



# Intro to Strength Training



*Total Fitness Series  
Strength Training*

# What are we going to cover ?



- ⌘ Basic Definitions
- ⌘ Benefits of strength training
- ⌘ Exercise Prescription
- ⌘ Principles
- ⌘ Introduction to Machines

# Basic Definitions



- ⌘ Resting Metabolism - the amount of energy (in calories) needed on a daily basis when your body is at rest. Accounts for 75% of your total caloric needs
- ⌘ Muscle - A contractile organ consisting of a special bundle of muscle tissue, which moves a particular bone, part, or substance of the body

# Strength Training, What are the Benefits?

## Increase Resting Metabolism

⌘ Muscle requires 35 calories per pound per day to maintain, while fat requires 2 calories per pound per day. Accounts for 75% of total calories burned each day.

 Muscle =  Resting Metabolism

Note: The average adult increases resting metabolic rate 7% by adding 3 pounds of muscle.

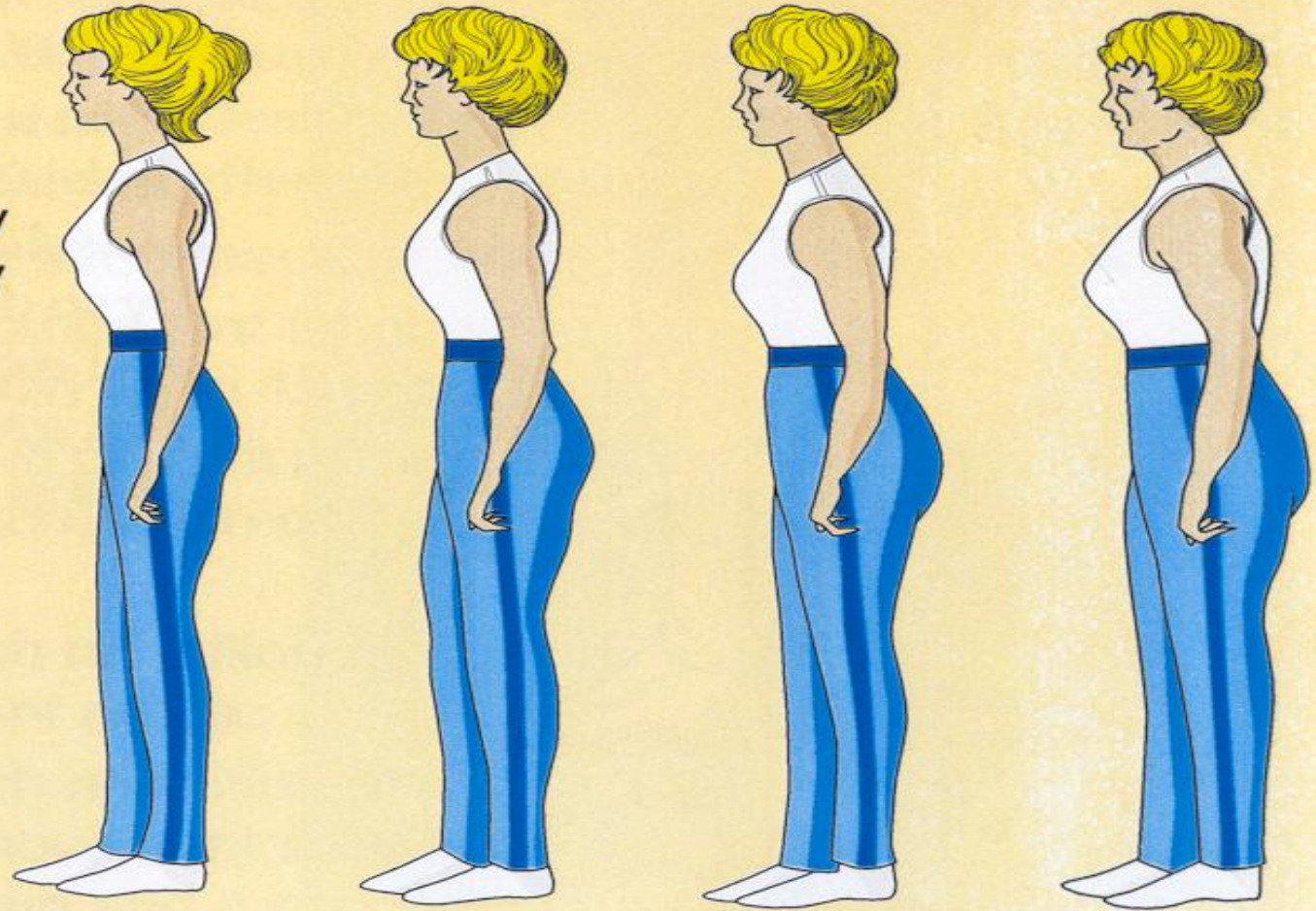
# Strength Training: Benefits Continued



## *Maintain / Gain Muscle Mass*

- ⌘ From about age 20, the average American loses about 5-7 pounds of muscle every 10 years
- ⌘ The only way to prevent muscle loss or increase muscle mass is through some form of resistance training

**Figure 1.** Body weight and body composition changes during adult life.

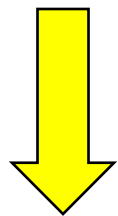


Age:	20	30	40	50
