

The following information pertains to standard techniques for performing basic resistance training exercises and some of their variations. Many strength training and conditioning programs regularly use these foundational exercises. Everyone using these exercises should have a sound understanding of how each of these exercises and their variations are performed to optimize individual techniques and progress.

Explosive Lifting Day

1. Clean Progression (choose one exercise per phase)

1a. Barbell Rack Clean (Rack Shrug OR Rack Jump)

1b. Barbell Hang Clean (Hang Shrug OR Hang Jump)

1c. Barbell Power Clean (Clean Shrug OR Clean Jump)

2. Shoulder Progression (choose one exercise per phase)

2a. Dumbbell Shoulder Raises (choose this if the athlete cannot stabilize the weight overhead) OR

2b. Barbell Standing behind the Neck Shoulder Press

2c. Barbell Push Press

2d. Barbell Push Jerk

3. Pulling Choice

3a. Pull-Ups

3b. Standing Low Row

3c. Lat Pulldown

3d. Bent-Over Row

4. Bicep Choice

4a. EZ-Bar Curl

5. Abdominals Choice

5a. Hand Planks

5b. Elbow Planks (front and sides)

Strength Lifting Day

1. Leg Progression (choose one per phase)

1a. Barbell Back Squat

1b. Barbell Front Squat

1c. Barbell Clean Deadlift

2. Barbell Romanian Deadlift (RDL)

3. Single-Leg Choice (choose one per phase)

3a. Forward Step Lunge

3b. Walking Lunge

4. Pushing Progression (choose one per phase)

4a. Barbell Bench Press

4b. Barbell Incline Bench Press

4c. Dumbbell Bench Press

4d. Dumbbell Incline Bench Press

5. Triceps Choice

5a. Triceps Pushdown

6. Abdominals Choice

6a. Heel Touch

Explosive Lifting Day Exercise Technique

1. Clean Progression

1a. Barbell Rack Clean

Exercise Objective: Develop the explosive phase of the pull and teach the athlete how to get under the bar quickly

Start Position

1. Set the bar at a height, either on boxes or in a power rack, where the thighs make contact with the bar at approximately mid-thigh (Figure 1)
2. Address the bar and place feet hip-width apart with toes pointed straight ahead
3. Grasp the bar with a pronated grip slightly wider than shoulder width
4. Keep knees slightly bent and behind the toes, flex at the hips and transfer weight from the balls of the feet to the heels
5. Shoulders should be slightly in front of the bar, in line with the knees and ankles
6. Arms should be completely extended and elbows pointed out)
7. Head remains in a neutral position looking forward
8. Take a deep breath to fill the chest with air and engage the core

Procedure

1. Explosively extend hips, knees, and ankles to achieve triple extension and accelerate bar upward (Figure 2)
2. Simultaneously extend onto the balls of the feet and shrug shoulders straight up
3. Keep the bar close to the body with arms extended and elbows pointed out
4. Transition feet to a squat stance and quickly pull entire body under the bar
5. Flex hips backward and sit into a quarter squat position to absorb the weight of the bar (Figure 3)
6. Quickly rotate elbows down and then up ahead of the bar to catch it on the front portion of the shoulders
7. Stand erect with feet flat on the ground and shoulders directly over the balls of the feet

Coaching Points

- Lower the bar in a slow and controlled manner between reps by keeping elbows slightly flexed
- Avoid pulling with the arms before attaining complete extension of the hips
- Catch the bar with elbows high, hips back, and eyes forward
- Keep elbows high in front to securely rack the bar on the front portion of the shoulders

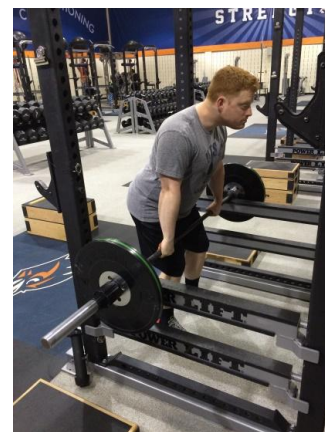


Figure 1. Start Position



Figure 2. Triple Extension



Figure 3. Catch Position

1b. Barbell Hang Clean

Exercise Objective: Develop explosive power in the hips and legs and teach the athlete to utilize the stretch-shortening cycle

Start Position

1. Approach bar resting on the floor or platform so the shins make contact
2. Place feet hip-width apart with toes pointed straight ahead
3. Keep back flat, shoulder blades pulled together, and squat down to grasp the bar
4. Grasp the bar with a pronated grip slightly wider than shoulder-width with arms straight and elbows pointed out (Figure 4)
5. Head remains in a neutral position looking forward throughout the entire lift
6. Slowly extend hips and knees to elevate the bar to just above the knees
7. Keep the bar close to the body and extend hips as the bar passes the knees
8. Stand erect with shoulders, hips, and knees in alignment and the bar held at arm's length touching the top part of the thigh (Figure 5)

Procedure

1. Take a deep breath to fill the chest with air and engage the core
2. Keep back flat, and shoulder blades pulled together
3. Lower the bar to the top of the knees by flexing at the hips
4. In the load position, shoulders should be in front of the bar, back flat, arms extended with elbows pointed out, hips flexed, knees slightly bent (not locked out), and weight on the heels (Figure 6)
5. From the load position, explosively extend hips, knees, and ankles to achieve triple extension and accelerate the bar upward
6. Simultaneously extend onto the balls of the feet and shrug shoulders straight up (Figure 7)
7. Keep the bar close to the body with arms extended and elbows pointed out
8. Transition feet to slightly wider than hip-width, keeping them in a 30" x 36" box, and quickly pull entire body under the bar
9. Flex hips backward and sit into a quarter squat position to absorb the weight of the bar (Figure 8)
10. Quickly rotate elbows down and then up ahead of the bar to catch it on the front portion of the shoulders
11. Stand erect with feet flat on the ground and shoulders directly over the balls of the feet (Figure 9)



Figure 4 Addressing the bar



Figure 5 Start Position



Figure 6. Load Position



Figure 7. Triple Extension



Figure 8. Catch Position



Figure 9. Finish Position

Coaching Points

- The purpose of the 30" x 36" box mapped out on the platform is to ensure that the explosive movement is primarily vertical (if the athlete puts too much emphasis in the horizontal or lateral directions it will be easy to observe as they will jump out of the box)
- Lower the bar in a slow and controlled manner between repetitions by keeping elbows slightly flexed
- Stand erect before each repetition
- Avoid pulling with the arms before attaining complete extension of the hips
- Catch the bar with elbows high, hips back, knees over toes, and eyes forward

1c. Barbell Power Clean

Exercise Objective: Develop the ability to express explosive power in the hips and legs

Start Position

1. Approach the bar resting on the floor or platform so the shins make contact
2. Place feet hip-width apart with toes pointed forward
3. Keep back flat and shoulder blades pulled together, squat down to grasp the bar (Figure 10)
4. Grasp the bar with a pronated grip slightly wider than shoulder-width with arms straight and elbows pointed out
5. Head remains in a neutral position looking forward throughout the entire lift
6. Weight should be shifted to the heels, and the hips should be slightly higher than the knees (Figure 10)

