Quiz Bowl Day is here! Tonight Anatomy Lab 7 pm.
Next Tuesday, Olympic Lifting technique!!

BI 199 APWT Discussion 12

I. **Announcements** Poster outlines?
   Anatomy Lab tonight! Hooray!

II. **Quiz Bowl Group Competition**

III. **Quiz Bowl Review & Scoring!**

IV. **Proper Weight Loss + Connections**

Don’t worry Tiggr, we’re taking the Quiz in groups! We’ll be fine!

Tiggr’s a lil’ nervous ‘bout da Quiz Bowl – rather be doing plyos?
1. Which of the following is the *study or science of structure*, that primarily identifies macroscopic structures and asks questions about *what* and *where*?

2. *Abduction* is an action that
   a. decreases a joint angle.
   b. increases a joint angle.
   c. moves a limb away from the midline of the body.
   d. moves a limb toward the midline of the body.

3. Weight training is *least likely to induce substantial improvements in which of the following components of health-related fitness*?
   a. Cardiorespiratory endurance
   b. Flexibility
   c. Muscular strength & local muscular endurance
   d. % Body fat
   e. Neuromuscular relaxation

4. Which exercise pair best demonstrates *superior-inferior balance*?
5. Which muscle groups are worked extensively by the squat, but not by the leg press?
   a. Gluteal group  b. Quadriceps  c. Adductors  d. Erector spinae

6. Why use soft knees or bend the knees for all standing exercises?
   a. To decrease tautness of the iliopsoas group.
   b. To prevent tugging on the lumbar spine.
   c. To decrease stress on vertebral column ligaments.
   d. To protect the lower back.
   e. All of the above are correct.

7. Which of the following single-joint action exercises is best for working the pectoral group and eliminates the triceps brachii?

8. The Bodybuilder’s Syndrome is a disproportionate focus on the development of which muscle regions?

9. Which exercise best isolates the soleus?

10. Which grip is best for isolating the latissimus dorsi muscles?
1. Which of the following is the study or science of structure...? 

ANATOMY vs PHYSIOLOGY

STRUCTURE vs FUNCTION

WHAT? vs HOW?

WHERE? vs WHY?
2. Abduction is an action that
   a. decreases a joint angle.
   b. increases a joint angle.
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3. Weight training is least likely to induce substantial improvements in which of the following components of health-related fitness?

- a. Cardiorespiratory endurance
- b. Flexibility
- c. Muscular strength & local muscular endurance
- d. % Body fat
- e. Neuromuscular relaxation
4. Which exercise pair best demonstrates **Superior-Inferior balance**?
- a. Leg ext-Leg curl  
- b. Bench press-Squat  
- c. Biceps curl-triceps ext  
- d. a., b. & c.
5. Which muscle groups are worked extensively by the squat, but not by the leg press?

- Lower back

a. Gluteal group  

b. Quadriceps  

c. Adductors  

d. Erector spinae
6. Why use *soft knees* or *bend the knees* for all standing exercises?

a. To decrease tautness of the iliopsoas group.
b. To prevent tugging on the lumbar spine.
c. To decrease stress on vertebral column ligaments.
d. To protect the lower back.
e. All of the above are correct.
Lower back stress by flexing hips & bending knees
Contract abdominals, bend knees, widen stance to reduce back stress!
Iliopsoas with Knees Straight vs. Bent?

Taut & tugs on lower back!

Knees Straight

Collapsed & relieves stress!

Knees Bent

110°

Hip Flexors? Iliopsoas, rectus femoris, sartorius

Feet Anchored vs. Unanchored? Unanchored
7. Which of the following *single-joint action exercises* is best for working the *pectoral group* and eliminates the *triceps brachii*?

a. Lat pull  
   b. Chest fly  
   c. Military press  
   d. Bench press

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1. Chest Fly

Pectoral group

Anterior deltoid

2.
Correct Fly Technique: Hug the Oak Tree!!

Pretty good technique, but keep those wrists straight!
8. The *Bodybuilder’s Syndrome* is a disproportionate focus on the development of which muscle regions?

a. Posterior-Inferior  

b. Anterior-Superior  

c. Anterior-Posterior  

d. Superior-Inferior
9. Which exercise best isolates the *soleus*?
   a. Russian dead lift  
   b. Straight-knee calf raise  
   c. Bent-knee calf raise  
   d. Lunge

A. *Knee straight*  
   **Gastrocnemius** stretched & engaged!

B. *Knee bent*  
   **Gastrocnemius** slack, **soleus** engaged
10. Which **grip** is best for isolating the *latissimus dorsi muscles*?
   
Shoulder-width grip ➞ more Latissiumus dorsi

Wider grip ➞ more Rhomboids, middle Trapezius
Rhomboid muscles include Major & minor

Courtesy S. Dawson, U of O
Physiology & Nutrition in the News!
Lose 30 lb in 30 days, Magic?