Bodyweight (lbs.)	126	136	146	156
Muscle (lbs.)	45	40	35	30
Fat (lbs.)	29	44	59	74
Percent Fat (%)	23	32	40	47

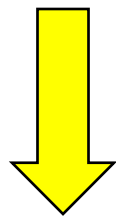
# Adding to the Problem...

## Diet and Muscle Loss

- ⌘ A low caloric diet will place your body in a state of calorie deprivation and cause weight loss (Yea!!!)
- ⌘ Unfortunately 25% of the weight lost comes from reduced muscle



Muscle =



Resting Metabolism

Note: Muscle mass can only be replaced by performing strength training

# Relationship Between Muscle and Metabolism

	<b>Body Weight*</b>	<b>Percent Fat</b>	<b>Fat Weight*</b>	<b>Lean Weight*</b>	<b>Estimated Muscle Weight*</b>	<b>Resting Metabolism %</b>
<b>Tracy</b>	<b>100</b>	<b>30</b>	<b>30</b>	<b>70</b>	<b>35</b>	<b>850</b>
<b>Tiffany</b>	<b>100</b>	<b>20</b>	<b>20</b>	<b>80</b>	<b>40</b>	<b>1075</b>
<b>Difference</b>	<b>----</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>5</b>	<b>225</b>

Data from BioAnalitics Diagnostic Medical Health Systems, Beaverton, Oregon

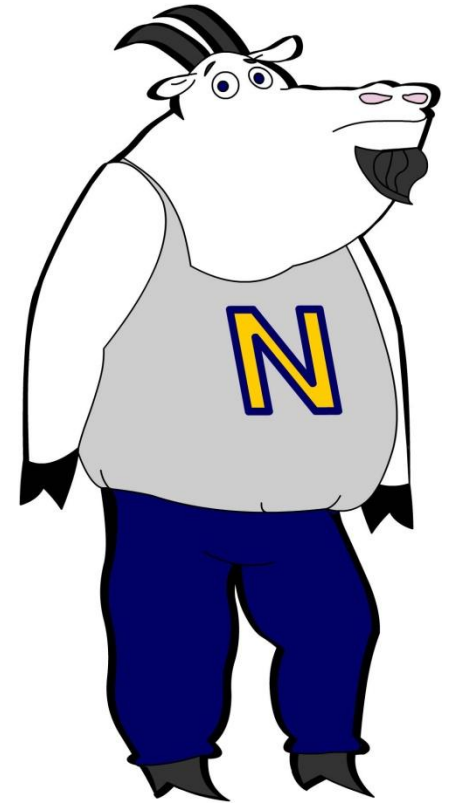
\*In Pounds

% In Calories

# Strength Training: Benefits Continued

## Reduce Body Fat

- ⌘ As muscle mass increases resting metabolic rate increases. This will cause a reduction in body fat assuming other factors (nutrition, etc.) remain constant.



Note: The average adult loses 4 pounds of fat after 3 months of strength exercise.