Procedure

1. Lift the bar smoothly off the floor to just above the knees by slowly extending the hips and knees (keep the bar in contact with the shins)
2. The bar, knees, hips, and shoulders rise in unison with a constant back angle throughout (i.e., avoid excessive arching)
3. As the bar passes over the knees, the shoulders remain in front of the bar, arms straight with elbows pointed out, hips flexed, and knees slightly bent (Figure 11)
4. Explosively extend hips, knees, and ankles to achieve triple extension and accelerate the bar upward (Figure 12)
5. Simultaneously extend onto the balls of the feet and shrug shoulders straight up (Figure 12)
6. Keep bar close to the body as it accelerates and keep shoulder blades pulled together, arms straight, and elbows pointed out
7. Transition feet to slightly wider than hip-width, keeping them in a 30" x 36" box, and quickly pull entire body under the bar
8. Flex hips backward and sit into a quarter squat position to absorb the weight of the bar
9. Quickly rotate elbows down and then up ahead of the bar to catch it on the front portion of the shoulders (Figure 13)
10. Stand erect with feet flat on the ground and shoulders



Figure 10. Addressing the Bar



Figure 11 Load Position



Figure 12 Triple Extension



Figure 13 The Catch

directly over the balls of the feet (Figure 14)

Coaching Points

- Lower the bar in a slow and controlled manner between repetitions by keeping the elbows slightly flexed
- To lower the bar back to the platform, push hips back and slide the bar down the front of the thighs until it reaches the knees
- Sit into a quarter squat position to allow the bar to land on the thighs to aid in its deceleration
- Avoid jerking the bar off the floor; instead, pull it smoothly and under control to the top of the knees
- Avoid pulling with the arms before attaining complete extension of the hips
- Catch the bar with the hips back, elbows high, and eyes forward

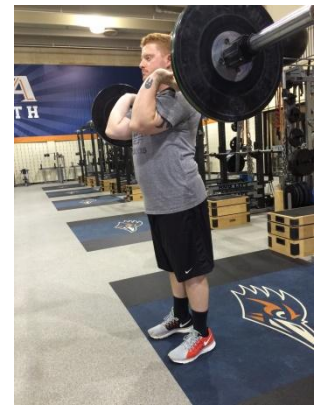


Figure 14 Finish Position

2. Shoulder Progression

2a. Dumbbell Shoulder Raises

Shoulder raises are a group of three exercises (front, lateral, bent-over) that can be performed together in any combination, or separately.

Front Raises

Exercise Objective: Isolate and develop strength in the anterior deltoids

Start Position

1. Stand erect with a dumbbell in each hand
2. Let arms hang in front of the thighs, and pull shoulder blades back and down
3. Position feet hip-width apart with toes pointed straight ahead
4. Slightly flex knees and engage the core to stabilize the body and prevent arching of the back (avoid rocking back and forth to complete the lift)

Procedure

1. Maintain a constant body position and raise dumbbells directly to the front until they are at shoulder level (Figure 15)
2. Keep palms facing the ground and lower dumbbells slowly, back to the start position

Coaching Points

- Maintain a constant head, body, and arm position throughout the entire lift
- Avoid using momentum to complete the lift

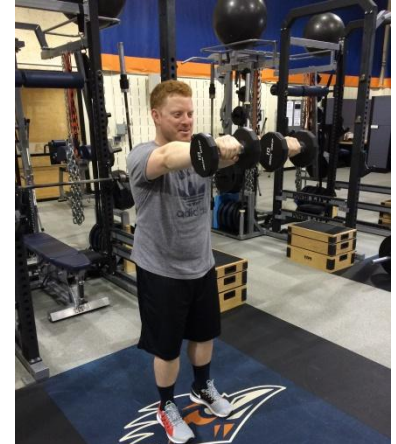


Figure 15 Front Raise

Lateral Raises

Exercise Objective: Isolate and develop strength in the lateral deltoids

Starting Position

1. Stand erect with a dumbbell in each hand
2. Let arms hang to the sides to the thighs, and pull shoulder blades back and down
3. Position feet hip-width apart with toes pointed straight ahead
4. Slightly flex knees and engage the core to stabilize the body and prevent arching of the back (avoid rocking back and forth to complete the lift)

Procedure

1. Maintain a constant body position and raise dumbbells to the sides until they are at shoulder level (Figure 16)
2. Keep palms facing the ground and lower dumbbells slowly, back to the start position

Coaching Points

- Maintain a constant head, body, and arm position throughout the entire lift
- Avoid arching the back to complete the lift

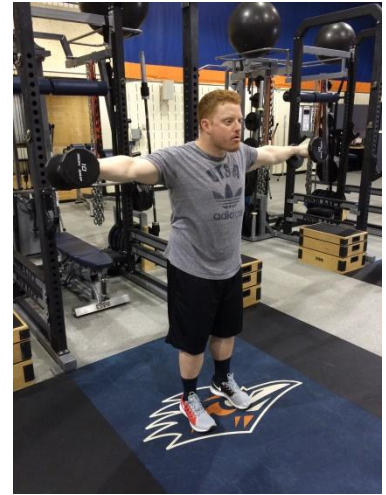


Figure 16 Lateral Raise

Bent-Over Raises

Exercise Objective: Isolate and develop strength in the posterior deltoids

Start Position

1. Stand erect with a dumbbell in each hand
2. Let arms hang to the sides to the thighs, and pull shoulder blades back and down
3. Position the feet hip-width apart with toes pointed straight ahead
4. Engage the core and push hips back to transfer weight to the heels
5. Back should be parallel with the ground
6. The dumbbells will hang in front of the body with arms extended, palms facing each other, and shoulder blades pulled back and down

Procedure

1. Keep core engaged and back parallel to the ground
2. Raise both dumbbells laterally from the shoulders until they are at shoulder level (Figure 17)
3. Slowly lower dumbbells to start position in a controlled motion

Coaching Points

- Keep the back parallel to the ground and maintain a flat back throughout the lift
- Avoid using momentum to complete the lift
- Concentrate on raising the dumbbells laterally from the shoulders

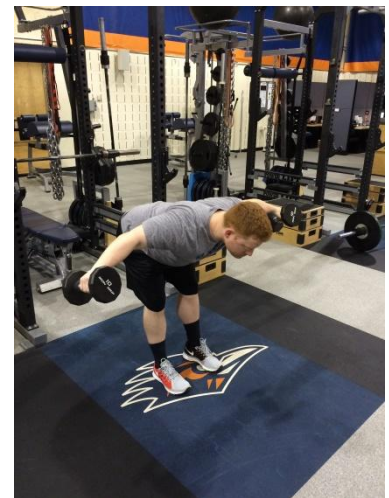


Figure 17 Bent-Over Raise

3b. Barbell Standing Behind the Neck Shoulder Press

Exercise Objective: Develop strength in the muscles of the shoulder girdle and teach the athlete to use the whole body to stabilize overhead loads

