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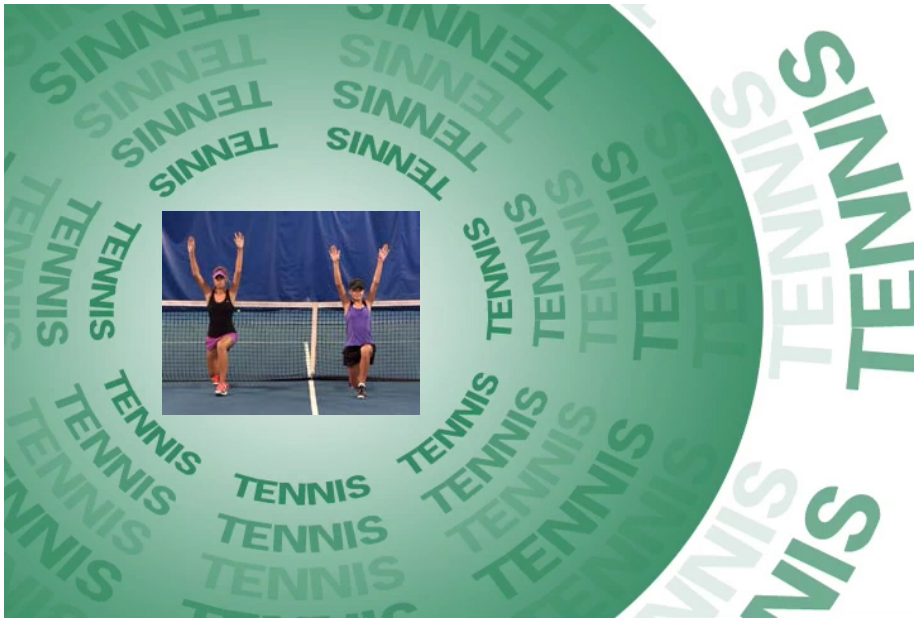
The Parent's Guide To Basic Injury Prevention For The Junior Tennis Player

An International Tennis Performance Association Course



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International Tennis Performance Association (iTPA)
Website: www.itpa-tennis.org

Chapter 1: Introduction

Introduction

This course produced by the International Tennis Performance Association is designed for the parent of junior tennis players. This course provides the parent with the basic information needed to be able to help the young athlete progress throughout the junior tennis career and prepare him or her for a successful high school, collegiate or professional career by improving performance and reducing the chance of injuries. This course is aimed at the parent who does not have an academic background in the exercise/sport sciences, but still wants to provide some basic assistance to help reduce the chance of injury in the junior player. It is highly encouraged that every competitive junior tennis player work with a Certified Tennis Performance Specialist (CTPS) who has gone through the extensive educational certification of the International Tennis Performance Association (iTPA), covering 20 modules of tennis-specific training information and requiring the coach/trainer to pass an extensive examination process and show the knowledge, skills and abilities needed to train the physical aspects of a tennis athlete. Contact the iTPA to find a qualified and certified professional in your area, or if you currently work with a tennis coach or physical trainer (strength and conditioning coach, athletic trainer, physical therapist, etc.), have that person go through the iTPA educational programs to ensure that they know how to effectively train tennis athletes to improve on-court performance and reduce the likelihood of injury. It is also highly recommended that your tennis player works with a tennis coach who has gone through the Tennis Performance Trainer (TPT) education and certification program. The TPT program is designed for the tennis coach to understand the physical aspects of tennis and covers 14 modules divided into three broad areas: *Leadership*, *Performance Enhancement* and *Injury Prevention*.

As a parent of a promising junior tennis player, your number one role is finding a good tennis coach and tennis performance specialist to work with your aspiring player(s). However, we know from research that for a young tennis player to be successful, he or she needs the support from parents and/or guardians. The purpose of this entire course is to provide you with some basic exercises and advice that you can use to help your young player(s) limit the likelihood of injury and improve performance. This course provides a general overview of some of the most important

aspects of injury prevention for tennis. The first few chapters focus on types of injuries common in tennis and other information important to parents including heat-related problems. The following is a series of exercises that can be performed by the junior tennis player at home with very limited equipment to reduce the chance of injuries. The final chapter provides some sample programs that provides a guide for how best to structure these injury prevention programs for the young athlete based on age and/or stage of development as well as competitive level.

To aid in the understanding of using these exercises with your young tennis athletes, photographs have also been provided; many of these exercises can also be found in The Parent's Course On Injury Prevention For The Junior Tennis Player section (either in the online library or on DVD). If an exercise also has an accompanying video the following symbol will be seen at the top of the exercise:

Although the majority of this course provides exercises and sample programs for the parent to implement with their child in a "homework" type session, it must be stressed that a qualified individual oversee the tennis-specific physical training of young tennis athletes. A Certified Tennis Performance Specialist (CTPS) is the qualification you need in a personal trainer, strength and conditioning coach, athletic trainer or physical therapist to ensure that they have a strong understanding of how best to train tennis athletes.

Chapter 2: Typical Tennis Related Injuries

Although tennis has very few acute injuries, the daily practice and competition of competitive tennis athletes may result in certain movements that over time may result in injury if appropriate training programs are not implemented. Below you will find tables highlighting the most common injuries seen in competitive tennis athletes; it is important to understand that this is a list to provide education for the tennis parent. This is not intended to treat or diagnose injuries, but it rather serves as an educational resource to help the tennis parent understand the most common issues that may arise if appropriate training is not implemented.

Typical Tennis Related Injuries

Part of the Body	Injury	Symptoms	Causes	Prevention & Treatment
Shoulder	▪ Rotator Cuff Impingement ▪ Labral Injury ▪ Biceps Tendinitis	▪ Typically players will feel pain during overhead motions or when lifting heavy weights. Tendinitis is the most common shoulder injury	▪ When muscles fatigue or when improper technique is used the rotator cuff tendons can get pinched particularly during overhead motions ▪ Overuse ▪ Rotational tightness	▪ A proper strengthening and stretching program as well as playing with proper technique can help prevent these injuries. ▪ Strengthening the muscles of the shoulders and upper back is particularly important
Elbow	▪ Tennis Elbow / Golfers Elbow	▪ Players can feel pain on both the outside (lateral epicondylitis – aka tennis elbow) or inside (medial epicondylitis – golfers elbow) of the elbow	▪ Lateral epicondylitis most commonly results from improper technique (or hitting the ball late) when hitting backhands. Medial epicondylitis involves the tendons that flex the wrist (forehands and serves) and occurs more often in skilled players	▪ Step 1 in preventing these injuries (particularly lateral epicondylitis) is taking tennis lessons to make sure the player has proper stroke technique ▪ Strengthening & stretching the forearm, shoulder and trunk muscles will also help to prevent elbow injuries. Strengthen w/ light weights & stretch both flexors & extensors of the forearms

Typical Tennis Related Injuries Cont'd

Part of the Body	Injury	Symptoms	Causes	Prevention & Treatment
Wrist	▪ Wrist Injuries	▪ Pain can be felt on the left or right side of the wrist. Pain can be due to a number of reasons, but many times athletes feel pain on the non-dominant wrist on the backhand stroke or during contact on all strokes.	▪ Wrist injuries can be caused by a number of factors, including improper technique, stiffer racquets, extreme grips and more powerful strokes than before	▪ Here's a two for one deal. Many of the same exercises can help prevent elbow injuries are also useful to help prevent wrist injuries.
Lower Back	▪ Lower Back Strain	▪ Lower back strains often manifest themselves during or after matches where players either make a sudden, unexpected move (acute injury) or when playing in a long match or series of long matches (or training sessions) with lots of stopping and starting	▪ Lower back injuries afflict many tennis players (on the pro tour as many as 38 percent of players reported missing a tournament due to a lower back injury). The modern game has a greater demand on trunk rotation particularly during open stance groundstrokes. Without adequate trunk strength, there is a chance for lower back strains	▪ The lower back muscles need to be able to support the vertebrae, discs and ligaments in the lower back. In addition, tightness in the hamstrings and deep rotators of the hip can also lead to lower back injuries. Proper stretching and strengthening of these areas is vital in the prevention of lower back injuries

Typical Tennis Related Injuries Cont'd

Part of the Body	Injury	Symptoms	Causes	Prevention & Treatment
Hips	▪ Hip flexor strain	▪ Players will often have difficulty moving on the court in addition to pain or discomfort in the hip area	▪ The hip flexors are quite active in all movement patterns on the court. Open stance ground-strokes, as well as frequent direction changes, can lead to hip flexor strains	▪ Proper flexibility of the hips is very important. Hamstring and quadriceps tightness will also decrease the motion available at the hip which in turn puts more stress on the lower back ▪ Make sure to strengthen these areas and more importantly stretch them regularly (daily if possible) since the sport itself imposes some tightness in the hip area
Lower Legs	▪ Calf muscle strain	▪ This injury is often referred to as "tennis leg." It is typically an acute strain of the medial gastrocnemius muscle and feels as if someone has just hit you with a ball	▪ We are including this injury as an overuse injury since it can happen to regular players. Often it is a result of frequent landing on the forefoot	▪ Proper stretching and strengthening of the gastrocnemius as well as the soleus muscles is important. Following an injury of this type, do not rush back to play too soon. These types of injuries tend to re-occur especially if not properly healed
	▪ Shin Splints	▪ This medial tibial stress syndrome shows up as pain along the front of the shin along the tibia. It is likely a chronic inflammation of the fibrous tissue covering muscle /bone	▪ In tennis players, this injury frequently shows up when players switch surfaces. Of all lower leg injuries, this is the most common and tends to show up more often with players that pronate significantly or with young players growing significantly	▪ The pain is relieved by rest and avoiding pain-causing activities. Stretching and strengthening and possibly wearing orthotics will help in rehabilitating and possibly help prevent the condition from recurring

Typical Tennis Related Injuries Cont'd

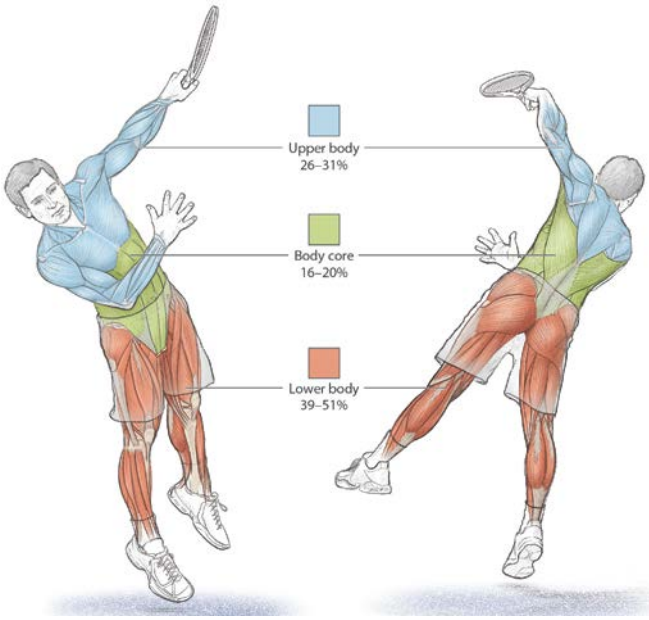
Part of the Body	Injury	Symptoms	Causes	Prevention & Treatment
Feet	▪ Plantar fasciitis	▪ Plantar fasciitis usually presents itself as pain at the bottom of the foot just in front of the heel. The pain is usually greatest when weight bearing and first thing in the morning. Extension of the toes and toe raises typically cause the greatest pain	▪ Lack of calf flexibility is a major cause of plantar fasciitis. Flat feet is another potential cause.	▪ A stretching program along with orthotics appears to have the greatest success of rehabilitation. Of course, rest immediately after injury or pain is important. Heel cups may help support cushion the heel during heel touchdown