# Changes in body composition following eight weeks of strength and endurance exercise

Training Group	Lean Weight **	Fat Weight**	Body Composition Improvement
<b>Younger Adults</b>	<b>+3.0 Lbs</b>	<b>-8.5 Lbs</b>	<b>11.5 Lbs</b>
<b>Seniors</b>	<b>+2.5 Lbs</b>	<b>-4.0 Lbs</b>	<b>6.5 Lbs</b>

\*Significant Change ( $p < 0.05$ )

\*\*Change in Pounds

# Strength Training: Benefits Continued

## Increase PFA scoring

- ⌘ By increasing your maximum strength in your triceps, chest, hip flexors, and abdominals you will see an increase in the maximal number of repetitions you can accomplish during a strength endurance test (curl-ups and push-ups).



# Other Benefits of Strength Training



- ⌘ Increase Bone Mineral Density
- ⌘ Improve Cholesterol Levels in the Blood
- ⌘ Increase Gastrointestinal Transit Speed
- ⌘ Reduce Resting Blood Pressure
- ⌘ Reduce Low Back Pain
- ⌘ Reduce Arthritic Pain
- ⌘ Increase Physical and Mental Well-Being
- ⌘ Improve Glucose Metabolism
- ⌘ Improve PFA Results

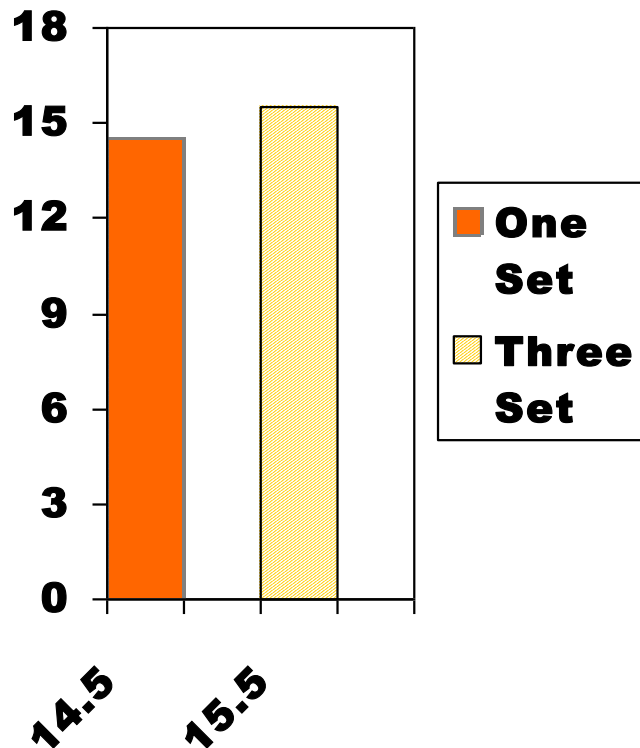
# Strength Training Guidelines

- ⌘ Days - 2 to 3 days per week
- ⌘ Time - 20 to 30 minutes per workout
- ⌘ Machines - 10 selectorized machines
- ⌘ Sets - 1 set to muscle failure per machine
- ⌘ Reps - 8 to 12 repetitions per set

Note: 1 to 3 Sets is generally recommended per muscle group. When performing multiple sets, do all sets on one machine before moving to the next machine.

# Strength Percentage Gain

## One Set VS Three Sets



- ⌘ One properly performed set of 8-12 repetitions (75% of your 1 repetition maximum) is as effective for increasing muscle strength as three sets
- ⌘ Single-Set training is more time-efficient than multiple set training