What about science?
32-wk Transformation?!! 401 lb to 222 lb!
179 lb in 224 d $\equiv 0.8$ lb/d $\equiv 5.6$ lb/wk $\equiv 22.4$ lb/mo

Good morning = forward bend

**NB**: Low back? Knees bent...

Bruce Randall as he appeared when he weighed over 401 lb, performing a Forward Bend exercise with 685 lb.

and Bruce Randall as he looked when he won the Mr. Universe Contest at a bodyweight of 222 lb.
Bruce Randall 1959 NABBA Mr. Universe
THE BARBELL WAY TO PHYSICAL FITNESS

Bruce Randall (Mr. Universe)

foreword by Stan Musial

A simple effective program for weight control and a sound muscular body through the use of barbells and proper diet.

With over 190 photographs
I'm not sure I believe you! Why can't I just starve to lose weight?
TOTAL FAST = No Energy Nutrients (No Carbohydrates, Fats or Proteins)

ONLY

1. Water
2. Vitamins
3. Minerals

60-day Fast???

Lost 60 lb!! Wow!!

Yet

76.7% \[\begin{align*}
26 \text{ lb Water} \\
20 \text{ lb Lean Body Mass} \\
14 \text{ lb Fat}
\end{align*}\]

Fat < ¼ total wt loss!
You can lose weight by starving – but it's mostly water & muscle! Also, there can be complications!
Potential Complications of Total Fasting

Nausea, diarrhea, persistent vomiting, postural hypotension, nutritional deficiencies, menstrual irregularities, and...sudden death.

Positive Aspect??

General loss of appetite within first 2 days, maintained throughout fasting period.


*NB:* Each group 500 kcal deficit/day, 16 weeks
Compared to dieting, exercise is superior in inducing % body fat reduction & preserving lean body mass!
Lose no more than 2.2 lb or 1 kg/wk!
Table H.1 Sample Exercises for Major-Minor, Agonistic-Antagonistic, and Superior-Inferior Programs

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Muscular Regions</th>
<th>Sample Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major-Minor (M-M)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Chest and lower extremity</td>
<td>Bench press and accessory chest; squat and accessory thigh and leg exercises.</td>
</tr>
<tr>
<td></td>
<td>Back, shoulder, and arm</td>
<td>Lat pull, military press, biceps curl, triceps extension, and accessory SJA exercises&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Agonistic-Antagonistic (A-A)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Chest, shoulder, and triceps</td>
<td>Bench press and accessory chest; military press, triceps extension, and accessory SJA exercises</td>
</tr>
<tr>
<td></td>
<td>Lower extremity, back, and biceps</td>
<td>Squat and accessory thigh and leg exercises; lat pull and accessory back exercises</td>
</tr>
<tr>
<td>Superior-Inferior (S-I)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Chest, shoulder, back, and arm</td>
<td>Bench press and accessory chest; military press, lat pull, biceps curl, triceps extension, and accessory SJA exercises</td>
</tr>
<tr>
<td></td>
<td>Lower extremity</td>
<td>Squat and accessory thigh and leg exercises</td>
</tr>
</tbody>
</table>

NB: Some bodybuilding routines push-pull over separate days.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Isometric</th>
<th>Isotonic</th>
<th>Isokinetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Contraction/Synonym</td>
<td>Static</td>
<td>Dynamic</td>
<td>Dynamic&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Relative Expense</td>
<td>None or low</td>
<td>Low&lt;sup&gt;b&lt;/sup&gt; to high&lt;sup&gt;c&lt;/sup&gt;</td>
<td>High</td>
</tr>
<tr>
<td>Maintenance</td>
<td>None or low</td>
<td>Low&lt;sup&gt;b&lt;/sup&gt; to moderate&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Moderate to high</td>
</tr>
<tr>
<td>Portability</td>
<td>Not required</td>
<td>Easy&lt;sup&gt;b&lt;/sup&gt; to difficult&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Moderate to difficult</td>
</tr>
<tr>
<td>Concentric loading</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Eccentric loading</td>
<td>No</td>
<td>Yes</td>
<td>No&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Accommodation</td>
<td>No</td>
<td>No&lt;sup&gt;b&lt;/sup&gt;/Yes&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td>Intramuscular tension</td>
<td>Low to high?</td>
<td>Moderate&lt;sup&gt;b&lt;/sup&gt; to high&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Moderate to high</td>
</tr>
<tr>
<td>Potential for delayed muscle soreness</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Potential for rehabilitation</td>
<td>Limited</td>
<td>Moderate to high</td>
<td>High</td>
</tr>
</tbody>
</table>

<sup>a</sup>Since the velocity on isokinetic devices may be set to zero, static contractions are also possible.

<sup>b</sup>For free-weight barbells, dumbbells, and most other constant load devices.

<sup>c</sup>For isotonic dynamic accommodating resistance (DAR) devices.

<sup>d</sup>New 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

\[ NB: \approx 5-10^\circ \text{ around set } <, \rightarrow \text{ limited functionality!} \]
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

B. Finish

\[ F_A = W \times WA = 100 \times 1d = 100d \]

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

W = 100 lb.