Typical Tennis Related Injuries Cont'd

Part of the Body	Injury	Symptoms	Causes	Prevention & Treatment
Abdominals	▪ Abdominal Strain	▪ Straining a stomach muscle (abdominal muscle pull) has become more common in recent years. This type of pain will often not allow the athlete to continue playing and hurts most when hitting high balls or being stretched out for wide shots	▪ The advent of open stances in the groundstrokes have allowed for more trunk rotation. In addition, serves are being hit with greater speeds than ever before. Both of these changes in the game have contributed to the greater number of abdominal strains in	▪ A strong core includes the lower back muscles as well as abdominals and obliques. Every stroke in tennis involves the abdominals. It is therefore critical to strengthen the abdominal muscles on a regular basis. An added benefit is that they will be

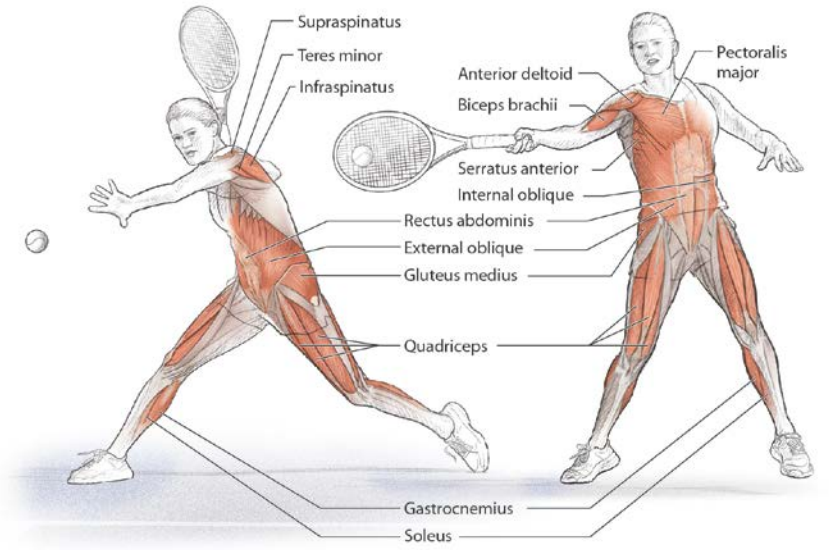
			recent years	more effective in transferring forces from lower to upper body as part of the kinetic chain
Knees	▪ Knee Pain	▪ Most common is an irritation or pain around the knee cap or near the patella	▪ The irritation or pain behind the knee cap is typically due to lack of strength or muscular support from the surrounding muscles. Without this muscular support the knee cap will not glide properly in the groove at the end of the femur. This can lead to irritation	▪ Although braces will help with support, strengthening and increasing range of motion in the quadriceps muscles will be most beneficial. Avoid exercises that require more than 90 degrees of flexion (deep knee squats), because they can be particularly stressful to the knee if appropriate strength and flexibility is not achieved. Also, strengthening the muscles of hip are important

**Used with permission from Tennis Anatomy (Roetert & Kovacs)*

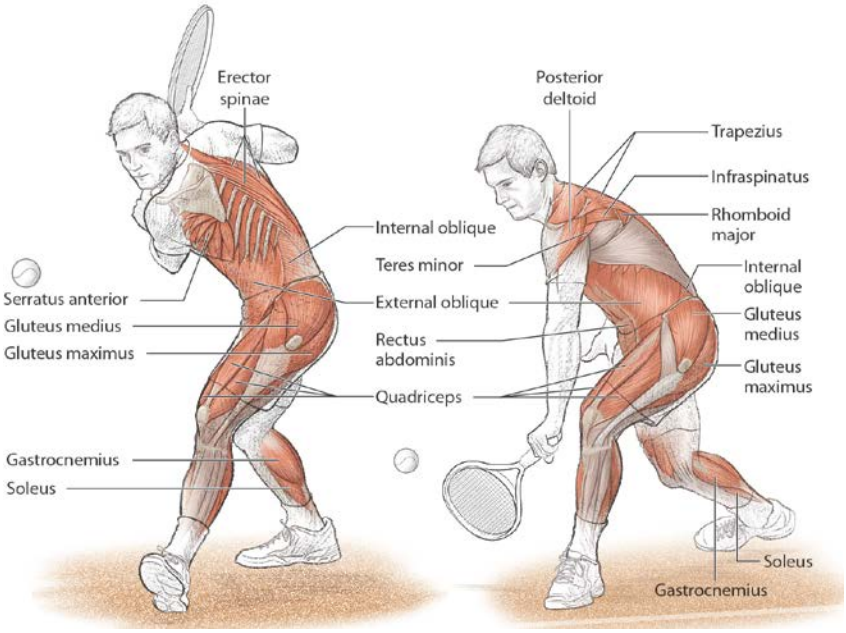


Muscles Used In Tennis

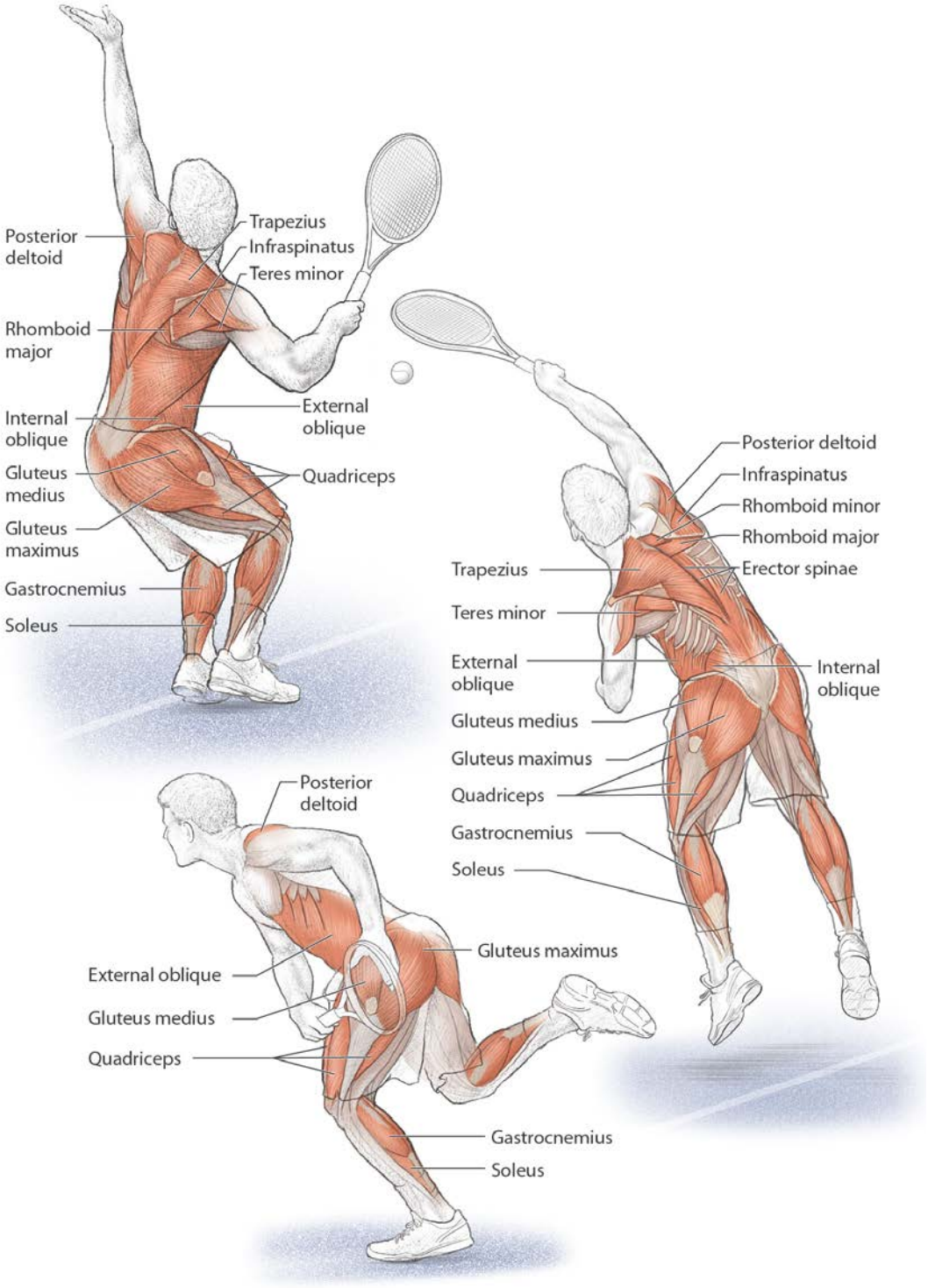
As you progress through this course and workbook many muscles will be discussed. Below is a reference guide for the major muscles used in the body and shown during tennis strokes. Please refer back to these diagrams when you come a across a name of a muscle that you may not be familiar with, or where it is located on the body - images below reprinted with permission from *Tennis Anatomy (Roetert & Kovacs 2011, Human Kinetics).*



Forehand



Backhand


Posterior deltoid
Trapezius
Infraspinatus
Teres minor
Rhomboid major
External oblique
Internal oblique
Gluteus medius
Quadriceps
Gluteus maximus
Gastrocnemius
Soleus
Posterior deltoid
Infraspinatus
Rhomboid minor
Rhomboid major
Trapezius
Erector spinae
Teres minor
External oblique
Internal oblique
Gluteus medius
Gluteus maximus
Quadriceps
Gastrocnemius
Soleus
Posterior deltoid
Gluteus maximus
External oblique
Gluteus medius
Quadriceps
Gastrocnemius
Soleus

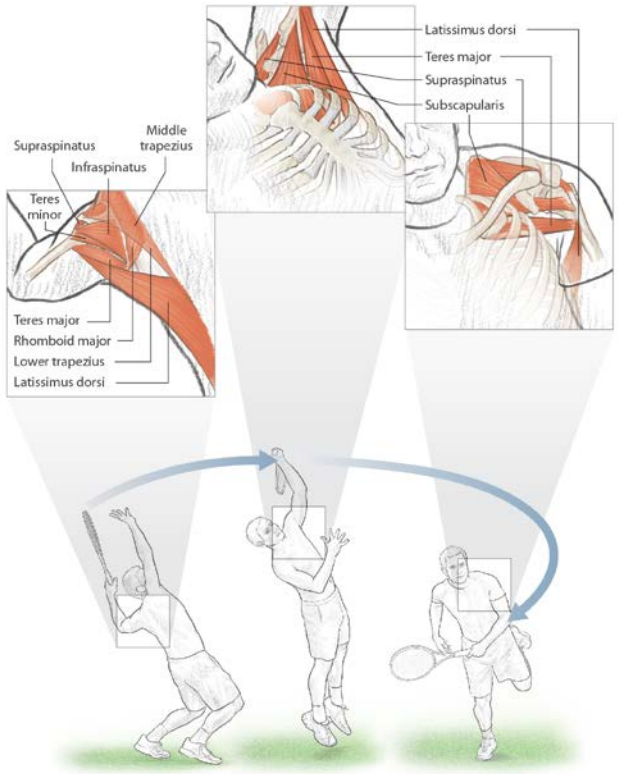
Serve

General Muscle Imbalances That Can Occur With Long Term Tennis Play

Below are some general muscle imbalances that occur with long term tennis play, and many of these conditions may result in injuries or poor performance if appropriate training and injury prevention protocols are not implemented. Many of these are common as a result of tennis play, but with appropriate training can be limited or completely eliminated. However, as individuals continue to play tennis at a competitive level, appropriate training needs to be implemented to offset the adaptations that occur:

Shoulder

- Poor stability of muscles surrounding and supporting the shoulder
- Loss and/or limited range of motion in the internal rotation of the dominant shoulder
- Muscle strength imbalances: weakness in muscles that help stabilize the shoulder blades (scapulas), tight internal shoulder rotator muscles, tight chest muscles.



