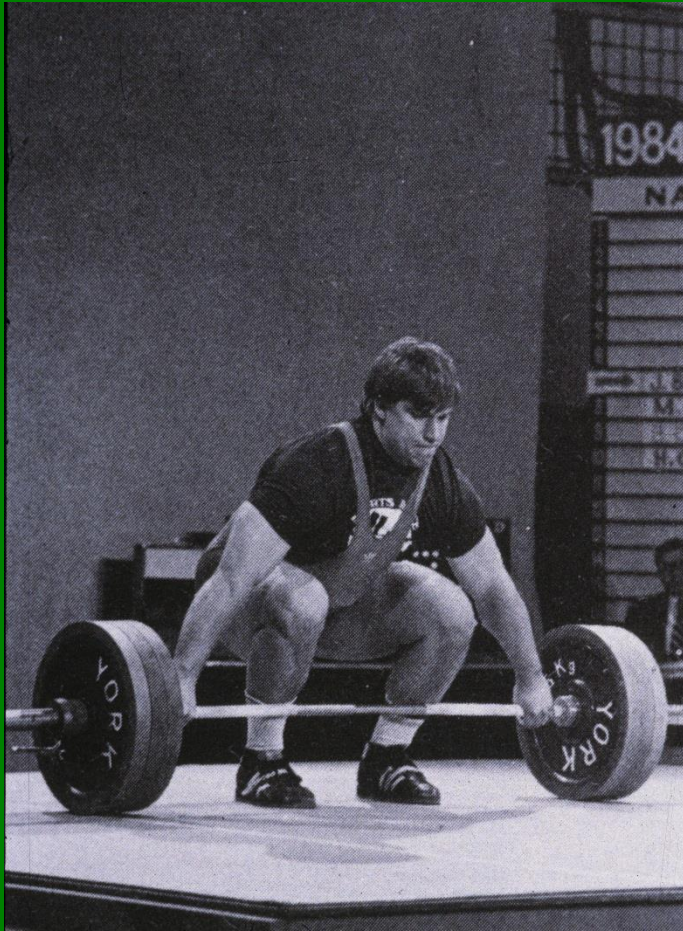




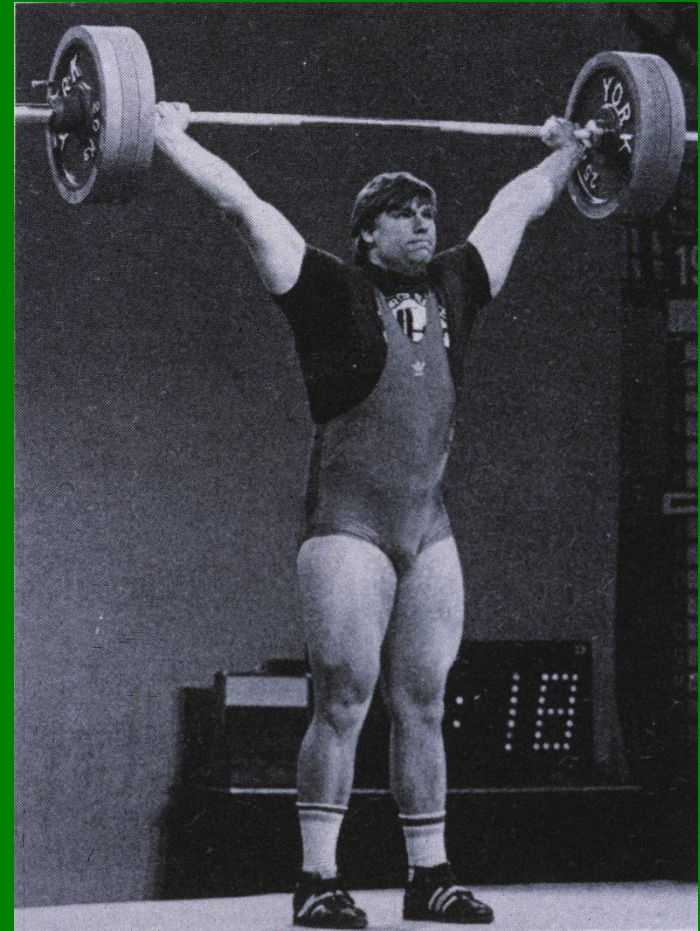