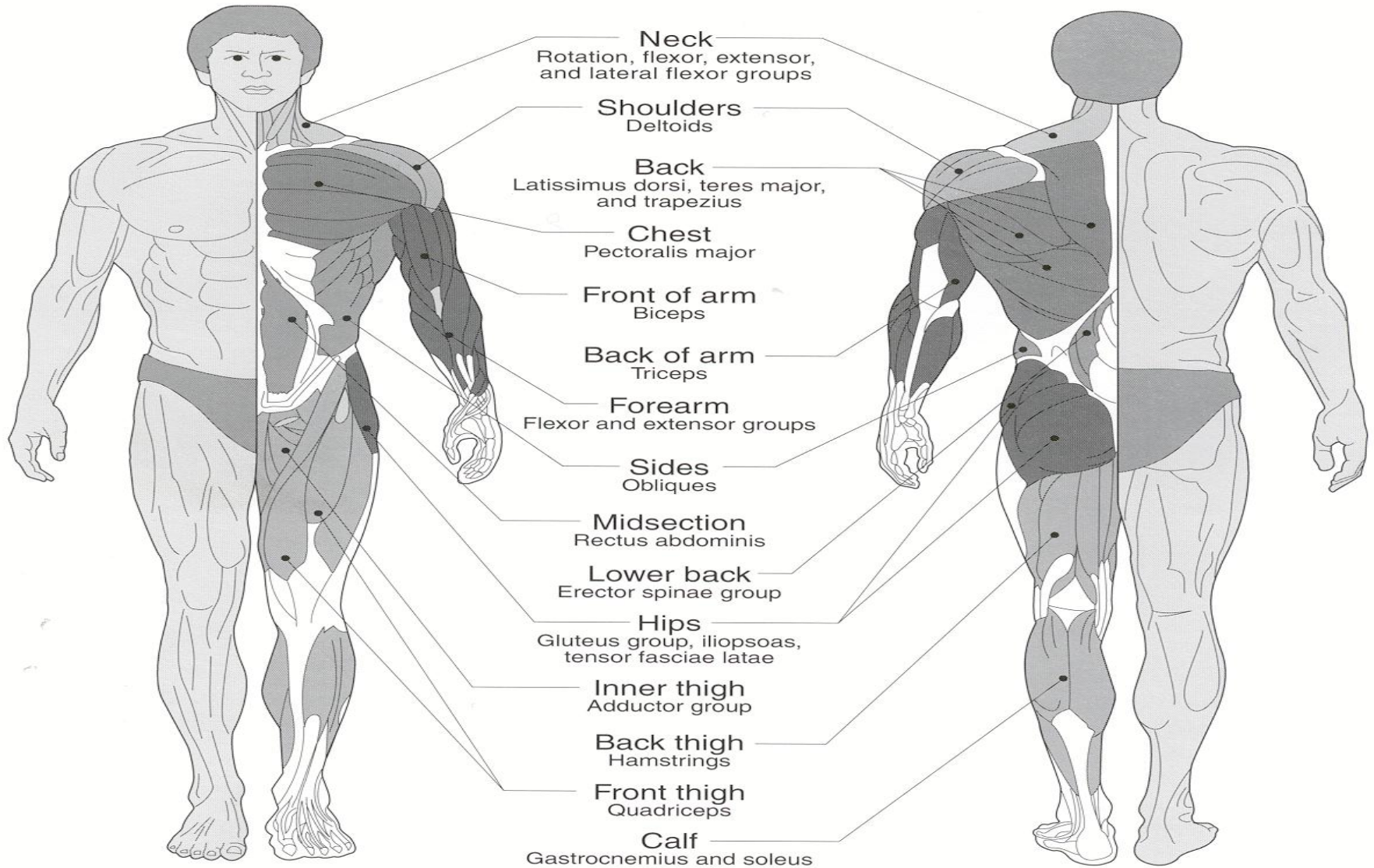
Note: Performing extra sets does burn more calories.

# Strength Training Guidelines

## Strength Training Guidelines (core workout)

Machine	Muscles Worked	# of Sets/Reps	Repetition Speed	Rest
Leg Press	Legs (Quadriceps, Hamstrings, Gluteus)	1 set of 8-12 repetitions for each exercise	2 seconds on positive 4 seconds on negative	30 seconds between each set and remember to stretch the muscle you just worked
Leg Extension	Quadriceps			
Leg Curl	Hamstrings			
Chest Press	Chest (Pectorals), Triceps			
Lat Pull-Down or Row	Back (Lats and Rhomboids), Biceps			
Shoulder Press	Shoulders, Triceps			
Biceps Curl	Biceps			
Triceps Extension	Triceps			
Abdominal Flexion	Rectus Abdominus (Abs)			
Low Back Extension	Erector Spinae (Low Back)			