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Pelvic Girdle and Lumbar Spine

- Poor pelvic (core) stability
- Weak stabilizers (deep muscles of the core region)
- Weak smaller muscles surrounding the hip
- Tight muscles which insert into pelvis

Patellofemoral (knee pain)

- Poor tracking of patella can be caused by:
    - Tight iliotibial band (IT Band – found on the outside of each leg between the hip and the knee)
    - Weak and poor timing of important muscles in the front of the leg
    - Weak and poor timing of small muscles supporting the hip
    - Foot and leg alignment
    - Tight muscles of the hip flexors

Elbow/Wrist

- Elbow/wrist problems commonly result of shoulder area problems
- Tight muscles surrounding the wrist (flexors and extensors)
- Reduced flexibility of wrist and elbow joints
- Poor muscular endurance of muscles surrounding wrist and elbow

Ankle and Foot

- Ligament instability
- Weakness in muscles surrounding ankle and foot
- Tightness in calf muscles
- Gait pattern problems which might need remedy via orthotics

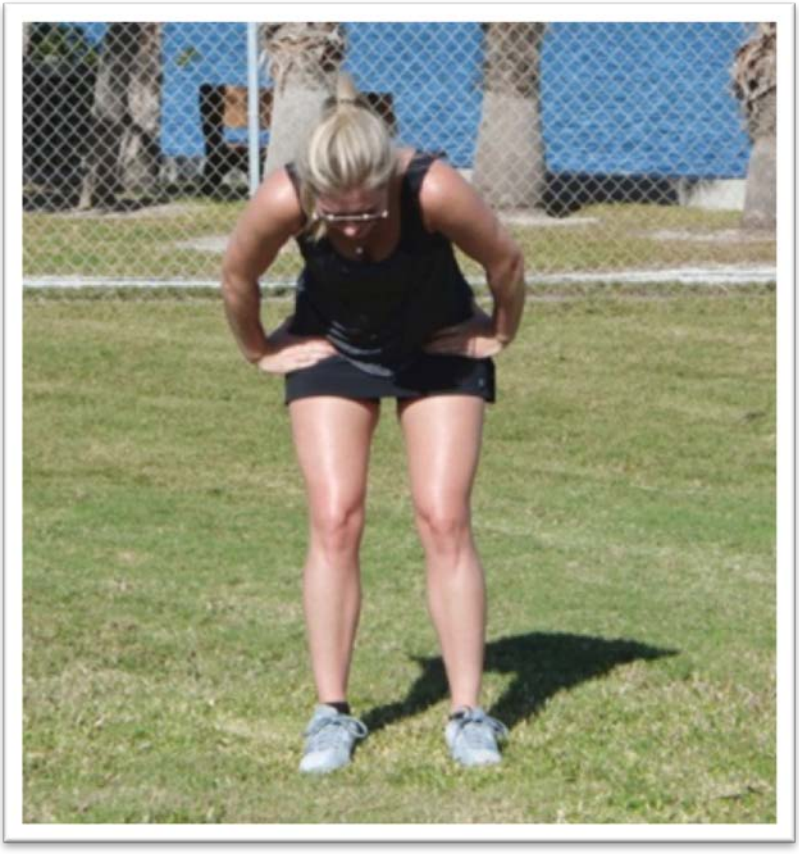
Many times competitive tennis players have a strength differential between their right and left legs. Typically a tennis player's landing leg on the serve (the left leg for a right-handed server) is stronger due the increased number of single-leg landings as a result of hitting serves. This imbalance may result in potential injury issues, but also reduced performance factors – possibly when needing to load and recover effectively on wide balls to the forehand when the left leg/hips need to stabilize vigorously. In the upper body, typically strength and flexibility differences exist between the dominant and non-dominant sides and the front and back of the body. Due to the nature of the

sport, obtaining true balance between front and back or left and right is almost impossible, but this needs to be continually trained.

Chapter 3: Heat Related Problems

Heat Illnesses

Players who practice or play in hot conditions are susceptible to heat illness. As a tennis parent it is important to understand the real concerns that exist and help your child prepare appropriately for training and competition in hot and/or humid conditions. The three stages of heat illness, in increasing order of seriousness, are: heat cramps, heat exhaustion, and heat stroke.



Heat Related Illnesses

	Possible Causes	Symbols	Treatments
Heat Cramps	▪ Excessive fluid loss; electrolyte imbalance; low-salt; poor acclimatization	▪ Excessive sweating; cramping in abs or extremity	▪ Rest in cool place; passive stretching; water/electrolyte re-placement; ice massage; stretch ▪ No play
Heat Exhaustion	▪ Prolonged excessive sweating	▪ Weakness; faintness; dizziness; headache; excessive thirst; vomiting; small urine volume or odor; skin is pale, cold and clammy	▪ Rest in cool place, lying down; cold towel or sponge; water/electrolyte replacement; discontinue activity 24h. Monitor weight ▪ No play
Heat Stroke	▪ Failure of body's cooling mechanism	▪ Abrupt onset; hysteria; irritability; aggressive; disorientation; glassy stare; feel like "burning up;" rapid pulse and respirations; absence of sweat; skin is red, hot, dry ▪ Loss of consciousness	▪ CALL 911-MEDICAL EMERGENCY! ▪ Full body immersion in cold water; fan over body ▪ Shade ▪ No play

Heat cramps are involuntary muscle cramps that are painful. They can occur throughout the body, but symptoms usually start at the extremities and move toward the core. The cause of heat cramps is thought to be a combination of dehydration, electrolyte imbalance, nutritional deficiencies and lack

of appropriate fitness. Replenishing fluids and electrolytes, particularly sodium, is critically important in the prevention of heat cramps and stopping play is highly recommended.

Heat exhaustion is an overload to the body's thermoregulatory system resulting in extreme sweating and often heavy breathing, rapid pulse and fatigue. Heat cramps often occur, along with other symptoms such as dizziness, nausea and an obvious outward appearance of distress. If players exhibit signs of heat exhaustion, they need to rest in a cool, shaded place, consume cool water and apply ice to the neck, back, under the arms and between the groin to help cool the body. Monitoring these athletes carefully in order to ensure their condition doesn't worsen is important. In this stage of heat illness, the body's thermoregulatory system is still working, but it is not able to keep up with current physical demands. No play or exercise is recommended.

Heat stroke occurs when the body's thermoregulatory system fails. The body can no longer cool itself, and the individual will likely die if formal treatment is not initiated. This is an emergency situation that requires emergency medical support. Treatment includes cooling procedures and intravenous fluids and electrolytes, as well as careful monitoring of all vital signs. The individual often is not sweating, has loss of memory and balance and may lose consciousness. Failure to recognize this condition and to initiate immediate medical treatment can result in sever problems. Calling emergency services if you suspect heat stroke is important and using all available means to help cool the athlete (cold water immersion, ice packs, etc).

10 Steps To Succeed in the Heat

1. **Physically Prepare** — the more physically fit the tennis player is, the less likelihood he/she will experience heat related issues
2. **Drink, Drink, Drink** — drinking a combination of water and electrolyte-enhanced beverages throughout the day will help keep the tennis player well hydrated
3. **Don't Rely on Thirst** — drink consistently, not just when thirsty. The body may be two % dehydrated by the time thirst is experienced. Waiting until thirsty is too late!
4. **Increase Salt Content in Food and Drink** — As salt is the major electrolyte lost in sweat, it is important to replace this important electrolyte throughout the day. Foods that contains high salt contents are vegetable juice, canned soups, sports drinks and salted pretzels
5. **Use Ice and Other Cooling Mechanisms** — Keeping the body cool before, during and after practice or competition is helpful in maintaining an appropriate body temperature. However, putting ice directly on muscles and joints during play is not advised due to the possibility of muscle and joint stiffening
6. **Appropriate fuel pre, during and post-practice or match**
7. **Clothing** — it is best to choose light colored, breathable and loosely woven fabrics to help sweat evaporate easily
8. **Sunscreen** — can help reduce the instances of skin cancer, which is important for long-term health, but using liberal amounts of sunscreen will also prevent short-term sunburn that increases an athlete's skin temperature and may increase the susceptibility to heat-related problems
9. **Acclimation** — The body's adaptation to a hot environment. Most occurrences of heat illness occur in the first two to three days of training or competition in a hot and humid environment
10. **Reduce contact with direct sunlight when not playing**

The best treatment for heat illness is prevention.

Have a complete medical profile for each high performance player.

Chapter 4: Basic Injury Prevention Exercises

As the major aspect of this parent course is to provide basic exercises that can be incorporated at home, it needs to be stressed that the list of exercises below are a starting point and should not be considered an all-encompassing list. It is highly recommended that a Certified Tennis Performance Specialist (CTPS) oversees the training of young tennis athletes and provides the program design and oversight of when to increase/decrease weight, repetitions or sets of exercises. The exercises below are divided into six broad categories:

1) Static Flexibility

Static flexibility is when the muscle is stretched and held at a certain length with no movement. Think of touching your toes and holding this stretch for 30 seconds. This would be an example of a static stretch. Static flexibility is very good for increasing range of motion, is very safe and needs to be incorporated into a junior tennis player's routine. The best time to perform these exercises is after tennis practice or competition and in the evenings at home. Most stretches should be held for 30 seconds and can be repeated 2-4 times depending on the level of athlete and time available. Most tennis players do not spend enough time on improving static flexibility and this is one major area where parental support can be a major benefit.

2) Dynamic Flexibility

Dynamic flexibility is when the muscle is stretched under a controlled movement pattern. The muscle changes shape under a controlled lengthening and shortening process and is not performed in a jerky (or ballistic fashion). The benefit of dynamic flexibility is that force is being produced, balance and coordination is required and research has shown that this form of flexibility is more beneficial before tennis practice or competition. It is highly recommended that dynamic flexibility be performed before tennis or physical training as opposed to static flexibility exercises. These exercises can be accomplished on a tennis court and the distance used for each exercises can be between the two doubles lines on the tennis court (36ft). This roughly equates to approximately 10 repetitions per movement. Depending on the age and stage of development of the athlete longer periods may be beneficial. For many elite junior players a good dynamic warm-up will take 20-30

minutes working from slow controlled movements to more explosive movements that mimic the movement patterns seen on the tennis court.

3) Basic Lower Body Resistance Training Exercises

Lower body resistance training is very important for the tennis athlete. Some misconceptions still exist about how young an athlete can start resistance training, and the research is very clear that athletes can and should start structured resistance training at a young age, but it must be appropriate for the age and stage of the young athlete. The most important factor is that young athlete focus on performing the movements with correct technique with light resistance and slowly progress. The goal at younger ages is not the amount of weight lifted, but the focus should be on improving functional flexibility, balance, coordination and technique.