Start Position

1. Set the bar at a height that is comfortable for lift-off
2. Place hands evenly on the bar, slightly wider than shoulderwidth, with a pronated grip
3. Position bar behind neck and comfortably across the shoulders with shoulder blades pulled together, elbows pointed down with hands directly above them (Figure 18)
4. Stand erect and take one or two steps back to position body in the center of the rack
5. Place feet hip-width apart, toes pointed straight ahead, and slightly flex hips and knees with the weight centered on the feet (Figure 18)
6. Head remains in a neutral position looking forward
7. Engage the core to stabilize the body and prevent arching the back

Procedure

1. From the start position, press the bar straight overhead by extending the arms and keeping the body stable (Figure 19)
2. At the top of the lift, the bar should be slightly behind the ears with elbows completely extended and in line with the shoulders, hips, and heels
3. Lower the bar to its starting position across the shoulders in a controlled manner

Coaching Points

- When lowering the bar, simultaneously flex hips and knees as the bar hits the shoulders to help absorb the weight (do not allow knees to come forward over toes)
- Avoid using the lower body to complete the lift
- Keep shoulders over hips during the entire range of motion
- Keep elbows directly under hands throughout the entire lift
- Engage the core to avoid arching the back to complete the lift
- This lift may also be performed from the front of the shoulders



Figure 18 Start Position

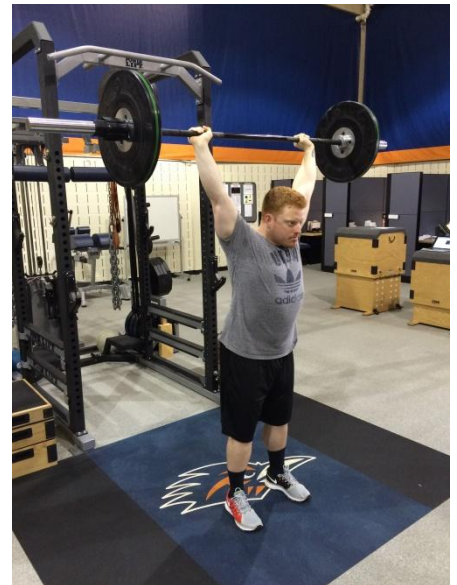


Figure 19 Finish Position

3c. Barbell Push Press

Exercise Objective: Develop explosive power in the hips and legs, as well as strengthen the shoulder muscles while stabilizing overhead loads

Start Position

1. Set the bar at a height that is comfortable for lift-off
2. Place hands evenly on the bar, slightly wider than shoulderwidth, with a pronated grip
3. Position bar behind neck and comfortably across the shoulders with shoulder blades pulled together, elbows pointed down with hands directly above them (Figure 20)
4. Stand erect and take one or two steps back to position body in the center of the rack
5. Place feet hip-width apart, toes pointed straight ahead, and slightly flex hips and knees with the weight centered on the feet (Figure 20)
6. Head remains in a neutral position looking forward
7. Engage the core to stabilize the body and prevent arching the back

Procedure

1. Keep back flat and shoulder blades pulled together
2. Lower into a quarter squat position by pushing hips back, flexing knees, letting the torso come forward, and transfer the weight onto the heels (Figure 21)
3. Explosively extend hips and knees to accelerate the bar upward
4. Drive the bar upward by extending arms completely, pressing it overhead
5. At the top of the lift, the bar should be slightly behind the ears with elbows completely extended and in line with the shoulders and hips (Figure 22)
6. As the bar is caught overhead, flex hips backward, keep knees behind toes, and sit into a quarter squat position
7. Extend hips and knees to stand erect
8. Lower the bar to the start position in a controlled manner

Coaching Points

- When lowering the bar, simultaneously flex hips and knees as the bar hits the shoulders to help absorb the weight (do not allow knees to come forward over toes)
- There should be no pause at the bottom of the initial countermovement quarter squat before explosively extending the weight overhead
- Keep elbows directly under hands throughout entire lift
- Engage the core to prevent arching the back
- This lift may also be performed from the front of the shoulders

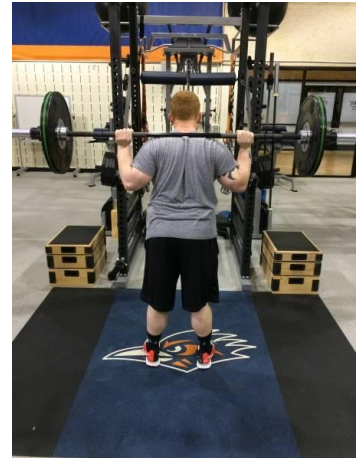


Figure 20 Start Position

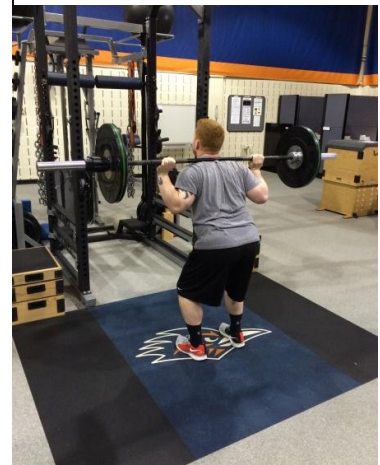


Figure 21 Quarter Squat Position



Figure 22 Finish Position

3d. Barbell Push Jerk

Exercise Objective: Develop explosive power in the hips and legs, as well as strengthen the shoulder muscles while stabilizing overhead loads

Start Position

1. Set the bar at a height that is comfortable for lift-off
2. Place hands evenly on the bar, slightly wider than shoulderwidth, with a pronated grip
3. Position bar behind neck and comfortably across the shoulders with shoulder blades pulled together, elbows pointed down with hands directly above them (Figure 23)
4. Stand erect and take one or two steps back to position body in the center of the rack
5. Place feet hip-width apart, toes pointed straight ahead, and slightly flex hips and knees with the weight centered on the feet (Figure 23)
6. Head remains in a neutral position looking forward
7. Engage the core to stabilize the body and prevent arching the back

Procedure

1. Keep back flat and shoulder blades pulled together
2. Lower into a quarter squat position by pushing hips back, flexing knees, letting the torso come forward, and transfer the weight onto the heels (Figure 24)
3. Explosively extend hips and knees and go onto the balls of the feet to accelerate the bar upward
4. Drive the bar upward with the shoulders and arms, and push the body under the bar (Figure 25)
5. In the catch position, the bar should be slightly behind the ears with elbows completely extended and in line with the shoulders and hips
6. Stabilize the body and step feet together so they are shoulder-width apart (Figure 26)
7. Lower the bar to the start position in a controlled manner

Coaching Points

- When lowering the bar, simultaneously flex hips and knees as the bar hits the shoulders to help absorb the weight (do not allow knees to come forward over toes)
- There should be no pause at the bottom of the initial countermovement quarter squat before explosively extending the weight overhead
- Keep torso upright when making the overhead catch (any forward lean will make it difficult to complete the lift)
- Drive the bar upward with the shoulders to take advantage of the power from the hips and legs
- Keep elbows directly under hands throughout the entire lift
- Engage the core to stabilize the body and prevent arching the back.
- This lift may also be performed from the front of the shoulders



