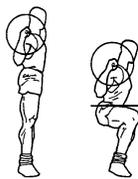


# Appendix C: Strength Exercises

## Legs

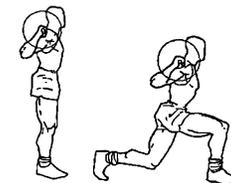
### Squats

Place barbell across shoulders on upper back, not directly on neck. Keep head up, back straight, feet slightly wider than shoulder-width apart, and point toes out. Keep back perpendicular to deck. Count 1: Squat in a controlled motion until knees are over toes, but no lower than having your thighs parallel to deck. Inhale squatting down. Count 2: Return to start position, exhaling while standing up. Variation: 3/4 Squat - Squat until knees are at a 120° angle (half of the normal squat). Return to start position. Works quadriceps, hamstrings, gluteals, calves.



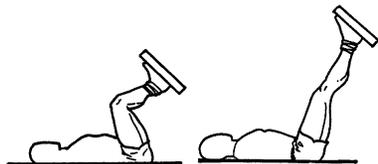
### Lunge

Stand with feet shoulder-width apart, bar resting on back of shoulders. Count 1: Take big step forward with one leg. Count 2: Squat straight down until the front leg's thigh is parallel to deck. Inhale when lunging. Do not let front knee bend so it moves in front of toes. Count 3: Stand up. Count 4: Push back to start position, exhaling when standing up. Repeat with other leg. Variation: Walking Lunge - perform lunges while alternating legs as you walk across the deck. Works hamstrings, quadriceps, gluteals, calves; can use dumbbells placed at your sides



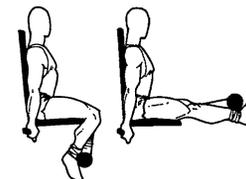
### Leg Press

Keep hips and back flat against support pad. Count 1: Slowly lower platform until knees are at a 90° angle. Inhale lowering platform. Count 2: Return to start position, exhaling while raising platform. Do not lock your knees. Works quadriceps and hamstrings.



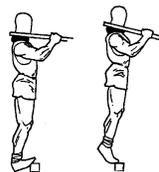
### Leg Extensions

Sit on machine with feet under foot pad, lightly hold seat handles for support. Count 1: Keeping feet flexed, raise weight until legs are extended but knees are not locked. Exhale while extending legs. Do not bounce the weight. Count 2: Slowly return to start position, inhaling while lowering legs. Do not let weight drop. Works quadriceps.



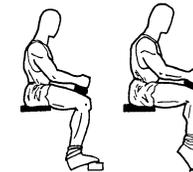
### Standing Calf Raises

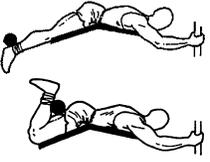
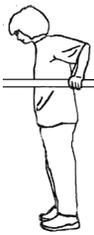
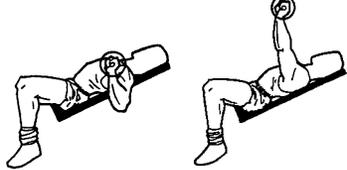
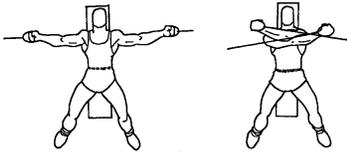
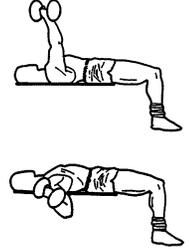
Place shoulders under pads of machine, balls of feet on foot rest. Count 1: Stand straight with knees slightly bent, rise up on toes as high as possible, keeping the balls of your feet in contact with the machine. Exhale lifting up. Count 2: Return to start position, inhaling while lowering weight. Do not lock knees. Works calves.



### Seated Calf Raises

Place balls of feet on foot rest, pads resting on top of thighs. Count 1: Raise heels as high as possible. Exhale lifting up. Count 2: Slowly drop heels as low as possible. Inhale lowering weight. Works calves.