Prevention Specific Exercises

4) Upper Body Exercises

Upper body exercises need to be incorporated into the tennis athlete's routine. At the younger ages the purpose of upper body work is to increase muscular endurance and flexibility more than how much weight is actually lifted. The goal is to improve technique and offset any current or potential future muscle imbalances that may be created do the large amount of hours spent on the tennis court.

5) Core/Torso Exercises

Core/torso exercises are paramount to success for the tennis athlete. It is very important for both performance improvement and also to reduce the chance of injuries. The core region links the lower body with the upper body and if the muscles of the core region are not trained effectively it directly relates to how well a young tennis athlete can perform on the court. It is also very important to help reduce the chance of injury by improving the stability of the smaller muscles of the core region.

6) Lower Body Exercises

Lower body exercises, focused on injury prevention, are very important during a junior tennis career. If the muscles and joints in the lower body are not strong and stable it may result in problems up through the core region and into the upper body. Many upper body injuries are the

result of weakness in the lower body and core region and spending appropriate time developing strength and stability in the lower body helps the young athlete progress more successfully throughout the tennis journey.

Flexibility Exercises

Static Stretching

Static Stretching Guidelines

- Perform after training, competition or physical activity
- Focus on slow, smooth movement and coordinated deep breathing
    - Inhale deeply → Exhale as stretching to the point just short of pain → then ease back slightly
    - Hold the stretch position for 15-30 seconds while breathing normally. Repeat multiple times depending on overall fitness goals
- Stretch the tight side first
- Stretch within safe limits
- Do not lock joints
- Do not bounce
- Stretch larger muscle groups first

Calf Stretch

Calf Stretch	
Technique	▪ Start in a pike position, contacting the ground with the hands and feet on the ground with the heels off the ground. ▪ Keeping the legs straight, use gravity and body weight to press the heels slowly toward the ground. ▪ Hold the stretch for 30 seconds and repeat.
Coaching Cues	▪ Keep lower back straight with neutral spine.
Variations	▪ Knees can be straight or bent. The straight leg technique focuses on the flexibility of gastrocnemius; whereas the knee bent variation focuses on the flexibility of the soleus.

Fence Calf Stretch

Fence Calf Stretch	
Technique	▪ Push both hands against a solid wall (or fence) while bending the right leg (front leg) and straightening the left leg (back leg). ▪ Hold the stretch for 30 seconds and repeat using the opposite legs.
Coaching Cues	▪ Maintain good body position while trying to maintain heel contact with the ground.

Standing Hipflexors Stretch

Standing Hipflexors Stretch	
Technique	▪ Stand with the left leg slightly in front of the right leg and with a small bend in the left knee (approximately 10-20% knee bend) slowly push the hip forward at the waist, which increases the range of motion and stretches the right hipflexor (muscles on the frontside of the leg). ▪ Slowly increase this stretch for between 30-45 seconds. ▪ Repeat this same movement on the opposite leg (right leg).
Coaching Cues	▪ Maintain good body position with a neutral spine throughout the movement.

Lying Hamstring Stretch

Lying Hamstring Stretch	
Technique	▪ Lie supine (back on the ground) and loop a towel/rope or stretching strap around the right foot. ▪ Keeping the leg straight and the left leg on the floor bring the thigh closer to the body via pulling on the towel/rope/stretch strap. ▪ Hold the stretch for 30 seconds and repeat.
Coaching Cues	▪ Keep lower back straight with neutral spine.
Variations	▪ Knees can be straight or bent. The straight leg technique focuses on the hamstring group and the popliteus (a big word to describe a small muscle behind the knee); whereas the knee bent variation focuses on belly of the hamstring.

Kneeling Hipflexor Stretch

Kneeling Hipflexor Stretch	
Technique	▪ Start this stretch in a lunge position, with the left foot forward and the right knee on the ground (put a towel or yoga mat under the right knee on the ground). ▪ Maintain good posture in the upper body (shoulders back, head and back straight) and gradually move the athlete's center of mass forward and downward so the hips drop slightly toward the floor. ▪ The stretch will be felt in the front of the right hip. Hold the stretch for 30 seconds and repeat.
Coaching Cues	▪ Squeeze shoulder blades together while maintaining a neutral spine and eyes forward.
Variations	▪ An advanced variation involves the same position, but grasping the back foot and pulling the foot upward toward the hamstring. This increases the stretch and also develops balance and coordination.

Lying Quadriceps Stretch

Lying Quadriceps Stretch	
Technique	▪ Start this stretch lying prone (facedown) on the ground (or on a mat). ▪ Grasp the left foot with the left hand and pull left heel to left buttock. ▪ The stretch will be felt in the front of the athlete's left thigh. Hold the stretch for 30 seconds and repeat on the opposite leg.
Coaching Cues	▪ Push hips into the ground during the stretch.
Variations	▪ An advanced variation involves the same position, but grasping both feet at the same time pull both heels to buttocks. This is more challenging and also develops balance and coordination.

Figure 4 Stretch (Piriformis Stretch)

Figure 4 Stretch (Piriformis Stretch)	
Technique	▪ Start this stretch lying supine (on the back) on the ground (or on a mat) and cross the right ankle over the left knee while bending the left knee. ▪ Grasp behind the left knee with both hands and pull toward the chest. ▪ The stretch will be felt deep in the right hip/buttock. Hold the stretch for 30 seconds and repeat on the opposite leg.
Coaching Cues	▪ Push pelvis into the floor and keep increasing the stretch.
Variations	▪ An advanced variation involves the same position, but extending the left leg (in example above), which also stretches the hamstring simultaneously.

Supine Single Leg Knee-to-Chest Stretch

Supine Single Leg Knee-to-Chest Stretch	
Technique	▪ Lying supine with legs bent and knees at 90 degrees, grasp the athlete's right knee with both hands and slowly pull the right knee up to the chest. ▪ Slowly increase this stretch for between 30-45 seconds, feeling the muscles of the lower back relax and lengthen. ▪ Repeat this same movement on the opposite leg (left leg).
Coaching Cues	▪ Maintain good body position by keeping the athlete's lower back pushed down against the floor.

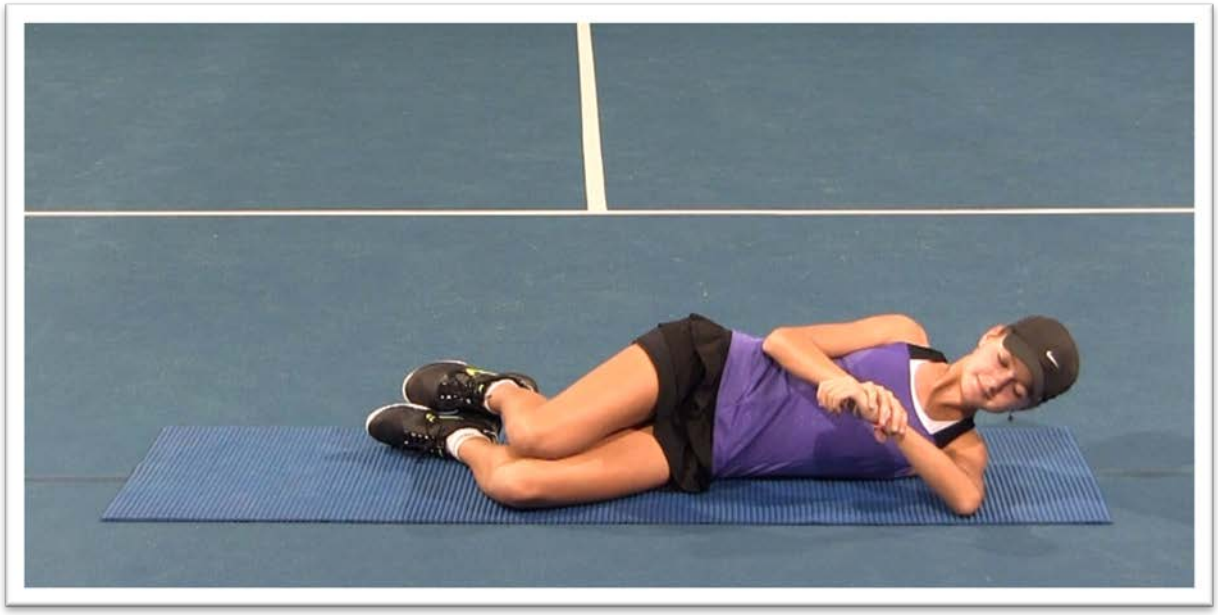
Cross Arm Stretch

Cross Arm Stretch	
Technique	▪ In a standing position hold the left arm straight out in front of the body. Lean back against a wall (or other flat surface) to help stabilize the left shoulder blade. ▪ Grasp the left arm with the right hand and slowly pull the left arm across the body. ▪ The stretch will be felt on the backside of the left shoulder. ▪ Hold the stretch for 30 seconds and repeat for the other arm.
Coaching Cues	▪ By minimizing the motion of the shoulder blade the effectiveness of the stretch will be increased.

Wrist Flexor Stretch

Wrist Flexor Stretch	
Technique	▪ In a standing position extend the left arm straight in front of the body. Grasp the top of the left hand with the right hand and pull gently toward the body. ▪ This stretch should be felt in the muscles of the left forearm. ▪ Hold the stretch for 30 seconds and repeat on the opposite arm.
Coaching Cues	▪ Maintain arm position while slowly increasing the stretch.

Sleeper Stretch



Sleeper Stretch	
Technique	▪ Lying on the left side of the body, flex the athlete's left elbow at 90° and position the left arm so that it is perpendicular to the upper body. The left hand should point to the ceiling. ▪ With the right hand, slowly and gently push the left forearm downward toward the floor. ▪ Hold the stretch for 30 seconds and repeat on the opposite arm.
Coaching Cues	▪ Maintain arm position while slowly increasing the stretch and keeping the scapula stable.

Tricep Stretch

Tricep Stretch	
Technique	▪ Reach right hand behind the head by bending the elbow and pointing the right fingers down toward the ground. ▪ With the left hand slowly push down against the right tricep to increase the stretch. ▪ Gradually increase the stretch hold for 30 seconds. ▪ Repeat this same movement on the opposite arm.
Coaching Cues	▪ Maintain good body position by keeping the shoulders back and the back straight with a neutral spine position.

Dynamic Stretching

Walking Knee-to-Chest Stretch

Walking Knee-to-Chest Stretch	
Technique	▪ Standing upright with shoulders back and head straight, raise your right leg upward via hip flexion while simultaneously bending the right knee and grasping the right shin with both hands to pull the right knee all the way to toward the chest. ▪ As the right knee moves toward the chest slowly rise up on the opposing (left) leg so that the left heel is off the ground. ▪ Hold the end position for approximately two seconds and return to the starting position. ▪ Repeat this movement using the opposite leg.
Coaching Cues	▪ Maintain good body position by keeping shoulders back and head straight, core and glutes contracted.

Knee to Shoulder Lateral Walk — Frogger

Knee to Shoulder Lateral Walk — Frogger	
Technique	▪ Standing upright with shoulders back and head straight and arms extended straight out to the sides at shoulder height. ▪ Flexing the left hip and externally rotating the left hip to bring the knee up toward the armpit and then immediately lowering the leg to the ground. ▪ As the left leg moves downward the same movement is performed using the other leg (right) and other side of the body. ▪ Repeat this movement for multiple repetitions (10-20 each leg).
Coaching Cues	▪ Maintain good body position by keeping shoulders back and head straight, core and glutes contracted throughout the entire movements.
Variations	▪ Although this movement is described using a walking movement. For more advanced athletes, this same movement pattern can be performed in a side-skipping pattern which increases the turn-over and limits the amount of time the athlete spends on the ground.