Figure 23 Start Position



Figure 24 Quarter Squat Position



Figure 25 Catch Position



Figure 26 Finish Position

4. Pulling Choice

4a. Pull-Ups

Exercise Objective: Develop strength in the muscles of the upper back, arms, and abdominals

Start Position

1. Place hands evenly on a bar slightly wider than shoulderwidth with a pronated grip
2. Let body hang completely from the bar, with elbows and hips fully extended, knees slightly flexed, and ankles crossed (Figure 27)

Procedure

1. From the start position, pull entire body up by squeezing the shoulder blades back and down, and flexing elbows
2. Continue to pull body upward until chin is over the bar (Figure 28)
3. Lower entire body back to the start position in a controlled manner

Coaching Points

- Avoid swinging the body or legs when pulling up
- Concentrate on squeezing the shoulder blades together to achieve a full range of motion
- Engage the core throughout the entire range of motion

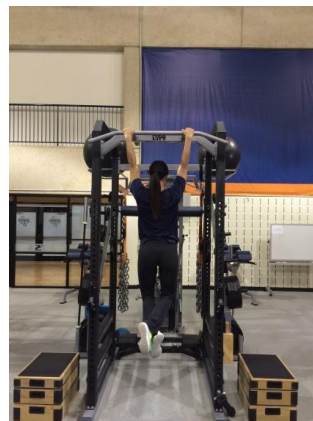


Figure 27 Start Position



Figure 28 Finish Position

4b. Standing Low Row

Exercise Objective: Develop the muscles of the upper back as well as the stabilizers of the legs and core

Start Position

1. Squat down to grasp the bar or handle and place hands evenly spaced
2. Keep chest up, back flat, and core engaged, and take a few steps back to center your body in the machine
3. Place feet hip-width apart, toes pointed straight ahead, hips and knees slightly flexed, and center weight on the feet (Figure 29)
4. Knees should be directly over ankles with a slight forward lean of the torso so the shoulders are directly over the knees
5. Fully extend elbows (Figure 29)

Procedure

1. Maintain the start position and squeeze shoulder blades back and down while flexing elbows
2. Continue to pull the handle until it touches the upper abdomen (Figure 30)
3. Return the bar to the start position in a slow, controlled manner

Coaching Points

- Maintain a flat back throughout the entire exercise
- Concentrate on maintaining a constant body position and pulling shoulder blades together
- Avoid using momentum to complete the lift

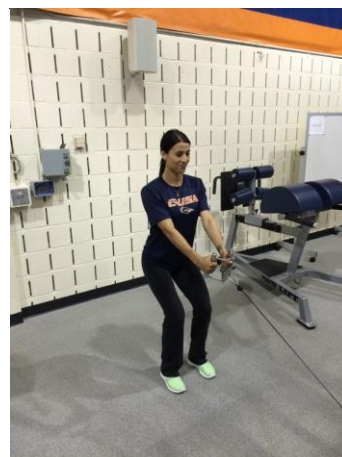


Figure 29 Starting Position

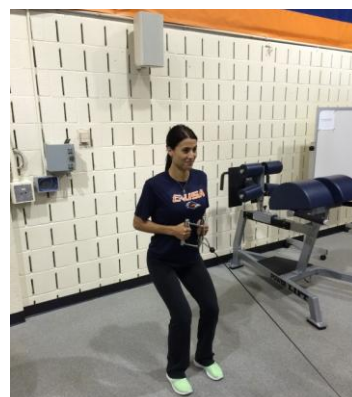


Figure 30 Finish Position

- Focus on achieving a full range of motion

4c. Lat Pulldown

Exercise Objective: Develop strength in the muscles of the upper back

Start Position

1. Adjust the thigh pad to anchor the body to the seat
2. Place hands evenly on the bar, slightly wider than shoulder width, with a pronated grip
3. Fully extend arms, keep chest up, back flat, and engage the core (Figure 31)

Procedure

1. Keep back flat, pull shoulder blades down and back while flexing elbows
2. Pull the bar down until it touches the top of the chest (Figure 32)
3. Return the bar to the start position in a slow, controlled manner

Coaching Points

- Maintain a flat back position throughout the entire lift
- Avoid initiating the downward movement of the bar by leaning backward with the torso
- Concentrate on pulling elbows straight down and squeezing shoulder blades together
- Focus on achieving a full range of motion

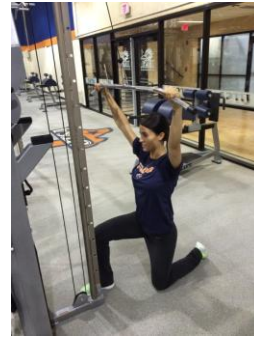


Figure 31 Starting Position

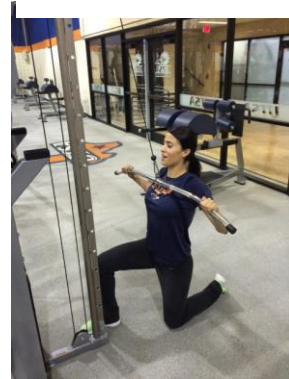


Figure 32 Finish Position

4d. Bent-Over Row

Exercise Objective: Develop strength in the muscles of the upper back

Start Position

1. Approach the bar resting on the floor or platform and place feet hip-width apart with toes pointed straight ahead
2. Keep back flat and shoulder blades pulled together
3. Squat down to grasp the bar with a pronated grip slightly wider than shoulder-width
4. Keep arms extended and elbows pointed out (Figure 33)
5. Slowly extend legs to elevate the bar to just above the knees, then extend hips to stand erect
6. Keeping the back flat and knees slightly flexed, push hips backward and lower torso until it is parallel with the floor

Procedure

1. Maintain a torso position parallel to the floor, squeeze shoulder blades together, and flex elbows to pull them up and slightly outward
2. Pull the bar upward until it touches the upper abdomen (Figure 34)
3. Return the bar to the start position in a slow, controlled manner



Figure 33 Starting Position



Figure 34 Finish Position

Coaching Points

- Weight should remain on the heels of the feet with knees slightly flexed
- Maintain a flat back position throughout the entire lift
- Concentrate on squeezing the shoulder blades back and down to achieve a full range of motion
- Avoid using momentum to complete the lift

5. Biceps Choice

5a. EZ-Bar Curl

Exercise Objective: Develop strength in the biceps

Start Position

1. Grasp the bar with a supinated grip at approximately shoulder-width
2. Stand erect with feet hip-width apart with toes pointed straight ahead
3. Hold the bar at arm's length with elbows completely extended and shoulder blades pulled together (Figure 35)
4. Engage the core to stabilize the body and prevent rocking back and forth

Procedure

1. Maintain an erect body position and slowly pull the bar upward by flexing the elbows
2. Pull the bar up to the shoulders until elbows are completely flexed (Figure 36)
3. Return the bar to the start position in a slow, controlled manner

Coaching Points

- Keep elbows positioned at the sides throughout the entire lift
- Avoid rolling shoulders forward during any part of the lift
- Avoid using momentum to complete the lift