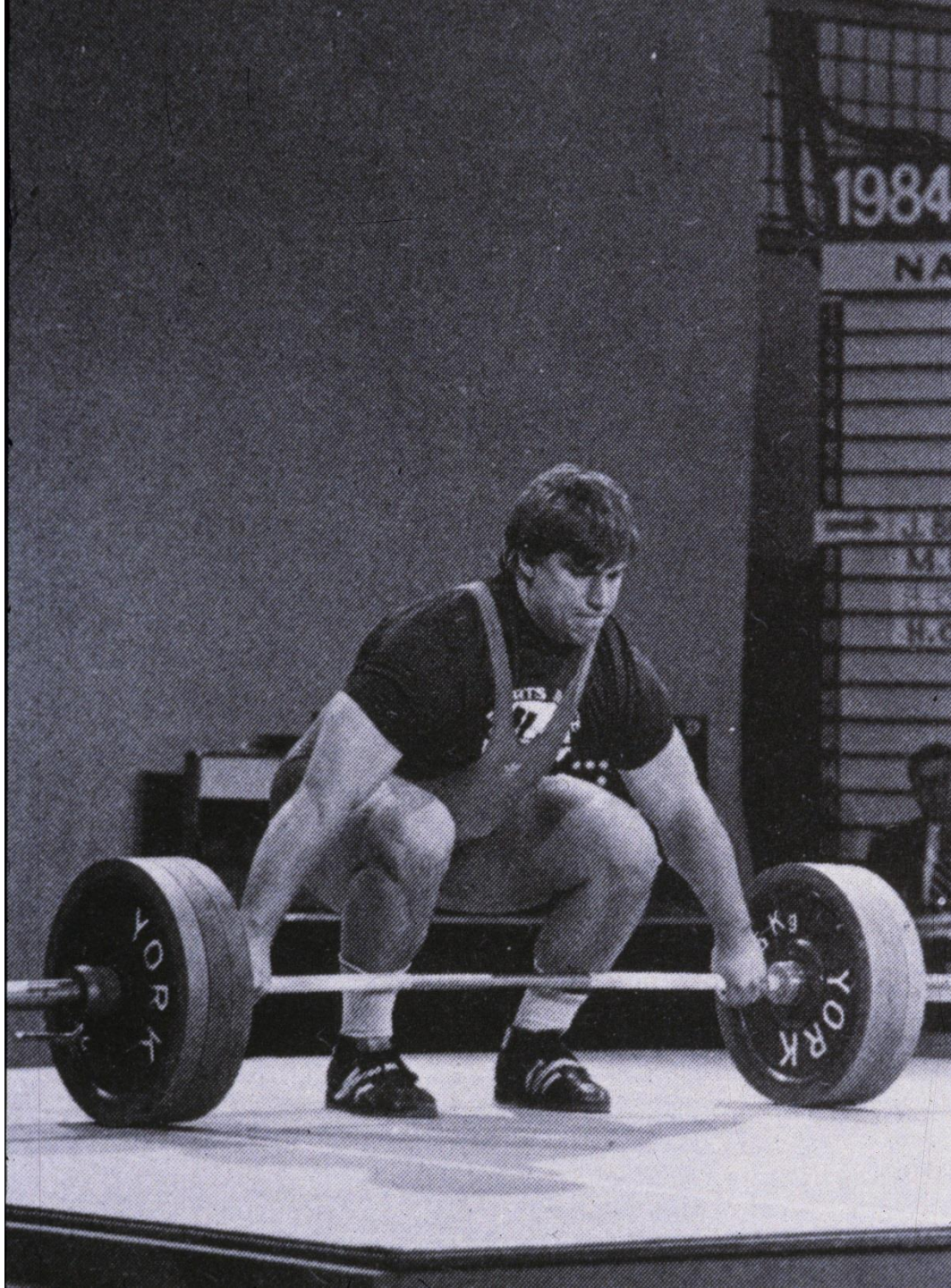


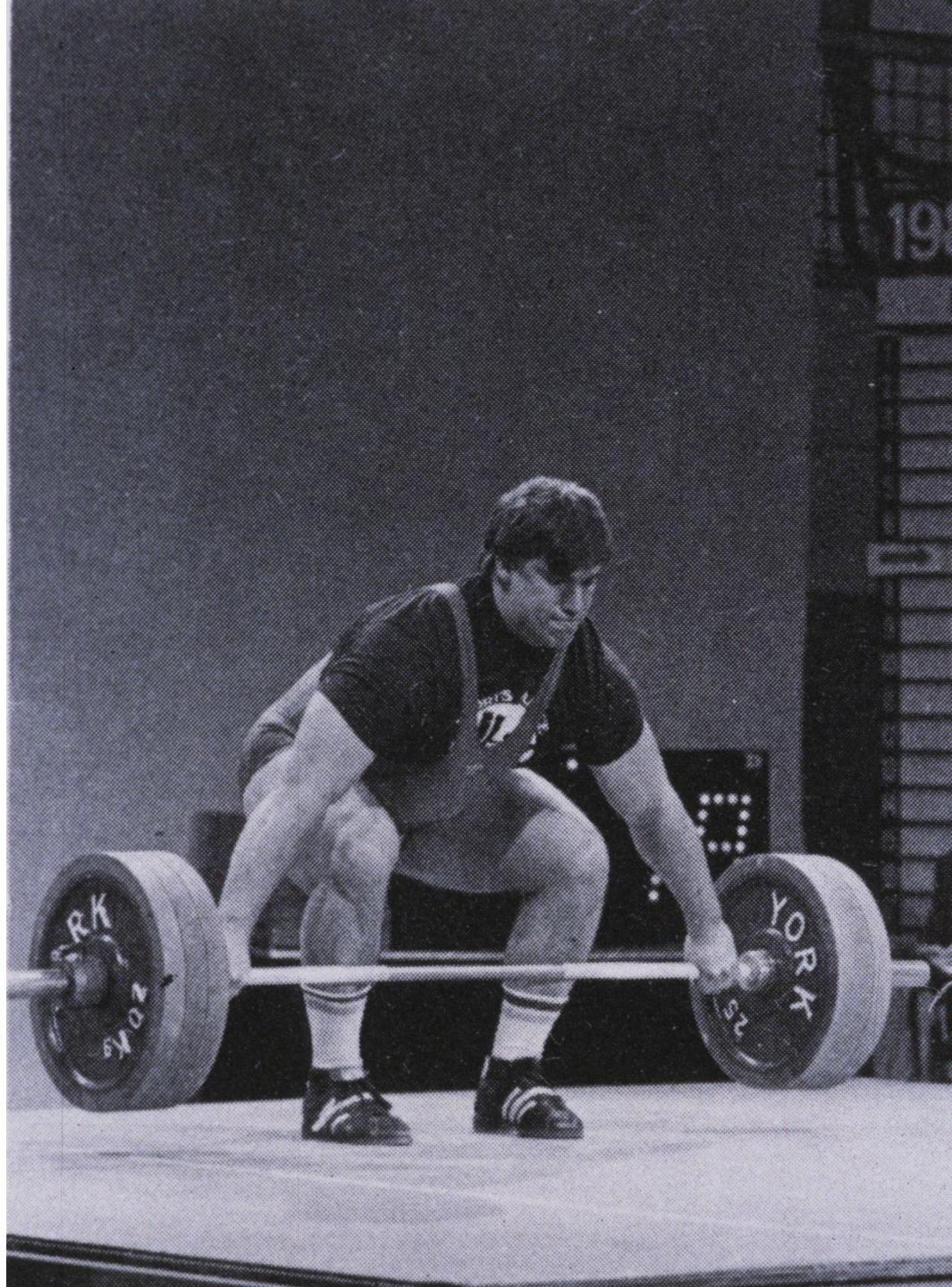
The snatch works nearly identical muscles, but is a more continuous movement of the bar from the floor to a point directly overhead! Wow!