Hamstring Handwalk — Inchworm

Hamstring Handwalk (Inchworm)	
Technique	▪ Standing upright with shoulders back and head straight slowly lower the hands out in front of the body into a starting pushup position while maintaining the legs straight (see photo). ▪ From this starting position the heels are pushed into the ground and while maintaining straight legs and back the feet are slowly walked toward the hands as far as possible without allowing the knees to bend. ▪ Once the feet have reached as close as possible to the hands, and then slowly walk the hands out forward to create a new starting push-up position. ▪ Repeat this movement for multiple repetitions (5-10).
Coaching Cues	▪ Maintain good body position by keeping shoulders back and head straight, core and glutes contracted throughout the entire movements. ▪ Maintain straight legs throughout the entire movement (do not allow the knees to bend).

Spiderman Crawl

Spiderman Crawl	
Technique	▪ Standing upright with shoulders back and head straight a small step is taken with the left leg at an approximate 45° forward direction. ▪ Flexing at the waist and bending the knee, crawl forward while maintaining a neutral spine and the hands are walked forward toward the left foot/knee and a forward eye gaze. ▪ From this position slowly bring the right hip around and crawl the right foot forward and follow the same process the opposing leg. Repeat this movement for multiple repetitions (10-15) for each leg.
Coaching Cues	▪ Maintain good body position by keeping shoulders back and head straight, core and glutes contracted throughout the entire movement and maintain a very low center mass. ▪ Keep the butt down as low as possible.

Hugs

Hugs	
Technique	▪ Standing upright with shoulders back, head straight, core and glutes contracted. ▪ From this starting position, the arms are wrapped around the body with the aim of grasping the back of the opposing shoulder (i.e. the left hand to the back of the right shoulder and vice versa). ▪ From this position, reverse the movement by opening the chest while taking the arms back and squeezing the shoulder blades together. ▪ Repeat this movement using a controlled tempo for 10-15 repetitions for each movement.
Coaching Cues	▪ Maintain good body position by keeping shoulders back and head straight, core and glutes contracted throughout the entire movement. ▪ Aim to increase the range of motion on each repetition.
Variations	▪ This exercise can be performed concurrently with many of the lower body movements such as lunges, skips, ankle, heel and toe walks. This is beneficial if time is a limitation. This also aids in the development of balance and coordination.

Cheerleaders

Cheerleaders	
Technique	▪ Standing upright with shoulders back, head straight, core and glutes contracted with hands by the side. ▪ From this starting position, the arms slowly raise both arms out to the side and straight above the head with both palms touching at the top of the movement. ▪ From the top of the position, reverse the movement by bringing the arms out to the sides and then down by the waist in a circular arch. ▪ This movement should be repeated at varying speeds and utilizing both supination and pronation of the arms. ▪ Repeat this movement using a controlled tempo for 10-15 repetitions for each movement.
Coaching Cues	▪ Maintain good body position by keeping shoulders back and head straight, core and glutes contracted throughout the entire movement. ▪ Aim to increase the range of motion on each repetition and perform between 10-20 repetitions per arm.
Variations	▪ This exercise can be performed concurrently with many of the lower body movements such as lunges, skips, ankle, heel and toe walks. This is beneficial if time is a limitation. This also aids in the development of balance and coordination.

Wipers

Wipers	
Technique	▪ Standing upright with shoulders back, head straight, core and glutes contracted with hands out in front of the body. ▪ From this starting position, slowly raise the left arm while simultaneously lower the right arm. ▪ Change the direction of the arm movement and repeat this movement in the opposite direction. ▪ Repeat this movement using a controlled tempo for 10-15 repetitions for each movement.
Coaching Cues	▪ Maintain good body position by keeping shoulders back and head straight, core and glutes contracted throughout the entire movement. ▪ Aim to increase the range of motion on each repetition and perform between 10-20 repetitions per arm.
Variations	▪ This exercise can be performed concurrently with many of the lower body movements such as lunges, skips, ankle, heel and toe walks. This is beneficial if time is a limitation. This also aids in the development of balance and coordination.

Walking Lunges

Walking Lunges	
Technique	▪ Standing upright with shoulders back, head straight, core and glutes contracted with hands down by the sides. ▪ From this starting position, step forward with the right foot and bend the back leg (left) until the knee is approximately one to three inches from the ground directly under the left hip. ▪ The right leg will also bend at the same time and there will be a 90˚ angle at the front knee with the knee directly parallel with the right ankle. ▪ Pushing with the back leg (left) which will bring the left leg through and then repeat the lunge movement with the opposing leg. ▪ Repeat this movement, alternating legs, using a controlled tempo for 10-15 repetitions for each movement.
Coaching Cues	▪ Maintain good body position by keeping shoulders back and head straight, core and glutes contracted throughout the entire movement.
Variations	▪ This exercise can be performed with different arm positions to increase the range of motion, change the center of mass or just add more difficulty to the exercise. The second photo above highlights one variation with hands above the head which raises the center of mass making the movement more challenging.

Walking Quad Stretch

Walking Quad Stretch	
Technique	▪ Standing upright with shoulders back, head straight, core and glutes contracted. Flexing the right knee and grasping the right foot with the right hand (see photo) while simultaneously rising up onto the left foot. ▪ Hold this erect position for approximately two seconds. ▪ As the right leg is released the right leg will take a step forward and this movement will be repeated on the opposing leg. ▪ Perform this movement for the appropriate number of repetitions (10-15 per leg).
Coaching Cues	▪ Maintain good body position by keeping shoulders back and head straight, core and glutes contracted throughout the entire movement. ▪ Focus on balance and stability while increase the range of motion in the quadriceps.

Basic Lower Body Resistance Training

DB Squat

DB Squat	
Exercise Setup	▪ Dumbbells.
Exercise Technique	▪ The athlete places one dumbbell in each hand and the hands are resting by the sides in a standing position with feet shoulder width apart with the feet pointed forward. ▪ From an upright standing position, slowly bend the knees and the athlete pushes their bodyweight through the heels. Keep the back straight and lower the body until the thighs are parallel to the floor (or sometimes even lower than parallel for advanced athletes). ▪ From the bottom of the movement, extend the hips and knees and return to the starting position. ▪ Repeat this same movement for the appropriate number of repetitions (1-20).
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. ▪ *Ensure that the knees do not buckle and that each knee is aligned over the second toe of the foot at the bottom of the movement. ▪ Variations: Barbell can be used instead of dumbbells.

Front Squat – Dumbbell

Front Squat - Dumbbell	
Exercise Setup	▪ Dumbbell.
Exercise Technique	▪ The athlete grasps the dumbbells in both hands with feet shoulder width (or slightly further apart) with toes pointed forward or slightly out. ▪ From an upright standing position, slowly bend the knees and the athlete pushes the body weight through his/her heels. Keep the back straight and lower the body until the thighs are parallel to the floor (or sometimes even lower than parallel for advanced athletes). ▪ From the bottom of the movement, extend the knees and return to the starting position. ▪ Repeat this same movement for the appropriate number of repetitions (1-20).
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. ▪ *Ensure that the knees do not buckle and that each knee is aligned over the second toe of the foot at the bottom of the movement. ▪ Variations: the depth and speed of movement can be altered to accomplish the appropriate goals.
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Relax the trapezius muscles while focusing on contracting the rhomboids and posterior deltoids. ▪ Variations: This exercise can be performed using different feet positions and hand positions to stress different muscles.

Romanian Deadlift — Dumbbell

Romanian Deadlift — Dumbbell	
Exercise Setup	▪ Dumbbells.
Exercise Technique	▪ The athlete stands with the feet shoulder width apart with the knees slightly bent (similar to an athletic position). ▪ While holding the dumbbells (one in each hand) in front of the body, arms down in front of the thighs resting the weight on the mid-thigh just above the knee. The athlete slowly lowers the weight to the middle of the shin by hinging at the hips. The athlete's glutes should go back and up while maintaining a subtle anterior pelvic tilt. ▪ Return the weight back to the starting position by extending the hips and waist until the athlete returns to an upright position with the shoulders back. ▪ Repeat this same movement for the appropriate number of repetitions (1-20).
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. ▪ Variations: Depth and speed may be altered depending on the goals of the athlete.

Modified Glute Bridge

Modified Glute Bridge	
Exercise Setup	▪ Floor.
Exercise Technique	▪ The athlete lies on his/her back with the right knee bent at approximately 45° and the left leg pulled toward the chest with both hands. ▪ From this starting position the athlete raises his/her hips and lower back from the ground by pushing weight through the right heel and squeezing the right glute to activate the movement. ▪ At the top of the movement hold the position for two seconds and then lower to the starting position. ▪ Perform this same movement for the appropriate number of repetitions (6-20) and then repeat on the opposing leg.
Coaching Cues	▪ A coaching cue for the athlete is to push through the heel while squeezing the glute muscles. ▪ Variations: The exercise described above is the first in a series of more difficult movements aimed at developing functional hamstring, glute and lower back strength and muscular endurance: o Physioball Hamstring Buck ▪ Performed using the same movement, but the left heel is on the physioball instead of the floor. o Medicine Ball Hamstring Buck ▪ Performed using the same movement, but the left heel is on the medicine ball instead of the floor. o Tennis Ball Hamstring Buck ▪ Performed using the same movement, but the left heel is on the tennis ball instead of the floor.

Glute Bridge Series (Hamstring Buck)

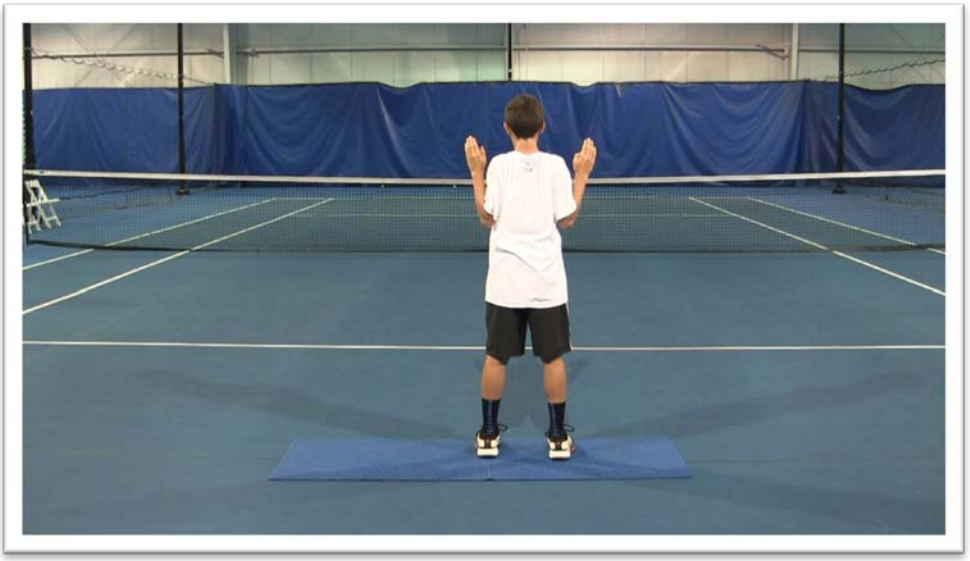
Glute Bridge Series (Hamstring Buck)	
Exercise Setup	▪ Floor.
Exercise Technique	▪ The athlete lies on his/her back with the right knee bent at approximately 45° and the right heel pressing against the floor, so that the right toe points toward the sky. The left leg will be extended straight in the air. ▪ The athlete raises his/her hips and lower back from the ground by pushing weight through the right heel (the hands are positioned flat on the ground). ▪ At the top of the movement hold the position for two seconds and then lower to the starting position. ▪ Perform this same movement for the appropriate number of repetitions (6-20) and then repeat on the opposing leg.
Coaching Cues	▪ A coaching cue for the athlete is to push through the heel and keep a straight line between the knee & the shoulders. ▪ Variations: The exercise described above is the first in a series of more difficult movements aimed at developing functional hamstring, glute and lower back strength and muscular endurance. By altering the hand position (crossed arms across the athlete's chest) it increases the difficulty: o Physioball Hamstring Buck ▪ Performed using the same movement, but the left heel is on the physioball instead of floor. o Medicine Ball Hamstring Buck ▪ Performed using the same movement, but the left heel is on the medicine ball instead of floor.
Variation	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Focus on transversus abdominis and multifidus control. ▪ Variations: This exercise can be performed using a cable pulley or weight stack machine as well.