# Exercises and Muscles Involved



1. Leg Press 2. Leg Extension 3. Leg Curl 4. Chest Press 5. Lat Pulldown / Row 6. Shoulder Press

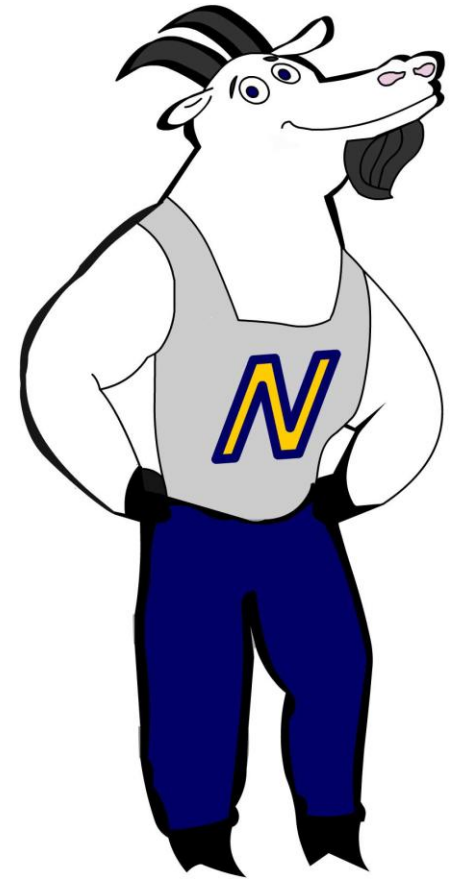
7. Tricep Extension 8. Bicep Curl 9. Abdominal Crunch 10. Low Back Extension

# What kind of results can I expect?

Although results will depend on many factors, everyone can expect to see gains in muscle strength and size/mass.

- ⌘ Body type (ectomorph, endomorph, mesomorph)
- ⌘ Muscle fiber type (fast or slow twitch)
- ⌘ Work ethic (time and effort will show results)

Note: As a beginner you should see an initial 3-5% strength gain per week. The average adult can expect to add 3 pounds of muscle after 2 months of strength exercise.



# Strength Training Principles

✘ The following principles apply to all levels of strength training.



# Warm Up

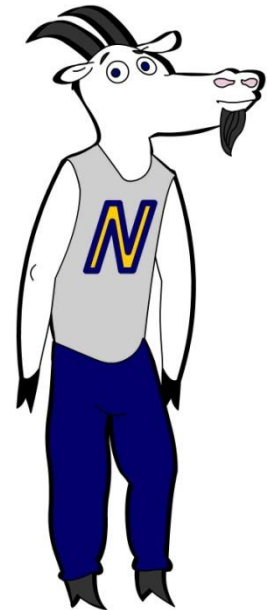
- ⌘ A general warm up consisting of light to moderate movement should be performed for a minimum of 3-5 minutes. This will start the flow of blood to your muscles. (Jogging, Biking, Cross Trainers)
- ⌘ Light stretching should be performed for tight muscle groups.
- ⌘ Stretching between sets also aids in keeping the muscle loose during a workout and can enhance your benefits from strength training.



# Rest

⌘ During a beginning program you should have at least 48 hours rest between workout sessions. This rest time is when you actually build muscle.

Note: Eight hours of sleep per night is optimal for muscle to recover between workouts.



# Muscle Balance

⌘ It is important to work all major muscles equally to achieve overall body balance.