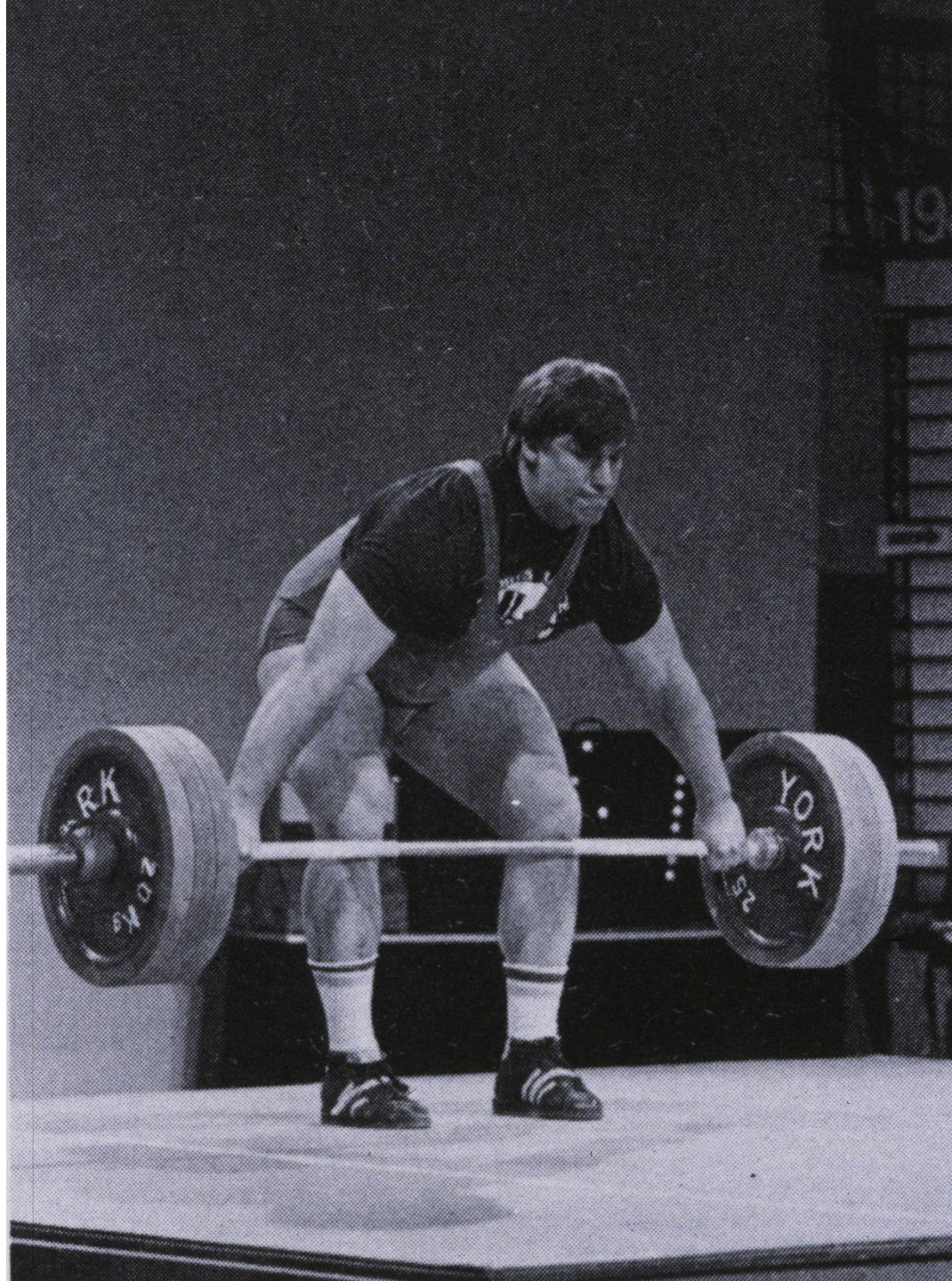