Injury Prevention Training for Tennis

- **Upper Body**
  (Shoulder, Upper Back, Elbow, Wrist)
- **Core and Torso**
- **Lower Body**
  (Hips, Quadriceps, Hamstrings, Calves)

Upper Body (Shoulder, Upper Back, Elbow, Wrist)

Elbow-to-Hip Scapula Retraction/Depression



Elbow-to-Hip Scapula Retraction/Depression	
Exercise Setup	▪ No equipment needed.
Exercise Technique	▪ The athlete stands erect with an approximate 90° angle at the shoulders and a 90° angle at the elbows. This is the starting position of the exercise. ▪ Slowly lower the elbows toward the hips. The athlete holds this position at the bottom of the movement for two to four seconds. ▪ Slowly raise the arms to the starting position and repeat for the appropriate number of repetitions.
Coaching Cues	▪ A coaching cue for the athlete is to relax the trapezius muscles, while contracting the rhomboids and focusing on scapula control. ▪ Variations: This drill can be performed while also standing on one leg to increase the requirements of the stabilizing muscles of the core and lower body to be more engaged and for advanced athletes a light weight can be added such as a 1-5lbs dumbbell.

External Shoulder Rotation – Tubing

External Shoulder Rotation —Tubing	
Exercise Setup	▪ Elastic tubing.
Exercise Technique	▪ This exercise can be performed using either elastic tubing or dumbbells. The description below will explain the technique for elastic tubing. ▪ The athlete grasps the tubing with the left hand (thumb up) and while standing erect with a 90° angle at the elbow and the forearm parallel to the floor. ▪ The athlete slowly rotates the shoulder externally (away from the body) against the resistance from the tubing, making sure the forearm remains parallel to the floor. ▪ At or close to the end of the range of motion the athlete holds this position for approximately two seconds. ▪ Slowly return to the starting position and repeat for the appropriate number of repetitions (8-15). Perform the same movement on the opposite side of the body for the same number of repetitions.
Coaching Cues	▪ A coaching cue for the athlete is to relax the trapezius muscles, while contracting the rhomboids and external shoulder rotators focusing on scapula control. ▪ Variations: This drill can be performed while also standing on one leg to increase the requirements of the stabilizing muscles of the core and lower body to be more engaged. o The athlete places a towel between the elbow and the side of the body during the external rotation exercise described above. This variation increases the muscle activation of the poster aspects of the shoulder – the infraspinatus and teres minor.

90°/90° External Shoulder Rotation

90°/90° External Shoulder Rotation	
Exercise Setup	▪ Elastic tubing.
Exercise Technique	▪ The athlete grasps the tubing with the right hand (thumb up) and while standing erect with a 90° angle at the shoulder and a 90° angle at the elbow while facing the tubing attachment. ▪ From this starting position the athlete will externally rotate the shoulder against the tubing resistance. The forearm starts parallel to the floor and becomes perpendicular to the floor at the top of the movement. Hold near the end range of motion for approximately two seconds. ▪ Slowly return to the starting position and repeat for the appropriate number of repetitions (8-15). ▪ Repeat this movement for the opposite hand.
Coaching Cues	▪ A coaching cue for the athlete is to relax the trapezius muscles while contracting the rhomboids and external shoulder rotators focusing on scapula control. ▪ Variations: This drill can be performed while also standing on one leg to increase the requirements of the stabilizing muscles of the core and lower body to be more engaged.

Low Row

Low Row	
Exercise Setup	▪ Elastic tubing.
Exercise Technique	▪ The athlete stands with a stable base of support while facing the resistance tubing attachment. While grasping the tubing handle in each, consciously activate the rhomboids by squeezing the shoulder blades together. ▪ The athlete slowly pushes the hands backward against the resistance while keeping the arms straight. ▪ Hold this end range for two seconds and then slowly return back to the starting position and repeat for the appropriate number of repetitions (8-15).
Coaching Cues	▪ A coaching cue for the athlete is to relax the trapezius muscles, while contracting the rhomboids and focusing on scapula control. ▪ Variations: This drill can be performed while also standing on one leg to increase the requirements of the stabilizing muscles of the core and lower body to be more engaged.

Lying Shoulder Y, T, W Exercises

Shoulder Y – Start

Shoulder Y – Finish

Shoulder T - Start

Shoulder T - Finish

Shoulder W – Start

Shoulder W - Finish

Lying Shoulder Y,T, W Exercises

Exercise Setup	▪ Dumbbells. ▪ Stability Ball/Physioball or Bench.
Exercise Technique	▪ The athlete lays face down on a stability/physioball (or bench). ▪ Holding the dumbbells in both hands the athlete will perform the three (Y, T,W) shoulder exercises. ▪ Y- The athlete glides the shoulder blades back and down while raising the arms over his/her head to form a "Y" position with the upper limbs. ▪ T - The athlete glides the shoulder blades back and down while raising the arms out to the side forming a cross ("T" position with the upper limbs). ▪ W – The athlete bends his/her elbows to 90˚ and then glides the shoulder blades back and down while lifting the arms to the side of the body forming a "W" with the upper limbs. ▪ Perform the appropriate number of steps to the right (6-25) and then repeat for the same number of repetitions to the left.
Variation	▪ A coaching cue for the athlete is to squeeze shoulder blades together and maintain good scapula control during all movements. ▪ Variations: This movement can be performed using elastic tubing instead of dumbbells as the resistance.

Tubing Scapula Retraction (External Rotation)

Tubing Scapula Retraction (External Rotation)	
Exercise Setup	▪ Elastic Tubing.
Exercise Technique	▪ The athlete grasps a small amount of elastic tubing in both hands and slowly externally rotates both shoulders simultaneously while retracting both shoulder blades. ▪ Return back to the starting position and perform this movement for the appropriate number of repetitions (10-15) to develop muscular endurance.
Variation	▪ A coaching cue for the athlete is to squeeze shoulder blades together and maintain good scapula control during all movements. ▪ Variations: This movement can be performed using different isometric hold positions throughout the movement.

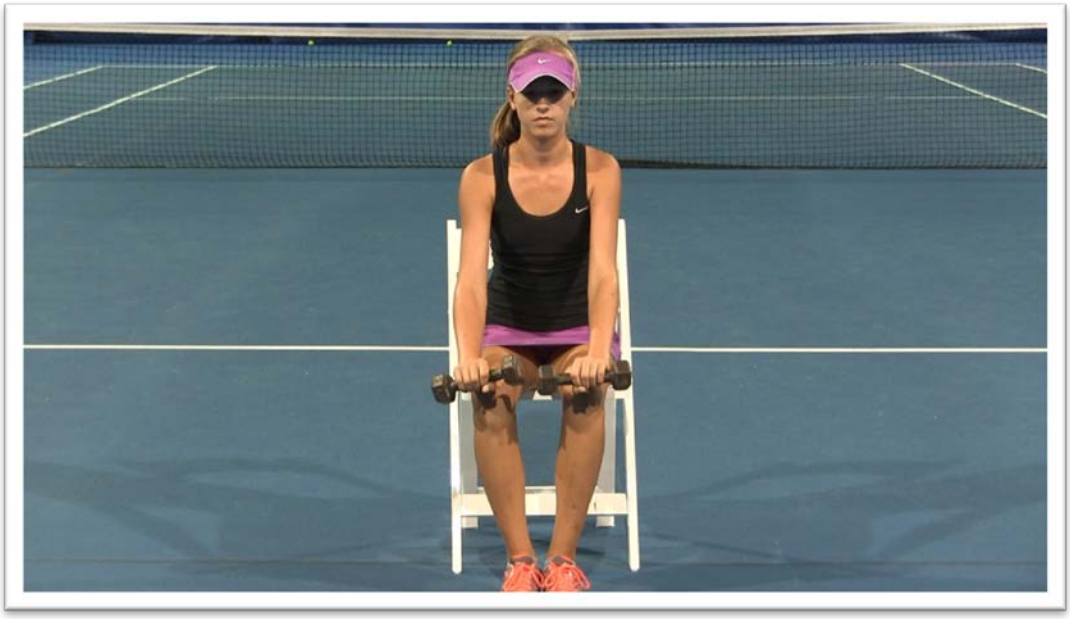
Overhead Triceps Extension

Overhead Triceps Extension	
Exercise Setup	▪ Cable pulley, weight stack or resistance tubing.
Exercise Technique	▪ The athlete stands upright and faces away from the machine or resistance tubing. Grasping the handle in the right hand with the right arm straight above the head with the elbow bent. ▪ The athlete slowly extends the arm toward the sky by contracting the triceps so the elbow straightens. ▪ At the end of the movement, the athlete pauses and then slowly returns the handle to the starting position via an eccentric triceps contraction. ▪ Repeat this movement for the desired number of repetitions (6-20) and then perform the same movement on left arm.
Coaching Cues	▪ A coaching cue for the athlete is to relax the trapezius muscles, while contracting triceps. ▪ Variations: The hand positions can be altered to stress different aspects of the triceps and shoulder muscles.

Hammer Curl

Hammer Curl	
Exercise Setup	▪ Cable pulley, weight stack, resistance tubing or dumbbell.
Exercise Technique	▪ The athlete stands upright holding dumbbells (or resistance tubing, etc.) with arms extended by the sides with the thumbs pointing upward. ▪ The athlete lifts one arm to his/her shoulder in a straight path by bending at the elbow with the thumb pointing up. ▪ At the top of the movement slowly lower the dumbbell back down to the starting position and repeat with the opposite arm for the required number of repetitions (6-20).
Coaching Cues	▪ A coaching cue for the athlete is to squeeze the shoulder blades together while performing the hammer curl exercise. ▪ Variations: The hammer curl with rotation begins in the same position, but as the elbow starts to bend, the thumb rotates out via forearm supination.

Wrist Roller



Wrist Roller	
Exercise Setup	▪ Barbell or Dumbbell.
Exercise Technique	▪ The athlete grasps a dumbbell using an overhand grip (palms facing down) and places his/her forearms on top of the thighs or on the edge of a weight bench. ▪ The dumbbell is lowered by flexing at the wrist, pointing the knuckles toward the floor. ▪ Raise the weight by contracting of the forearm muscles (wrist extensors) to return to the starting position with the knuckles pointing toward the ceiling for the appropriate number of repetitions.
Coaching Cues	▪ A coaching cue for the athlete is limit all movement in the upper arm and shoulders during this exercise. ▪ Variations: This exercise can be performed with a barbell and/or resistance tubing.