6. Abdominals Choice

6a. Hand Planks

Exercise Objective: Develop strength, stability, and balance in the muscles of the pelvic, abdominal, back, and shoulder areas

Start Position

1. Start on all fours on a non-slip surface (Figure 37)
2. Hands should be directly under shoulders and knees should be directly under hips
3. Head should remain in a neutral position to keep the body in line

Procedure

1. From the start position, walk feet straight back (staying on toes) until legs reach full extension
2. Create a neutral pelvic and spine position by rolling the pelvis forward, contracting the gluteals, and pulling the belly button

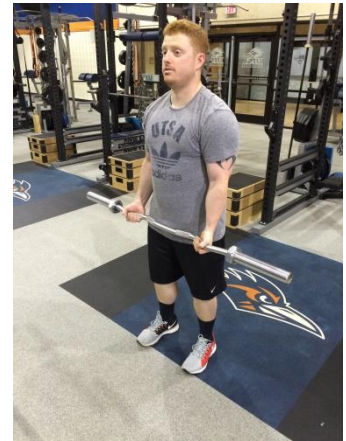


Figure 35 Start Position



Figure 36 Finish Position

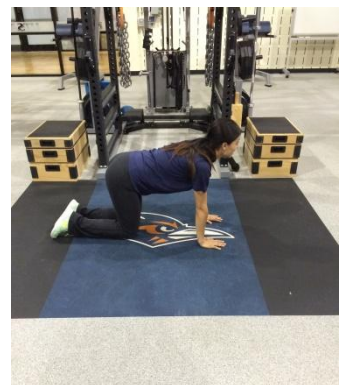


Figure 37 Start Position

- to the spine by contracting the inner abdominal muscles
- 3. Maintain a straight line from the ankles to the ears (Figure 38)
- 4. Maintain this position for the designated time, or until a breakdown in technique occurs (e.g., hips pike upward, back arches, etc.)

Coaching Points

- Avoid letting hips sag and arching lower back
- Concentrate on breathing normally without releasing the abdominal contraction throughout the entire exercise
- Try holding for 20 s to start (as strength is gained and technique improves, increase the time)

6b. Elbow Planks (front and sides)

Exercise Objective: Develop strength, stability, and balance in the muscles of the pelvic, abdominal, back, and shoulder areas

Start Position

1. Start on elbows and knees on a non-slip surface
2. Elbows should be directly under shoulders and knees should be directly under hips
3. Head remains in a neutral position to keep the body in line

Procedure

1. From the start position, walk feet straight back (staying on toes) until legs are fully extended
2. Create a neutral pelvic and spine position by rolling the pelvis forward, contracting the gluteals, and pulling the belly button to the spine by contracting the inner abdominal muscles (Figure 39) (Figure 40)
5. Hold for 20 s then return to the front elbow plank position and roll to the opposite side and hold for another 20 s
6. This should equate to 20 s for the front elbow plank and 20 s for each side elbow plank

Coaching Points

- Maintain stable body position for the designated time, or until a breakdown in technique occurs
- Avoid letting hips sag and arching lower back
- Concentrate on breathing normally without releasing the abdominal contraction throughout the entire exercise
- Increase the time as strength and technique improve
- Keep elbows directly under shoulders throughout the entire exercise



Figure 38 Finish Position



Figure 39 Front Plank Position



Figure 40 Side Plank Position

Strength Lifting Day Exercise Description

1. Leg Progression

1a. Barbell Back Squat

Exercise Objective: Develop the quadriceps, thigh adductors, gluteus maximus, and hamstrings

When done correctly, full squats strengthen the muscles, ligaments, and tendons surrounding the knee. The core muscles are developed to a large degree by keeping the torso erect. For this reason, this Manual provides detailed descriptions for the back squat.

Start Position

1. Stand under the bar with bar across the center of the shoulders
2. Ensure entire body is under the bar
3. Prior to lifting the bar, inhale to expand the lungs and hold until you have set up
4. Stand erect with the chest filled with air
5. Take one or two steps backward to set up (Figure 41)

Common Mistakes

- Not placing the body in center of the bar
- Not placing entire body under the bar
- Not filling the body with air and holding
- Taking more than two steps to set up

Grip Position

1. All athletes should grip the bar with a closed, pronated grip (Figure 42)
2. A closer grip activates the muscles in the back
3. Taller athletes' grip will vary from medium to wide
4. Shorter athletes' grip will vary from close to medium

Common Mistakes

- Gripping the plates and not the bar
- Taking hands off the bar during the ascending phase
- Gripping the bar with an open grip

Bar Placement

No Significant Difference in Muscle Development between High-Bar and Low-Bar Squatting

1. High Bar Squat: The bar sits on top of the trapezius muscles near the base of the neck (increases force at the knees)
2. Low Bar Squat: The bar sits 1 – 2 in. below the deltoids (increases force at the hips)

Common Mistakes

- High-Bar: Leaning forward or rounding the back
- Low-Bar: Bar rolling down

Head and Eye Position

1. Head and eyes are positioned forward (Figure 43)
2. This is a natural position; keeping the cervical spine in line



Figure 41 Start Position

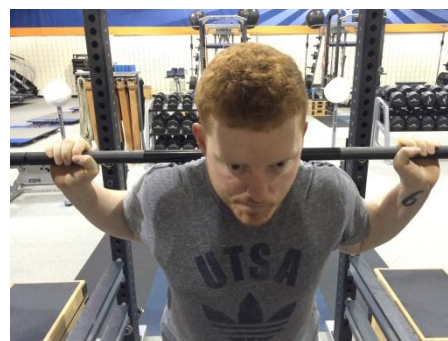


Figure 42 Grip Position



Figure 43 Head and Eye Position

with the body helps maintain bodyweight distribution throughout the squat

Common Mistakes

- Tilting head forward can shift weight to the balls of the feet, placing excess stress on the body, and cause rounding of the back
- Tilting head backward can shift weight to the heels of the feet, causing an improper curvature of the spine and unwanted stress on the neck and back

Foot Position

1. Narrow stance – works quadriceps and gluteals to some extent
2. Medium stance – works quadriceps and adductors to some extent
3. Wide stance – works adductor, gluteus, and outer quadriceps
4. Keep heels on the floor
5. Point toes out slightly from neutral to 30°
6. The angle of the foot position makes no difference as long as you are comfortable with the stance

Common Mistakes

- Not finding what stance works for you
- Turning or pointing the toes inward

Abdominals

1. Strong abdominal muscles help maintain torso stability and intra-thoracic pressure throughout the squat
2. The abdominal obliques are an important muscle group when performing the squat as they help to maintain torso stability

Common Mistakes

- Not including abdominal work as part of the regular strength training routine
- Working only one section of the abdominal area (either upper or lower, or just the abdominal obliques)
- Not using a variety of abdominal/oblique exercises
- Too much hip flexion during abdominal exercises

Breathing

1. Inhale deeply to maintain intra-thoracic pressure and prevent bending forward, arching the back, and passing out
2. Helps maintain tightness throughout the squat
3. Inhale and hold prior to descent
4. Exhale near or at the top of the squat
5. Inhale and exhale at the top of the squat between repetitions