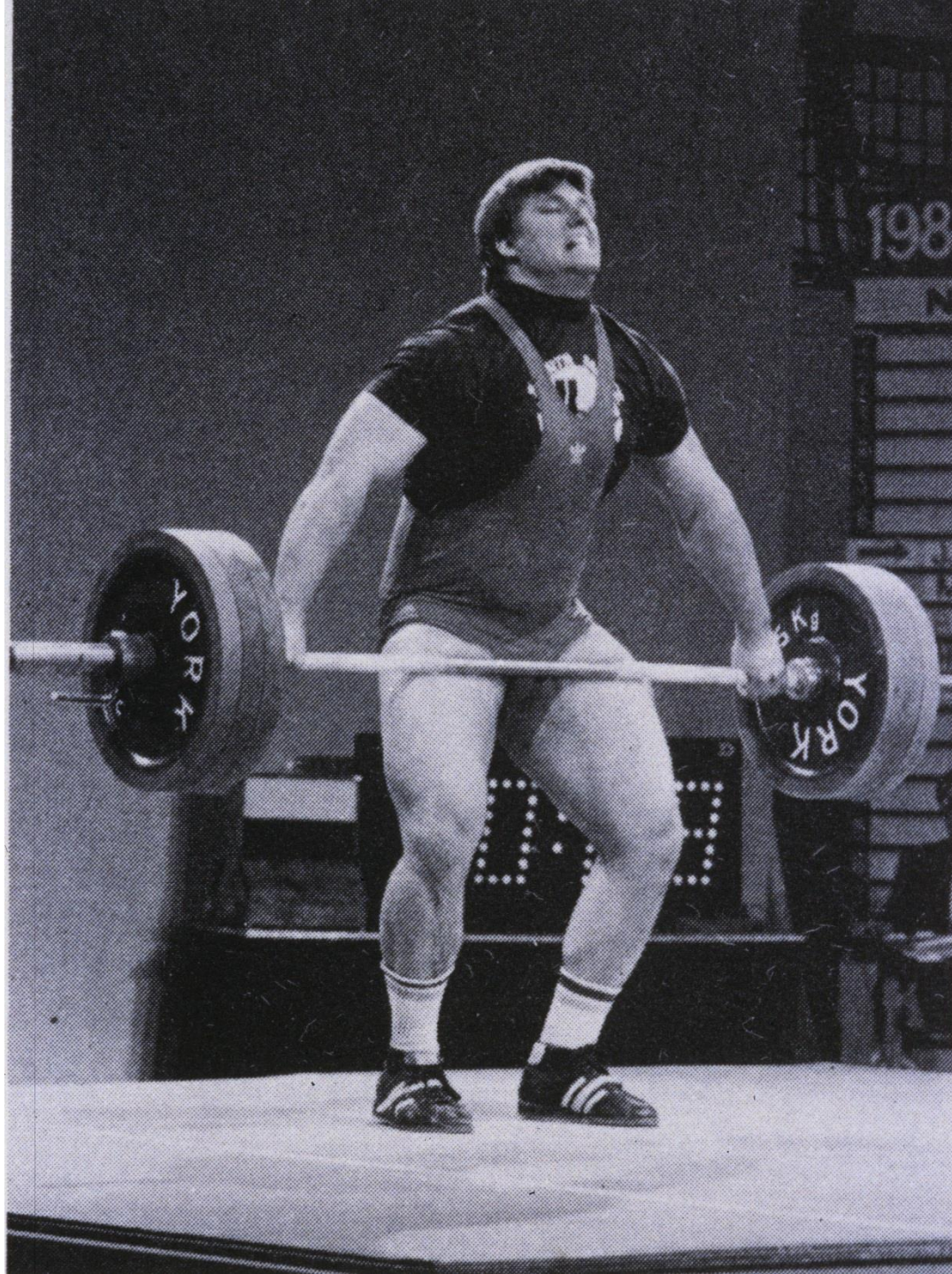
*Shear
Power*