Wrist Curl

Wrist Curl	
Exercise Setup	▪ Barbell or dumbbell.
Exercise Technique	▪ The athlete grasps a barbell using an underhand grip (palms facing up) and places his/her forearms on top of his/her thighs or on the edge of a weight bench. ▪ The bar is lowered by bending (extending) at the wrist. ▪ Raise the weight by contracting of the forearm muscles to return to the starting position for the appropriate number of repetitions.
Coaching Cues	▪ A coaching cue for the athlete is limit all movement in the upper arm and shoulders during this exercise. ▪ Variations: This exercise can be performed with dumbbells and/or resistance tubing.

Forearm Supination

Forearm Supination	
Exercise Setup	▪ Hammer or one-sided weighted implement.
Exercise Technique	▪ The athlete positions his or her right forearm on a bench with the wrist over the side. Grasping a hammer (or head heavy weighted implement) the athlete begins with the hammer head toward the ceiling. ▪ The athlete slowly rotates the forearm so that the thumb will move to the right as you rotate your forearm. ▪ At the end of the movement, hold the position then the athlete slowly returns to the starting position. ▪ Repeat this same motion for the appropriate number of repetitions (6-20) and then perform on the other arm.
Coaching Cues	▪ A coaching cue for the athlete is limit all movement in the upper arm and shoulders during this exercise. ▪ Variations: This exercise can be performed using different time periods for the concentric and eccentric portions of the movement.

Forearm Pronation

Forearm Pronation	
Exercise Setup	▪ Hammer or one-sided weighted implement.
Exercise Technique	▪ The athlete positions his/her right forearm on a bench with the wrist over the side. Grasping a hammer (or head heavy weighted implement) the athlete begins with the hammer head toward the ceiling. ▪ The athlete slowly rotates the forearm so that the thumb will move to the left as the athlete rotates the forearm. ▪ At the end of the movement, hold the position then the athlete slowly returns to the starting position. ▪ Repeat this same motion for the appropriate number of repetitions (6-20) and then perform on the other arm.
Coaching Cues	▪ A coaching cue for the athlete is limit all movement in the upper arm and shoulders during this exercise. ▪ Variations: This exercise can be performed using different time periods for the concentric and eccentric portions of the movement.

Core and Torso

Crunch

Crunch	
Exercise Setup	▪ Floor.
Exercise Technique	▪ The athlete lays supine on floor with hips and knees bent at 90°, with hands touching the ears. ▪ Via contraction of the abdominal muscles raise the shoulders and upper back from the floor, bringing the chest forward by firmly contracting the abdominals while keeping the lower back in contact with the floor. ▪ Slowly lower the upper back and shoulders to the starting position and repeat this movement for the appropriate number of repetitions (20-100).
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Focus on transversus abdominis control. ▪ Variations: This exercise can be performed on a physioball instead of the floor to train the stabilizing muscles of the core and hip to a greater extent.

Reverse Crunch

Reverse Crunch	
Exercise Setup	▪ Floor.
Exercise Technique	▪ The athlete lays supine (back on ground) on floor with hips and knees bent at 90,° with hands touching the ears. ▪ Via contraction of the abdominal muscles raise the pelvis from the ground via contraction of the rectus abdominis, hip flexors and obliques. ▪ Slowly lower the legs down to the starting position and repeat this movement for the appropriate number of repetitions (20-100).
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Focus on transversus abdominis control. ▪ Variations: This exercise can be performed on a physioball instead of the floor to train the stabilizing muscles of the core and hip to a greater extent.

Rotational Crunch

Rotational Crunch	
Exercise Setup	▪ Floor.
Exercise Technique	▪ The athlete lays supine on floor with hips and knees bent at 90°, with hands touching the ears. ▪ Via contraction of the abdominal muscles raise the shoulder blades from the ground via contraction of the rectus abdominis and obliques and rotate the torso moving the right elbow to the left knee. ▪ Slowly lower upper body to the starting position and repeat this movement for the appropriate number of repetitions (20-100) alternating arms on each repetition.
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Focus on transversus abdominis control. ▪ Variations: This exercise can be performed on a physioball instead of the floor to train the stabilizing muscles of the core and hip to a greater extent.

Bicycles

Bicycles	
Exercise Setup	▪ Floor.
Exercise Technique	▪ The athlete lays supine on floor with hips and knees bent at 90°, with hands touching the ears. ▪ Via contraction of the abdominal muscles raise the shoulder blades from the ground via contraction of the rectus abdominis and obliques and rotate the torso moving the left elbow to the right knee. ▪ Return back to the starting position and repeat on the opposite side. ▪ The speed of movement can either be fast or slow, depending on the goal of the exercise within the program. ▪ Repeat this movement for the appropriate number of repetitions (20-100).
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Focus on transversus abdominis control. ▪ Variations: This exercise can be performed on a physioball instead of the floor to train the stabilizing muscles of the core and hip to a greater extent.

*Addition of unstable surfaces (Physioball, Slide board, Bosu ball, airex pads, etc.)

Dead Bug

Dead Bug	
Exercise Setup	▪ Soft floor or rubber mat.
Exercise Technique	▪ The athlete lays supine with arms and legs raised from the ground. ▪ The athlete slowly lowers the left leg and right arm toward the ground. At the bottom of this movement the position is held for two seconds and slowly returned to the starting position. ▪ Repeat this same movement using the opposing limbs. ▪ The athlete performs this movement for the appropriate number of repetitions (6-20).
Variation	▪ A coaching cue for the athlete is to isolate the contraction of the transversus abdominis while the remaining muscles of the core and hips are the active movers of this exercise. ▪ Variations: This movement can be performed using different isometric holds at the top and middle of the movements.

Plank Bridge Variations

Plank Bridge Variations	
Exercise Setup	▪ Floor.
Exercise Technique	▪ The athlete lies prone with elbows and forearms resting underneath the body. ▪ Via contraction of the core and hip muscles, the athlete lifts the torso and hips from the ground into a bridge position with the bodyweight evenly disbursed through the elbows and feet. ▪ Hold this position while maintaining a neutral spine (flat back) for the designated period of time. (30 seconds for the beginner athlete to 120 seconds for the more advanced athlete). ▪ Weight may be added for the advanced athlete.
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Focus on transversus abdominis control. ▪ Variations: Plank Bridge Elbow Hold Plank Bridge Push-Up Hold Single Arm Plank Bridge Elbow Hold Single Arm Plank Bridge Push-Up Hold

Side Plank Bridge Variations

Side Plank Bridge Variations	
Exercise Setup	▪ Floor.
Exercise Technique	▪ The athlete lays prone with elbows and forearms resting underneath the body. ▪ The athlete then rotates onto the side with the left elbow and shoulder positioned with a 90° angle and the entire body raised from the ground except the elbow & left foot. ▪ Via contraction of the core and hip muscles, the athlete lifts the torso and hips from the ground into a bridge position with the bodyweight evenly disbursed through the elbows and feet. ▪ Hold this position while maintaining a neutral spine (flat back) for the designated period of time. (30 seconds for the beginner athlete to 120 seconds for the more advanced athlete). ▪ The athlete will repeat the same movement on the other side of the body. *Wt may be added for the advanced athlete.
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Focus on transversus abdominis control. ▪ Variations: Side Plank Bridge Hold (Left & Right) Side Plank Bridge Hold Side Plank Bridge w/Thoracic Rotations Side Plank Bridge w/Hip Abduction (Left & Right)

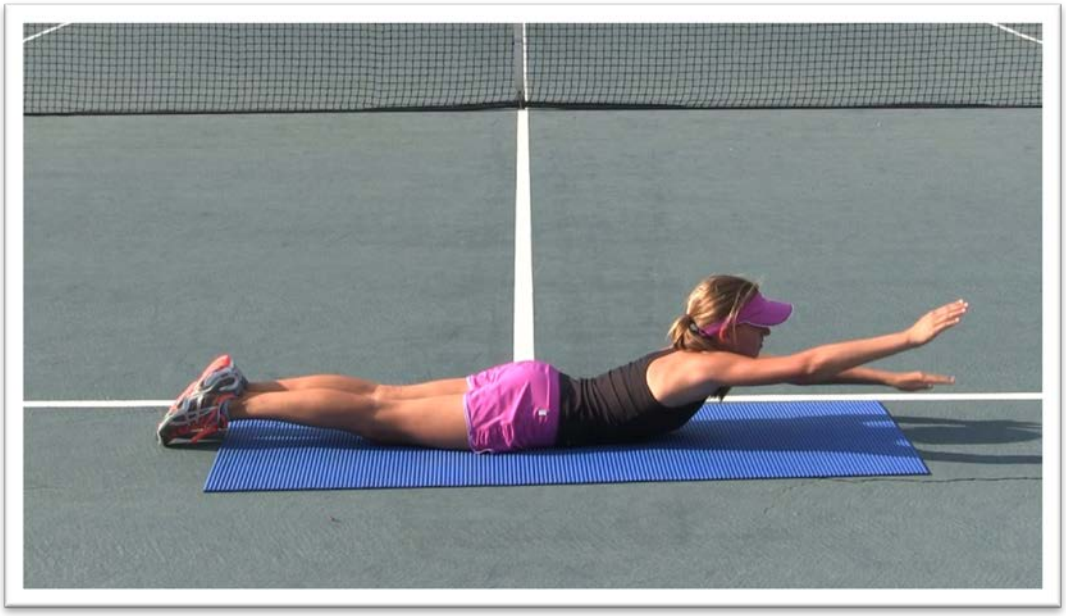
Glute/Hip Bridge Variations

Glute/Hip Bridge Variations	
Exercise Setup	▪ Floor.
Exercise Technique	▪ The athlete lays supine with elbows and forearms resting on the athlete's chest and knees bent at approximately 45°. ▪ The athlete then lifts both hips from the floor squeezing the glutes and contracting the deep stabilizing muscles of the core. ▪ Hold this position while maintaining a neutral spine (flat back) for the designated period of time. (30 seconds for the beginner athlete to 120 seconds for the more advanced athlete). ▪ The athlete can perform this same movement using a single leg variation. ▪ *Weight may be added for the advanced athlete.
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Focus on transversus abdominis control. ▪ Variations: Glute/Hip Bridge Single Leg Glute/Hip Bridge Single Leg Glute/Hip Bridge With Open-Stance Abduction

Russian Twist

Russian Twist	
Exercise Setup	▪ Mat ▪ Medicine Ball
Exercise Technique	▪ The athlete lies supine on a mat with the torso raised from the ground and the legs raised from the ground with hands straight out grasping a medicine ball. ▪ The athlete slowly rotates to the right keeping the core tight via contraction of transversus abdominis and obliques. ▪ Repeat this same movement back to the center and to the left. Perform this movement for the appropriate number of repetitions (10-50).
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Focus on core and hip position. ▪ Variations: This exercise can be performed using a physioball which increases the difficulty of the exercise.