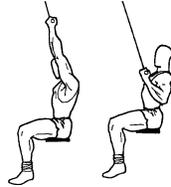


Legs	<p><b>Leg Curls</b> Place heels, with feet flexed, under foot pads so the pads are at the back of heels, not calves. Count 1: Curl legs up, bringing ankle pad close to your gluteals. Exhale curling legs up. Count 2: Return to start position, inhaling while extending legs. Do not lift hips or arch back during lift. Works hamstrings.</p> 	<p><b>Dips</b> Rest hands on parallel bars. Extend arms; legs are not to support your weight unless needed for assistance. Count 1: Bend the elbows until shoulders are level with the elbows. Inhale while lowering body. Count 2: Extend arms to return to start position. Exhale while lifting body. Works triceps, chest and shoulders.</p> 
	Chest	<p><b>Incline Dumbbell Press</b> Lie on 20° incline bench. Feet flat on deck. Hold the dumbbells in front of shoulders, palms out. Count 1: Press dumbbells straight up until arms are extended. Exhale raising weight. Keep elbows slightly bent. Lower back should stay on the bench and back should be straight. Count 2: Return to start position, inhaling while lowering weight. Works chest, shoulders and arms.</p> 
<p><b>Cable Flys</b> Lie on bench with feet flat on deck. Grip cable handles with arms extended, palms up, and elbows slightly bent. Count 1: Bring arms up and over your chest, crossing them over your chest. Exhale while pulling cables across chest. Elbows should remain slightly flexed; but do not bend them more to pull the cables. Count 2: Return to start position, inhaling while extending arms. Keep upper arms in line with shoulders and collarbone during movement. Works chest.</p> 		<p><b>Dumbbell Flys</b> Lie on bench with feet flat on deck. Hold dumbbells at arms length above upper chest with palms facing each other. Count 1: Keeping elbows slightly bent, lower dumbbells out to each side of chest in semi-circular motion. Dumbbells should be even with sides of chest. Inhale lowering dumbbells. Count 2: Return to start position, exhaling while raising dumbbells. Works chest.</p> 

## Back

**Curl Grip Pulldowns**

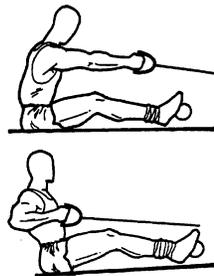
Grab pulldown bar using underhand grip, arms extended shoulder-width apart. Sit on pad and keep back straight. Count 1: Pull bar down until it touches top of chest. Exhale on pull down. Do not swing or rock lower back during movement. Count 2: Return to start position, inhaling as you extend your arms. Works back and biceps.

**T-Bar Rows**

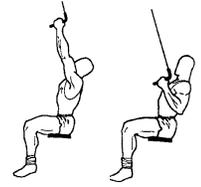
Using a T-bar row machine, step onto foot supports and lie torso flat on support pad. Reach down and grab one set of handles on the T-bar with an overhand grip, hands shoulder width apart. Center and hold T-bar in extended arms. This is your start position. Count 1: Lift bar toward chest, pulling elbows straight up and behind you. Keep torso still on the support pad. Exhale when raising the T-bar. Count 2: Inhale while fully extending arms. Works back and arms.

**Seated Rows**

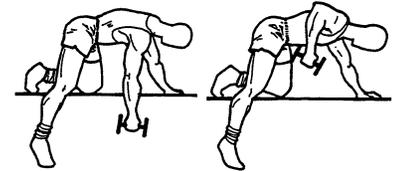
Place feet against a stationary foot rest with knees slightly bent. Hold pulley bar at chest height with arms extended. Keep back straight. Count 1: Pull bar to middle of chest, keeping forearms parallel to deck. Exhale pulling arms back. Do not rock backwards or forward during movement. Count 2: Return to start position, inhaling while extending arms. Works back and arms.

**Lat Pulldowns**

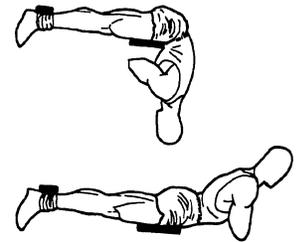
Grab pulldown bar using overhand grip, arms extended shoulder-width apart. Sit on pad and keep back straight. Count 1: Pull bar down by bringing elbows down to your sides until the bar touches your upper chest. Exhale on pull down. Do not arch your lower back during this exercise. Count 2: Return to start position, inhaling as arms extend. Works back and biceps.