Common Mistakes

- Holding breath during entire repetitions
- Exhaling at the bottom of the squat

Torso

1. Engage the core
2. The torso should be held between 35 and 45° from vertical
3. Less than 35°, you are too upright

4. More than 45° , you are leaning too far forward
5. Back should be kept flat and straight

Common Mistakes

- Allowing the torso to lean too far forward
- Keeping the torso too upright
- Not squatting with a rigid torso

Descent

1. Push hips back
2. Simultaneously flex knees while pushing hips back
3. Maintain torso angle throughout lift
4. Distribute bodyweight from the balls of the feet to the heels
5. Keep knees behind the balls of the feet
6. Maintain slow, controlled descent
7. Keep shins as vertical as possible by sitting back into the squat
8. At the bottom, do not bounce, jerk, or stop the motion
9. Proper depth is achieved when mid-thigh is parallel to the floor (Figure 44)

Common Mistakes

- Shins not being vertical
- Rounding the back
- Dropping down too quickly into the squat (not slow and controlled)

Ascent

1. Drive feet into the floor
2. Simultaneously raise hips and shoulders
3. Push shoulders slightly back into the bar so chest remains facing outward (Figure 45)
4. Continue extending hips and knees
5. Maintain proper head and eye position
6. Stand erect and back into the start position

Common Mistakes

- Bouncing out of the bottom of the squat
- Raising hips too quickly out of the bottom of the squat
- Allowing the weight to shift to the toes

Without question, the squat is the single most effective leg exercise. This strength training exercise involves a large portion of the muscular system. Remember that every athlete's squat will vary based on differences in body types, length of the legs, and flexibility of the ankles. Technique will vary based on differences in stance widths, the use of heel blocks, and positioning of the bar (high or low) on the back. Coaches should instruct athletes to stabilize the torso by engaging the core. Never flex the spine (i.e., round forward) during a squat. Overall, the key to performing the squat is to do it correctly and carefully. Squats are not "bad for your knees." The fact is that if you have healthy knees, they are quite capable of handling even the heaviest weight that your body can tolerate (2,4,5).

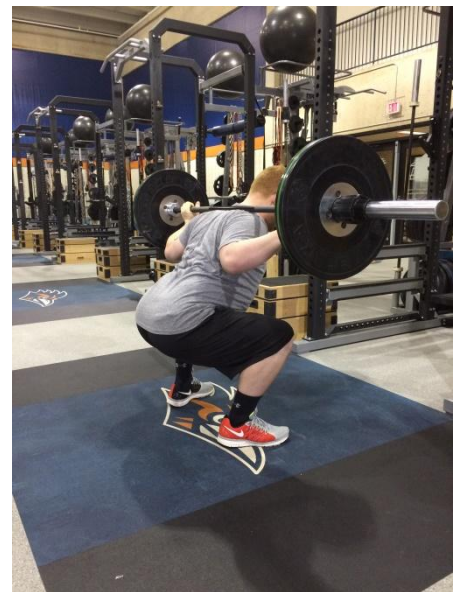


Figure 44 Low Point of Descent

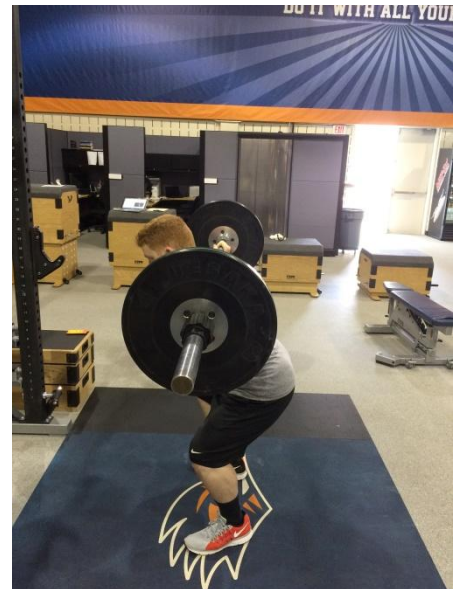


Figure 45 Ascent

1b. Barbell Front Squat

Exercise Objective: Develop the quadriceps, thigh adductors, gluteals, and hamstrings

When done correctly, front squats build the muscles, ligaments, and tendons surrounding the knee. This exercise is great for athletes who have problems keeping erect during back squats.

If an erect position is not maintained during this lift, the bar will roll forward.

Start Position

1. Set the bar at a height that is comfortable for lift-off
2. Step under the bar with the knees slightly bent
3. Place the bar comfortably on the front of the shoulders in one of two positions:
4. Clean Style: Place hands on the bar slightly wider than shoulder-width and rotate elbows up so they are high in front of the bar (Figure 46)
5. Cross-Arm Style: Cross arms in front of shoulders and place hands on top of the bar with elbows high in front
6. Align hips vertically with shoulders
7. Inhale to expand the lungs until you are set up
8. Lift the bar off the rack by extending the knees (Figure 46)
9. Step backwards using as few steps as possible, and position the feet so they are shoulder-width apart with the toes pointing straight

Procedure

1. Focus head and eyes straight ahead, take a deep breath to fill the chest with air, and engage the core (Figure 47)
2. In a slow, controlled motion, simultaneously push hips back, flex knees, and allow the torso to come forward slightly
3. Distribute bodyweight from the balls of the feet to the heels
4. At the bottom (Figure 48), do not bounce, jerk, or stop the squat
5. Drive through the floor (keeping the weight back on the heels), and extend hips and knees
6. Raise hips and shoulders simultaneously to keep back flat and head neutral
7. Exhale near the top of the squat and fully extend knees and hips to return to start position

Coaching Points

- Do not bounce out of the bottom position
- Keep knees pointed out, aligned with feet, and behind toes throughout entire lift
- Pick a spot on the wall and focus on it throughout the entire lift



Figure 46 Lift-off

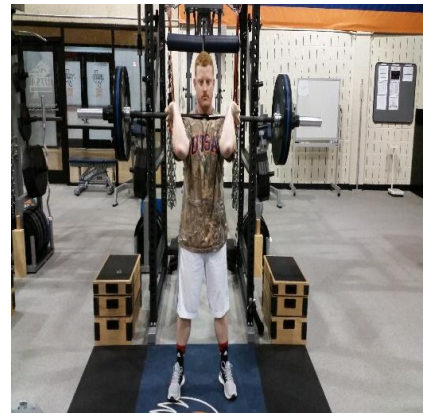


Figure 47 Starting Position



Figure 48 Bottom Position

1c. Barbell Clean Deadlift

Exercise Objective: Learn how to lift the bar off the floor properly and develop strength in the muscles of the legs, hips, back, and torso stabilizers

Start Position

1. Approach the bar resting on the floor or platform so the shins make contact
2. Place feet hip-width apart with toes pointed straight ahead
3. Keep back flat and shoulder blades pulled together, squat down to grasp the bar
4. Grasp the bar with a pronated grip slightly wider than shoulder-width with arms straight and elbows pointed out
5. Head remains in a neutral position looking forward throughout the entire lift
6. Weight should be shifted to the heels, and the hips should be slightly higher than the knees
7. Take a deep breath to fill the chest with air and engage the core (Figure 49)