Swimmer



Swimmer	
Exercise Setup	▪ Floor.
Exercise Technique	▪ The athlete lies face down on the ground with arms extended above the head. ▪ While keeping the feet on the floor, the athlete lifts his/her arms up and above the head via contraction of the muscles in the lower back (multifidus, erector spinae and quadratus lumborum) as well as the muscles of the upper back. ▪ Repeat this same movement for the appropriate number of repetitions (10-50).
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Focus on core and hip position. ▪ Variations: This exercise can be performed lifting the legs from the ground at the same time as the arms are raised. This method is more challenging and caution should be used for individuals with a history of lower back problems.

Open Book Thoracic Rotation

Open Book Thoracic Rotation	
Exercise Setup	▪ N/A.
Exercise Technique	▪ The athlete lies on his/her side (left side first) with knees and hips bent at approximately 90°. ▪ Reaching the right arm (top arm) toward ceiling while following the hand with the athlete's eyes. The movement occurs through the thoracic spine (not the shoulder). ▪ As the athlete holds the arm at the top of the movement he/she takes 3-4 deep breaths and then moves the arm further toward the floor increasing thoracic rotation. ▪ Slowly return to the start position and perform this movement for the appropriate number of repetitions (6-20) and repeat on the opposite side of the body.
Variation	▪ A coaching cue for the athlete is to get the sternum facing the ceiling while the athlete keeps the arm in line with the sternum. ▪ Variations: This movement can be performed using different breathing patterns and ranges of motion based on the flexibility and stability of the individual athlete.

Kneeling Thoracic Rotation

Kneeling Thoracic Rotation	
Exercise Setup	▪ Soft floor or mat.
Exercise Technique	▪ The athlete assumes a quadruped position. From this starting position the athlete will raise the right hand and reach to the left. ▪ From this extended position, the athlete will then bring the right arm back under the body (and via rotation of the thoracic portion of the back) the right arm will move to the athlete's right with the fingers pointed to the sky. ▪ This top position will be held for two seconds and then the arm returns back to the starting position. ▪ Repeat this same movement for the appropriate number of repetitions (10-20). ▪ Alternate this movement performing it with the opposite extremities.
Coaching Cues	▪ A coaching cue for the athlete is to keep the glutes contracted during this movement and good stable posture. Focus on core and hip position. ▪ Variations: This exercise can be performed with varying start positions.

Lower Body (Hips, Quadriceps, Hamstrings, Calves)

Forward Monster Walk

Forward Monster Walk	
Exercise Setup	▪ Thin elastic tubing.
Exercise Technique	▪ The athlete places a thin elastic band around the calves and assumes an athletic position. ▪ From a low starting position (with thighs parallel to the ground and the knees are bent approximately 90°) the athlete takes a small step forward and slight to the right (i.e approximately on a 45 degree angle), followed by a small step with the left leg forward and to the left. ▪ Perform the appropriate number of steps to the right (6-20) and then repeat for the same number of repetitions to the left.
Variation	▪ A coaching cue for the athlete is to activate the gluteus medius muscles in both legs while maintaining an erect core posture. ▪ Variations: This movement can be performed using different movement patterns (forward, backward, diagonal, lateral, etc).

Lateral Monster Walk

Lateral Monster Walk	
Exercise Setup	▪ Thin elastic tubing.
Exercise Technique	▪ The athlete places a thin elastic band around the calves and assumes an athletic position. ▪ From a low starting position (with thighs parallel to the ground and the knees are bent approximately 90°) the athlete takes a small step to the right using the right leg, followed by a small step with the left leg to the right returning the body to the starting position. ▪ Perform the appropriate number of steps to the right (6-20) and then repeat for the same number of repetitions to the left.
Variation	▪ A coaching cue for the athlete is to activate the gluteus medius muscles in both legs while maintaining an erect core posture. ▪ Variations: This movement can be performed using different movement patterns (forward, backward, diagonal, lateral, etc).

Tubing Standing Hip Abduction

Tubing Standing Hip Abduction	
Exercise Setup	▪ Thin Elastic Tubing.
Exercise Technique	▪ The athlete stands with good posture (shoulders back, head straight and core and glute muscles contracted) with thin elastic tubing around the calf muscles on both legs and feet shoulder width apart and slight tension on the tubing. ▪ From this starting position the athlete slowly lifts the left leg from the ground and abducts the left leg away from the body approximately 3-5 inches and is held for two seconds. ▪ Return back to the starting position and perform this movement for the appropriate number of repetitions (>10) to develop muscular endurance. Perform the same movement on the opposite leg.
Variation	▪ A coaching cue for the athlete is to squeeze the gluteal muscles during the entire movement to ensure that gluteus medius is activated during the movement. ▪ Variations: This movement can be performed using different isometric hold positions throughout the movement.

Rotational Pull (Lawnmower)

Rotational Pull (Lawnmower)	
Exercise Setup	▪ Resistance Tubing.
Exercise Technique	▪ With the resistance anchored low to the ground, the athlete grasps a handle with the right hand outside of the left foot while standing in an athletic position facing the anchored resistance. ▪ While maintaining an athletic position the athlete pulls the resistance so that the right elbow comes up to the level of the right shoulder via contraction of the upper back muscles. o Power focused: explode the movement as fast as possible to develop explosiveness via this motion. o Stability focused: the athlete moves slowly through this range of motion focused on squeezing the shoulder blades in a controlled manner. ▪ After completing the appropriate number of repetitions perform the same movement on the opposing side (left arm) (3-12 repetitions).
Coaching Cues	▪ A coaching cue for the athlete is to keep a strong core and good posture during the entire movement. Relax the trapezius muscles while focusing on contracting the rhomboid muscles. ▪ Variations: This exercise can be performed using different weighted implements including a cable machine.

Chapter 5: Basic Injury Prevention Sample Programs

The programs below are sample workouts for specific areas of the body. Each workout should take between 10-15 minutes to complete and a chart is provided below with simple recommendations on how many times per week each program can be completed based on the age and level of player. The dynamic warm-up segments of each workout are provided if the athlete is performing the routine in an environment where they have played tennis beforehand or the body is not warm. These warm-up exercises can be used during the general dynamic before tennis or fitness training instead of before the injury prevention workouts if this is being performed when the athlete is already warm. However, the best way to use the information in this course is to work with your Certified Tennis Performance Specialist (CTPS) to help devise an individualized program for your young athlete.

	Weekly Sessions
12 and under competitive junior	1-2
14 and under competitive junior	1-3
16 and under competitive junior	2-3
18 and under competitive junior	2-4
12 and under elite junior	2-3
14 and under elite junior	3-4
16 and under elite junior	3-5
18 and under elite junior	3-5

Sample Injury Prevention Program For The Shoulder Region

	Reps	Sets	Time of Exercise (seconds)	Tempo (ecc/iso/con/iso)	Rest
Dynamic Warm-Up					
Hugs	10	2	30 per set		
Cheerleaders	10	2	30 per set		
Wipers	10	2	30 per set		
Prehab/Injury Prevention for The Shoulder Region					
Shoulder Blade (Scapula)Control					
Elbow-to-Hip Scapula Retraction/Depression	10	2	~30 per set	2221	0
Tubing Scapula Retraction	10	2	~30 per set	3221	0
Low Row	10	2	~30sec per set	3321	
Rotator Cuff Specific-Exercises					
External Shoulder Rotation - Tubing	12	2		2221	0
90°/90° External Shoulder Rotation	12	2		2221	0
Static Stretches					
Cross-Arm Stretch	4	1	30 per rep		
Sleeper Stretch	4	1	30 per rep		
Tricep Stretch	4	1	30 per rep		

Sample Injury Prevention Program For The Core/Lower Back Region

		Reps	Sets	Time of Exercise (seconds)	Tempo (ecc/iso/con/iso)	Rest
Dynamic Warm-Up						
Walking Knee-to-Chest Stretch		10	2	30 per set		
Knee-to-Shoulder Lateral Walk		10	2	30 per set		
Hamstring Handwalk (inchworm)		10	2	30 per set		
Spiderman Crawl		10	2	30 per set		
Prehab/Injury Prevention for The Shoulder Region						
Isometric Stability Exercises						
Plank Bridge Variation						
-Prone Plank		1	3	See chart	isometric	0
-Side Plank		1	2	See chart	isometric	
	-Left Side					
	-Right Side	1	2			
Flexion Exercises						
Crunch		25	2		2222	0
Reverse Crunch		25	2		2221	0
Extension Exercises						
Swimmer		20	2		2221	0
Dead Bug		20	2		2222	0
Rotational Exercises						
Russian Twist		20	2		1111	
Rotational Pull		12	2		2221	
Static Stretches						
Cross-Arm Stretch		4	1	30 per rep		
Sleeper Stretch		4	1	30 per rep		
Tricep Stretch		4	1	30 per rep		

3- Day A Week Sample Injury Prevention Program For A 12 and Under Competitive Junior

	Reps	Sets	Time of Exercise (seconds)	Tempo (ecc/iso/con/iso)	Rest
Dynamic Warm-Up					
Walking Knee-to-Chest Stretch	10	2	30 per set		
Knee-to-Shoulder Lateral Walk	10	2	30 per set		
Hamstring Handwalk (inchworm)	10	2	30 per set		
Spiderman Crawl	10	2	30 per set		
Walking Lunge	10	2	30 per set		
Hugs	10	2	30 per set		
Wipers	10	2	30 per set		
Prehab/Injury Prevention					
Shoulder Blade (Scapula)Control					
Elbow-to-Hip Scapula Retraction/Depression	10	2	~30 per set	2221	0
Tubing Scapula Retraction	10	2	~30 per set	3221	0
Low Row	10	2	~30sec per set	3321	
Rotator Cuff Specific-Exercises					
External Shoulder Rotation - Tubing	12	2		2221	0
90˚/90˚ External Shoulder Rotation	12	2		2221	0
Lower Body Hip/Core					
Linear Monster Walk	10	2			
Lateral Monster Walk	10	2			
Dead Bug	20	2			
Bicycles	20	2			
Rotational Exercises					
Russian Twist	20	2		1111	
Rotational Pull	12	2		2221	
Static Stretches					
Cross-Arm Stretch	4	1	30 per rep		
Sleeper Stretch	4	1	30 per rep		
Tricep Stretch	4	1	30 per rep		

3- Day A Week Sample Injury Prevention Program For A 16 and Under Competitive Junior

	Reps	Sets	Time of Exercise (seconds)	Tempo (ecc/iso/con/iso)	Rest
Dynamic Warm-Up					
Walking Knee-to-Chest Stretch	15	2	60 per set		
Walking Quad Stretch	15	2	60 per set		
Knee-to-Shoulder Lateral Walk	15	2	60 per set		
Hamstring Handwalk (inchworm)	15	2	60 per set		
Spiderman Crawl	15	2	60 per set		
Walking Lunge	15	2	60 per set		
Hugs	15	2	60 per set		
Wipers	15	2	60 per set		
Prehab/Injury Prevention					
Shoulder Blade (Scapula)Control					
Elbow-to-Hip Scapula Retraction/Depression	10	3	~30 per set	2221	0
Tubing Scapula Retraction	10	3	~30 per set	3221	0
Low Row	10	3	~30sec per set	3321	
Rotator Cuff Specific-Exercises					
External Shoulder Rotation - Tubing	12	3		2221	0
90°/90° External Shoulder Rotation	12	3		2221	0
Lower Body Hip/Core					
Linear Monster Walk	20	2			
Lateral Monster Walk	20	2			
Dead Bug	25	2			
Bicycles	40	2			
Sleeper Stretch	4	1	30 per rep		
Tricep Stretch	4	1	30 per rep		