**One Arm Dumbbell Rows**

Place left knee and hand on bench, extend right leg on deck. Keep back straight. Extend right arm straight down below right shoulder and hold dumbbell in right hand. Count 1: Pull dumbbell straight up to rib cage by bringing elbow straight up and behind you. Exhale raising dumbbell. Do not turn your torso. Count 2: Return to start position, inhaling while lowering dumbbell. Switch sides and repeat. Works back and biceps.

**Back Extensions**

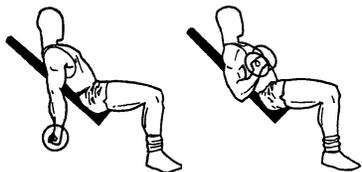
On a back extension bench, place your hip bones just over the front end of the front pad and your ankles under the rear pads. Count 1: Slowly bend at the waist, lowering your head to the deck. Bend at the waist and keep your back straight. Inhale when lowering torso. Count 2: Slowly lift your torso up until your back is parallel to the deck. Exhale when raising torso. Works lower back. For beginners, see the lower back exercises on pages [52](#) and [61](#).



**Rotating Dumbbell Curls**

On incline bench, hold dumbbells with arms extended down, palms facing back.

Count 1: As you begin to lift dumbbells, rotate hands so palms face up before they pass the bench pad. Keep palms up as you bring dumbbells up to shoulder. Exhale raising dumbbell. Count 2: Return to start position, rotating your palms to face back after they pass the bench pad. Inhale while lowering dumbbell. Works biceps.

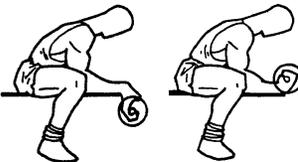
**Triceps Pressdown**

Grab bar or rope with hands close together in center of body, elbows at 75° so forearms are not quite parallel to deck. Push rope down until arms are straight, elbows remaining close to your sides. Exhale while pushing down. Count 2: Return to start position, inhaling while bringing forearms up. Works triceps.

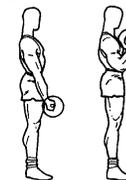
**Wrist Curls**

Grab a dumbbell or barbell palms up and sit on the edge of a bench. Place elbows on bench edge between knees. Let wrists hang over bench. Count 1: Curl wrists up to raise weight toward elbow.

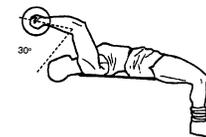
The motion should resemble a semi-circle. Exhale raising dumbbell. Keep forearms flat against bench through entire exercise. Count 2: Return to start position, inhaling while lowering weight. Works wrist flexors.

**Barbell Curls**

Stand with feet shoulder width apart, back straight. Grab barbell with underhand grip, shoulder-width apart. Extend arms down, placing barbell against upper thighs. Count 1: Bend elbows and lift barbell toward chest. Keep elbows and arms close to sides. Do not throw weight up by arching back and swinging barbell. Do not rock elbows forward. Count 2: Return to start position. Exhale raising barbell, inhale lowering barbell. Works biceps.

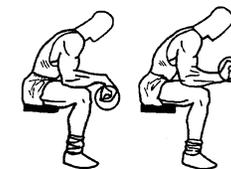
**Tricep Extension with Barbell**

Lie on bench with feet flat on deck, head at top of bench. Hold barbell above head with hands approximately 6" apart, palms up. Count 1: Lower bar to forehead, bending elbows. inhale lowering barbell. Upper arm should remain stationary. Count 2: Return to start position, exhaling while raising barbell. Works triceps.

**Reverse Wrist Curls**

Grab a dumbbell or barbell palms down and sit on the edge of a bench. Place elbows on bench edge between knees. Let wrists hang over bench. Count 1:

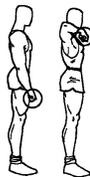
Curl wrists up to raise weight toward elbow. The motion should resemble a semi-circle. Exhale raising dumbbell. Keep forearms flat against bench through entire exercise. Count 2: Return to start position, inhaling while lowering weight. Works wrist extensors.



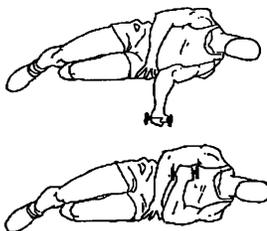
## Shoulders

**Upright Rows**

Hold barbell with narrow overhand grip. An E-Z curl bar is suggested. Hands should be no more than 6 inches apart. Stand straight, hold barbell against upper thighs at arms length. Count 1: Keeping bar close to body and back straight, pull bar upward until just under chin. Arms should form a slight “v” at top of movement. Exhale raising bar. Keep elbows out and up. Count 2: Return to start position, inhaling while lowering bar. Works shoulders.