Figure 49 Starting Position

Procedure

1. Lift the bar smoothly off the floor to just above the knees by slowly extending the hips and knees (keep the bar in contact with the shins)
2. Raise the bar, knees, hips, and shoulders in unison with a constant back angle throughout (i.e., avoid excessive arching)
3. As the bar passes over the knees, the shoulders remain in front of the bar, arms straight with elbows pointed out, hips flexed, and knees slightly bent
4. Extend the hips forward and engage the core to establish erect position
5. As a fully erect body position is established, shoulders, hips, knees, and ankles should be in alignment (Figure 50)
6. Return the bar to the platform in a slow, controlled manner, maintaining a straight back
7. The bar should slide down the thighs as you flex primarily at the hips until it passes over the knees
8. Then, squat down by simultaneously pushing hips back and flexing knees with weight on the heels



Figure 50 Finish Position

Coaching Points

- Maintain a constant back angle during the initial lift-off (the shoulders, hips, knees, and bar should all move together as one unit)
- Do not jerk the bar off the floor; pull it smoothly and under control
- The bar should remain in contact with the legs throughout the entire lift

Barbell Romanian Deadlift (RDL)

Exercise Objective: Develop strength in the hamstrings, gluteals, and torso stabilizers

Start Position

1. Grasp the bar with a pronated grip slightly wider than shoulder-width
2. Stand in an erect position with feet shoulder-width apart, toes pointed straight ahead, and knees slightly flexed
3. Arms should be fully extended with elbows pointed out, and the bar resting against the thighs
4. Keep chest high by pulling shoulder blades together
5. Engage the core to maintain a straight back (Figure 51)

Procedure

1. Slowly push hips backward, let the bar slide down the thighs, and transfer weight onto the heels
2. Lower the bar until the plates touch the floor (Figure 52)
3. Initiate the upward movement by contracting the gluteals and hamstrings

Coaching Points

- Maintain the starting back, chest, and knee positions throughout the entire range of motion
- Keep the shoulder blades pulled together throughout the entire lift
- Do not jerk the torso back to initiate the upward movement
- The bar should remain in contact with the legs throughout the entire lift



Figure 51 Starting & Finishing Position



Figure 52 Descent

3. Single-Leg Choice

3a. Forward Step Lunge

Exercise Objective: Isolate a single leg and develop strength in the muscles of the hips, legs, and core

Start Position

1. Stand in an erect position with dumbbells at sides, shoulder blades pulled back and down, arms straight, and palms facing in
2. Position feet hip-width apart with toes pointed straight ahead

Procedure

1. Take an exaggerated step forward keeping feet hip-width apart with toes pointed straight ahead (Figure 53)
2. Sit hips down until the front thigh is parallel with the floor
3. The torso should come forward to a 35 – 45° angle with back flat and straight (Figure 54)
4. Maintain balance and push through the heel of the front foot to return to the start position

Coaching Points

- Make sure that hips and shoulders remain square to the direction facing throughout the entire lift
- Keep weight on the front heel and keep back heel pointed to the sky to prevent it from rolling to the side



Figure 53 Start Position



Figure 54 Finish Position

- Do not allow the front knee to go forward past the toes

3b. Walking Lunge

Exercise Objective: Develop strength in the muscles of the hips, legs, and core

Start Position

1. Stand in an erect position with dumbbells at sides, shoulder blades pulled back and down, arms straight, and palms facing in
2. Position feet hip-width apart with toes pointed straight ahead (Figure 55)

Procedure

1. Take an exaggerated step forward with one leg, keeping toes pointed straight ahead
2. Sit hips and knee down until the front thigh is parallel with the floor (Figure 56)
3. The torso should come forward to a 35 – 45 ° angle with the back flat and straight
4. Maintain balance as you push off with the back leg and step all the way through to the next lunge

Coaching Points

- Make sure that hips and shoulders remain square to the direction facing throughout the entire lift
- Keep weight on the front heel and keep back heel pointed to the sky to prevent it from rolling to the side
- Do not allow the front knee to go forward past the toes
- Avoid taking a middle step for balance as you step through to the next rep

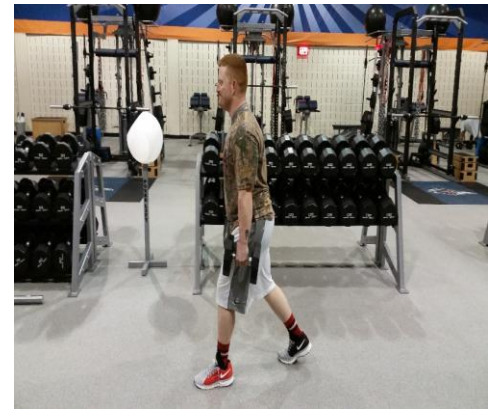


Figure 55 Start Position

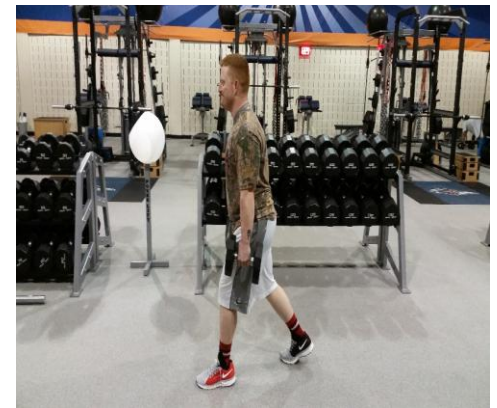


Figure 56 Finish Position

4. Pushing Progression

4a. Barbell Bench Press

Exercise Objective: Develop strength in the muscles of the pectorals, shoulders, and triceps

Start Position

1. Lie flat on the bench in a five-point body contact position with eyes directly under the bar
2. Grasp the bar evenly with a closed, pronated grip with hands slightly wider than shoulder-width
3. Lift the bar from the hooks and position it directly above shoulders with elbows fully extended (Figure 57)

Procedure

1. Take a deep breath to fill the chest with air and engage the core to prevent the back from arching
2. Lower the bar slowly and under control, allowing it to touch the chest (Figure 58)
3. Keep wrists rigid and directly above elbows
4. Drive the weight explosively off the chest by extending elbows
5. Exhale as you near the top of the lift

Coaching Points

- The movement of the bar should be down and slightly forward, and up and slightly back
- The most common error is to let the bar come off the chest moving toward the legs (the bar must come straight up and back off the chest for maximum force)
- Wrists should be in line with elbows with thumbs wrapped around the bar throughout the entire lift
- The lower back should remain in contact with the bench throughout the entire lift (do not arch the back or raise the chest to meet the bar)
- Avoid bouncing the bar off the chest