⌘ Chest ↔ Back      Quads ↔ Hamstrings  
Low Back ↔ Abs      Biceps ↔ Triceps

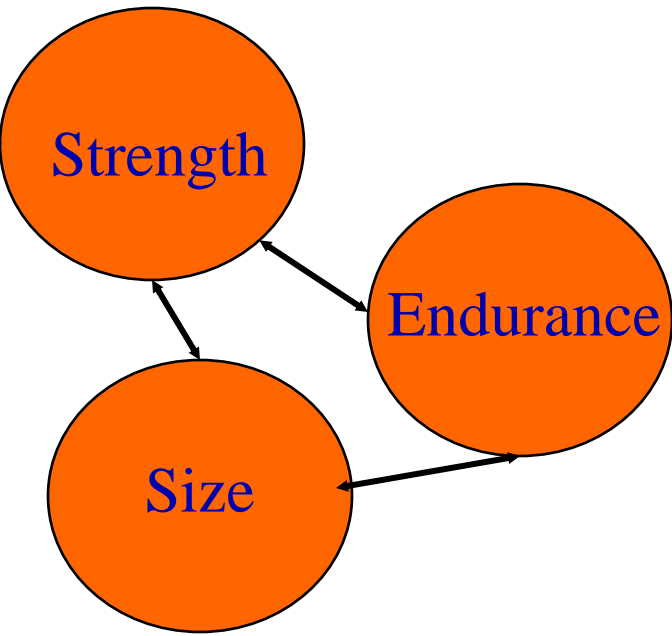
⌘ Note: Having muscle balance can prevent low back pain, postural deviations, and shoulder pain.

# Overload Principle

⌘ In order for adaptation (change) to occur, the muscle must be challenged into performing more work than it is used to performing.



# Muscular Strength, Endurance, and Size



Muscle strength, endurance, and size will develop based more on body type / genetics than workout type. Go with the workout that fits you.

Fast Twitch = Increased Size = Low Reps = 50-60 Sec Sets

Slow Twitch = Increased Endurance = High Reps = 60-70 Sec Sets

# Exercise Speed

- ⌘ All exercise should be performed with a consistent speed
- ⌘ 2 seconds on the concentric phase (lifting)
- ⌘ 4 seconds on the eccentric phase (lowering)



Note: Normally sets should last between 50-70 seconds

# Exercise Range of Motion



- ⌘ Full Range of Motion is the complete movement that a joint can make. You should only use a full range of motion when the machine allows for less resistance to be placed upon the joint towards the end of the movement. Some movements are strongest in the end range (e.g. chest press, shoulder press, leg press, etc..).

# Breathing

- ⌘ Exhale during the concentric (lifting phase)
- ⌘ Inhale during the eccentric phase (lowering phase)



# Maintain A Fitness Log



## Strength Training Log

Name: John Doe

Exercise	Machine Settings		DATE								
			14-Sep	16-Sep	18-Sep	21-Sep					
Leg Extension	2	WEIGHT	150	155	155	160					
		REPS	12	10	12	10					
Leg Curl	5	WEIGHT	135	135	140	140					
		REPS	10	12	10	11					
Leg Press	4	WEIGHT	400	420	430	440					
		REPS	12	12	12	10					
Chest Press	6	WEIGHT	210	215	215	220					
		REPS	12	10	12	10					
Lat Pulldown	7	WEIGHT	180	180	185	190					
		REPS	8	12	12	8					
Shoulder Press	5	WEIGHT	160	165	170	170					
		REPS	12	12	8	10					
Tricep Extension	6	WEIGHT	130	130	130	135					
		REPS	8	10	12	10					
Bicep Curl	4	WEIGHT	120	120	125	125					
		REPS	10	12	8	10					
Low Back Extensions	2	WEIGHT	180	180	190	190					
		REPS	9	12	8	11					
Abdominal Flexion	3	WEIGHT	130	135	140	140					
		REPS	12	12	8	10					
		WEIGHT									
		REPS									
		WEIGHT									
		REPS									
		WEIGHT									
		REPS									
		WEIGHT									
		REPS									

**Repetitions:** Reach muscle failure while performing 8-12 repetitions  
**Speed:** 2 seconds on the positive and 4 seconds on the negative  
**Breathing:** Exhale on the positive and exhale on the negative

# Supplementation

- ⌘ A normal diet where 15% of your calories is consumed from protein sources is plenty for muscular strength and size gains.
- ⌘ Excess protein is costly and not needed for gains in muscular strength and size.



# Should I weight train before or after cardiovascular training?

⌘ You may begin your workout with either exercise because you can achieve similar strength gains regardless of the activity order



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# Have a great workout!!



**NAVY**   
*Fitness*