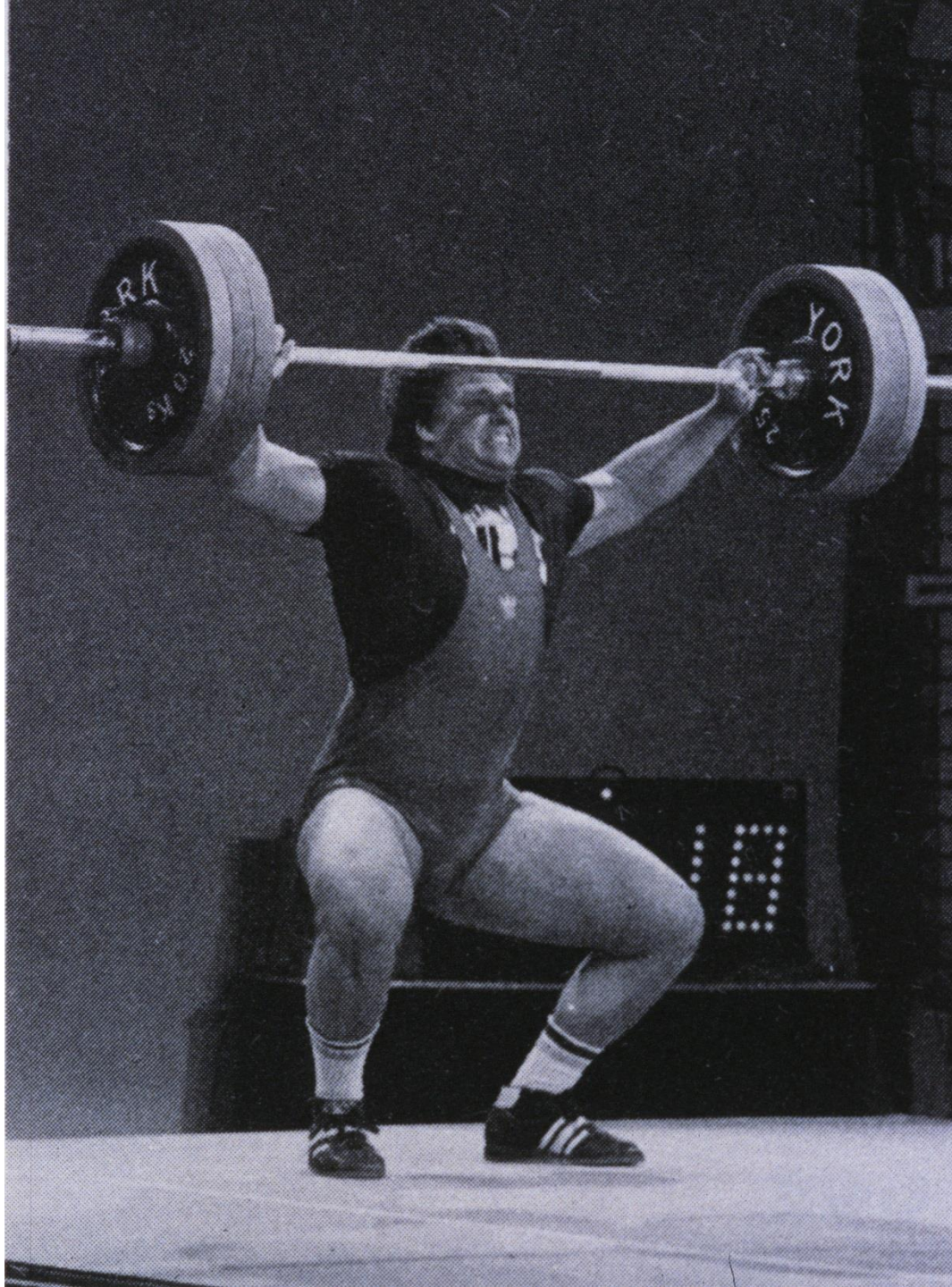