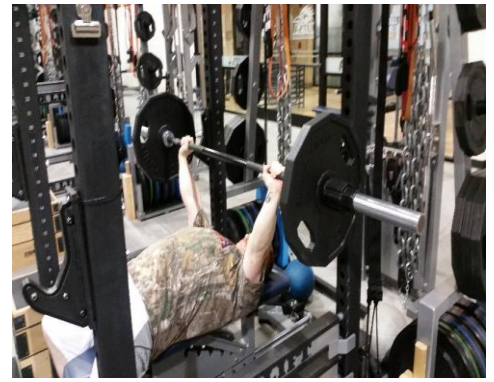


Figure 57 Start & Finish Position

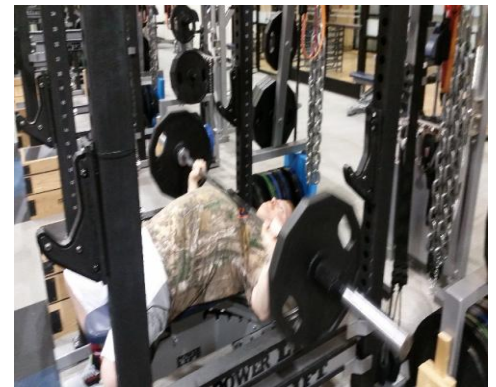


Figure 58 Bottom Position

4b. Barbell Incline Bench Press

Exercise Objective: Develop strength in the upper pectorals, shoulders, and triceps

Start Position

1. Lie flat on the inclined bench in a five-point body contact position with eyes directly under the bar
2. Grasp the bar evenly with a closed, pronated grip with hands slightly wider than shoulder-width
3. Lift the bar from the hooks and position it directly above the shoulders with elbows fully extended (Figure 59)

Procedure

1. Take a deep breath to fill the chest with air and engage the core to prevent the back from arching
2. Lower the bar slowly and under control, allowing it to touch the top of the chest (Figure 60)
3. Keep wrists rigid and directly above elbows

Coaching Points

- The movement of the bar should be down and slightly forward, and up and slightly back
- The most common error is to let the bar come off the chest moving toward the legs (the bar must come straight up and back off the chest for maximum force)
- Wrists should be in line with elbows and thumbs wrapped around the bar throughout the entire lift
- The lower back should remain in contact with the bench throughout the entire lift (do not arch the back or raise the chest to meet the bar)



Figure 59 Start & Finish Position



Figure 60 Bottom Position

4c. Dumbbell Bench Press

Exercise Objective: Develop strength and stability in the pectorals, shoulders, and triceps

Start Position

1. Grasp a dumbbell in each hand with a closed grip and sit on the bench
2. Lie flat on the bench in a five-point body contact position with arms extended (Figure 61)

Procedure

1. Take a deep breath to fill the chest with air and engage the core to prevent the back from arching
2. Lower the dumbbells slowly and under control keeping hands over shoulders until the dumbbells reach chest level (Figure 62)
3. Drive the weight off the chest extending the elbows
4. Exhale as you near the top of the lift

Coaching Points

- Wrists should be in line with elbows, and forearms perpendicular to the ground
- The lower back should remain in contact with the bench throughout the entire lift (do not arch the back or raise the chest to complete the lift)



Figure 61 Start & Finish Position



Figure 62 Bottom Position

4d. Dumbbell Incline Bench Press

Exercise Objective: Develop strength and stability in the upper pectorals, shoulders, and triceps

Start Position

1. Grasp a dumbbell in each hand with a closed grip and sit on the bench
2. Lie back on the bench in a five-point body contact position with arms extended (Figure 63)

Procedure

1. Take a deep breath to fill the chest with air and engage the core to prevent the back from arching
2. Lower the dumbbells slowly and under control keeping hands over shoulders until the dumbbells reach chest level (Figure 64)
3. Drive the weight off the chest extending the elbows
4. Exhale as you near the top of the lift

Coaching Points

- Wrists should be in line with elbows
- The most common error is letting the dumbbells and hands go wider than the elbows (i.e., the forearms should not go wider than perpendicular to the ground)
- The lower back should remain in contact with the bench throughout the entire lift (do not arch the back or raise the chest to complete the lift)



Figure 63 Start & Finish Position

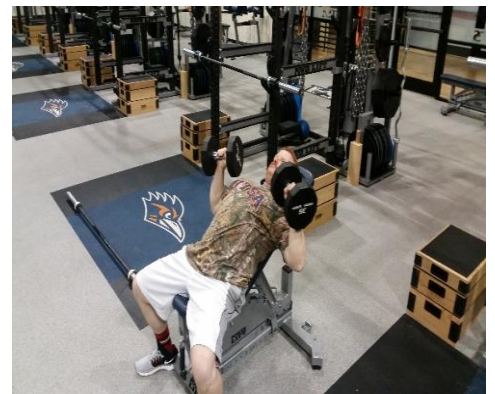


Figure 64 Bottom Position

5. Triceps Choice

5a. Triceps Pushdown

Exercise Objective: Isolate and develop strength in the triceps

Starting Position

1. Position hands on the pulldown bar about 6 in. apart in an overhand grip
2. Stand with feet flat on the floor, hip-width apart, toes pointed straight ahead, and knees slightly flexed
3. Engage the core to stabilize the body and prevent the back from arching

Procedure

1. Keep shoulder blades pulled together and elbows positioned at the sides until there is a 90° angle at the elbows (Figure 65)
2. Maintain an erect body position and push the bar down to full elbow extension (Figure 66)

Coaching Points

- Avoid letting the shoulders move forward during any part of the lift
- Avoid letting momentum help you complete the lift



Figure 65 Start Position

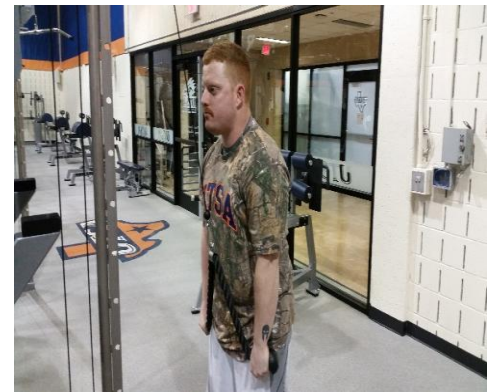


Figure 66 Finish Position

6. Abdominals Choice

6a. Heel Touch

Exercise Objective: Develop strength in the abdominal muscles

Starting Position

1. Lie on the floor face up with arms straight at the sides, and palms flat
2. Bend knees keeping feet flat on the floor and pressing lower body into the floor

Procedure

1. Slide hands along the ground close to the body by bringing the left shoulder toward the left heel until it touches the heel (Figure 67)
2. Hold position for 1s and slowly return back to the start position, pause, and repeat for the desired repetitions
3. Slowly return to the start position, and repeat on the right side

Coaching Points

- Avoid pulling head forward throughout the exercise
- Avoid lifting the lower back off the ground



Figure 67 Example

Conclusion:

Exercise technique forms the foundational knowledge and skill to allow the coach to supervise strength training and conditioning programs effectively. Proper technique must be taught to both the athlete as well as the spotter(s) to ensure safe and effective movements. Prior to beginning a strength training program, these techniques should be taught to all athletes.