I. **Announcements** This Thursday group Quiz @ 10 am, Anatomy Lab 7 pm! Big Day!! Update on outlines & presentation dates. Q?

II. **Review of Anatomy Lab 2 Exploration**

III. **Exercise Physiology & Nutrition in the News**

30 lb 30 d? Magic? Lose 179 lb in 32 wk? Is this possible? Fasting? What is considered reasonable weight loss?

American College of Sports Medicine

IV. **Intermediate to Advanced Program Design**?

V. **Exercise & System Classifications**

VI. **Q? Open Discussion + Getting to Know You**
Anatomy Lab 2 Exploration. Question 1

Identify & list muscles that are worked specifically by the straight & bent-knee calf raise. Which muscles are stressed most by which unique form of the calf raise?

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

B. **Knee bent**
   
   Gastrocnemius slack, **soleus** engaged
Anatomy Lab 2 Exploration. Question 2

Identify anterior thigh muscles worked by the leg extension exercise.

Name these four anterior thigh muscles specifically.

Which of these four (sub-) muscles is worked specifically by the last 10-15° of the leg extension?
Leg Extension

Front of thigh = quadriceps
Schematic of Anterior Left Thigh

- Rectus femoris
- Vastus intermedius
- Vastus lateralis
- Vastus medialis

Quadriceps

Tendons

Patella

L
L thigh anterior & medial

- Adductor
- Gracilis
- Vastus medialis
- Rectus femoris
- Patella/kneecap
L thigh anterior

Quadriiceps

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

NB: worked last 10-15° of knee extension
Find and identify muscles that are worked specifically by the *chest fly*.

Why is this exercise described like “hugging an oak tree” or "hugging grandma"?

Which *joint/joints* should be stabilized *during the chest fly*?

What muscle groups are activated by the *bench press*, but not by the *chest fly*?
Correct Fly Technique: Hug the Oak Tree!!

Pretty good technique, but keep those wrists straight!
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

Chest Fly does not activate the triceps (except isometrically) whereas Bench Press does!
Anatomy Lab 2 Exploration. Question 4

Find and identify *three major muscle groups* worked by the *military press*. Classify this exercise as *squat* or *push* or *pull*.

Which muscle groups activated by the *military press* are not exercised extensively by the *bench press*?

Which muscle groups worked by the *bench press* are not exercised extensively by the *military press*?
Military Press

- Shoulder – front & middle
- Arm – back
- Neck

Push Exercise
Does not active chest/pectoral muscles

- Anterior & Middle Deltoid
- Supraspinatus
- Triceps Brachii
- Anterior neck muscles
- Sternocleidomastoid
- Posterior neck muscles
- Upper trapezius
- Levator scapula
Anatomy Lab 2 Exploration. Question 5

Identify at least three major muscle groups worked by the lat pull.

Classify this exercise as squat or push or pull.

Can you find subsections or unique parts of any of these major muscle groups? If so, identify them below?

Can the subsections you’ve chosen be isolated based on the specific exercise or grip performed?
What are upper & lower extremity climbing muscles?
Some Muscles the Lat Pull & Row Activate

- Trapezius
- Posterior Deltoid
- Latissimus Dorsi
- Biceps + Forearm Teres m.
Trapezius = Shaped like a Trapezoid
Teres Minor above the Major!
Which grip is best for isolating the *latissimus dorsi* muscles?

a. Supinated wide  
b. Pronated shoulder-width  
c. Alternate wide  
d. Pronated wide
Shoulder-width grip → more Latissimus dorsi

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

- 26 lb Water
- 20 lb Lean Body Mass
- 14 lb Fat

Fat < \(\frac{1}{4}\) 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>

<sup>a</sup> 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(^a)</td>
</tr>
<tr>
<td>Relative Expense</td>
<td>None or low</td>
<td>Low(^b) to high(^c)</td>
<td>High</td>
</tr>
<tr>
<td>Maintenance</td>
<td>None or low</td>
<td>Low(^b) to moderate(^c)</td>
<td>Moderate to high</td>
</tr>
<tr>
<td>Portability</td>
<td>Not required</td>
<td>Easy(^b) to difficult(^c)</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(^d)</td>
</tr>
<tr>
<td>Accommodation</td>
<td>No</td>
<td>No(^b)/Yes(^c)</td>
<td>Yes</td>
</tr>
<tr>
<td>Intramuscular tension</td>
<td>Low to high?</td>
<td>Moderate(^b) to high(^c)</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>

\(^a\)Since the velocity on isokinetic devices may be set to zero, static contractions are also possible.

\(^b\)For free-weight barbells, dumbbells, and most other constant load devices.

\(^c\)For isotonic dynamic accommodating resistance (DAR) devices.

\(^d\)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

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

A. Start

B. Finish

$W = 100 \text{ lb.}$

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

$F_B = W \times WA = 100 \times \frac{1}{2} d = 50d$
Group Overview of Presentations