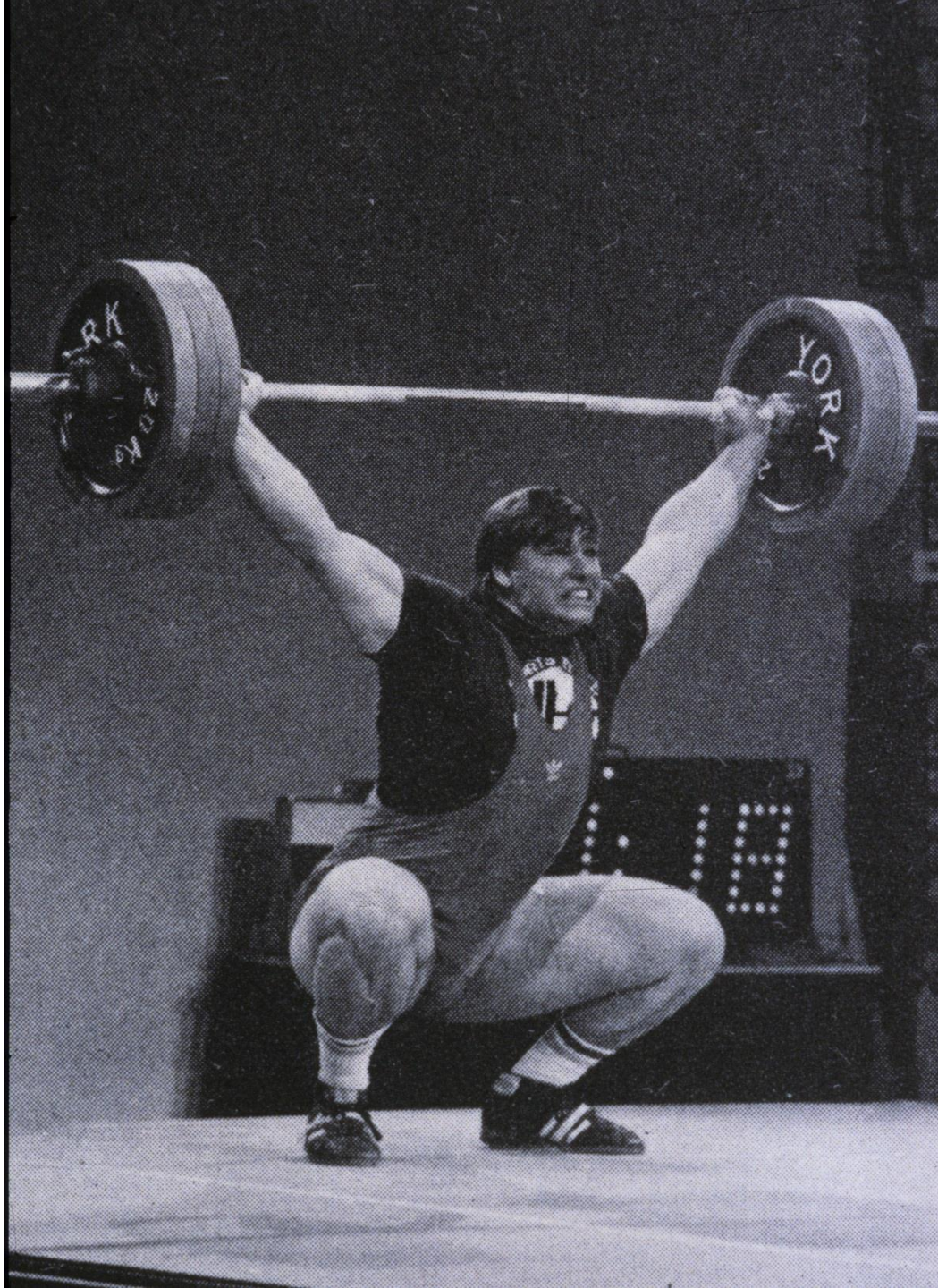
















Discussion

+ Q?