**Internal Rotators**

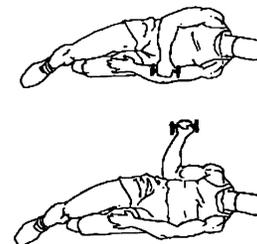
Hold a dumbbell in left hand and lie on a bench on your left side. Bend left elbow 90°. Count 1: Rotate left upper arm so left hand is lifted up toward your right side. Exhale on lift. Do not move torso during exercise. Count 2: Return to start position, inhaling while lowering your left forearm. Works internal shoulder rotators. Switch sides to work right shoulder.

**Shoulder Press**

Sit with back straight and against support pad; keep feet flat on the deck. Incline bench 5-10°, if possible. Raise dumbbells to shoulder height, palms facing forward. Keep elbows out. Count 1: Raise dumbbell overhead until arms are extended, slight bend in elbow. Count 2: Return to start position. Exhale raising weights, inhale lowering weights. Works shoulders.

**External Rotators**

Hold a dumbbell in right hand and lie on a bench on your left side. Bend right elbow 90°. Count 1: Rotate right upper arm so right hand moves down toward left side. Inhale while lowering right forearm. Do not move torso during exercise. Count 2: Rotate right upper arm so right hand moves up above your right side. Exhale when lifting weight. Works internal shoulder rotators. Switch sides to work right shoulder.



Diagrams adapted from *Strength Training for Sports*, Applied Futuristics<sup>SM</sup>, 1994 with permission from Fred Koch.

The following key points will help you perform most exercises correctly and help prevent many of the common training errors listed in [Table C-1](#).

- ◆ Understand which muscle groups you are targeting during an exercise, i.e., which joints need to move to perform the lift?
- ◆ Think of strength training as keeping your balance and posture while moving a weight. Focus on your muscle contractions, not the weight. This makes you aware of how your muscles work.
- ◆ Practice new exercises with a light weight until your form is perfected.
- ◆ Always perform slow, controlled movements.

**Table C-1. Examples of Common Training Mistakes**

	<b>Exercise</b>	<b>Common Mistakes</b>	<b>Proper Form</b>
Chest	Bench Press	Bouncing the bar off the ribs - uses momentum to lift the bar and can break ribs.	Lower bar to within 1 inch of the chest, pause, then lift.
	Bench Press/ Chest Fly	Lifting the lower back and hips off bench when lifting the weight - weight too heavy, this motion increases stress on the spine.	Decrease the weight to be lifted, keep lower back and hips on the bench.
Shoulders & Arms	Lateral Raises, Biceps Curls	Arching the back when lifting the weights - uses momentum to lift the back and can cause back pain and injury.	Decrease the weight to be lifted. Keep a natural curve in the back, bend knees, and push chest out. Lift and lower the weight with control.
Back	Lat Pulldowns/ Seated Rows/ T-bar Rows	Rounding shoulders and bending forward at the waist when pulling the weight - uses body weight, not lat muscles to pull the bar; puts lots of stress on the spine.	Squeeze shoulder blades together, push chest out, back straight, and pull bar down to chest.
Legs	Squats/ Lunges/ Leg Press	Squatting or bending knees beyond the tips of toes causes the heel to lift off deck and increases the stress on the knees as they move past the toes.	Keep heels flat on deck and squat/ lunge. Stop when knees are directly above toes.

General training mistakes that you should be aware of and avoid include:

- ◆ Locking joints at the end of their range of motion. This places a lot of stress on the joint. You should extend the joint as far as possible without locking it during your exercises.
- ◆ Moving your legs or “bouncing” during exercises. If you have to move or bounce body parts that are not directly involved in the exercise to lift a weight, then the weight is too heavy. Lower the weight and check your form by focusing on how your body is moving; do not focus on lifting the weight.
- ◆ Lifting and lowering weights rapidly. This can lead to injury. Slowly return the weight to the starting position, as this is the part of the workout that results in the greatest training effects!