INTRODUCTION

To ensure that elite level tennis players perform at their highest level requires extensive practice, physical training and challenging competition. Maintaining this high level of performance and meeting the demands of training, however, can ultimately lead to overuse injuries. Regular physical testing, to identify areas of weakness and/or inflexibility, is an important part of optimizing performance while preventing injury.

The USTA High Performance Profile (HPP) is a series of tests put together by the USTA Sport Science Committee to screen players and identify potential injury risk factors. The purpose of the HPP is to highlight strength and/or flexibility deficits and identify areas where players should focus their physical training. The HPP is not a substitute for a complete evaluation by a qualified health care provider for an injury.

Instructions for Players, Parents and Coaches

The HPP was designed to be administered by a qualified healthcare provider (e.g., sports medicine physician, physical therapist, certified athletic trainer, chiropractor). We recommend discussing the HPP with your healthcare provider first to describe the purpose of the HPP and also to ask if he/she would be able to perform the tests. Take this brochure with you at the time of the testing, as it describes how to perform the tests. Fill out and complete pages which contain important information for the health care provider about your training habits and injury history. This will allow the health care provider to have additional information that will assist him or her during the examination process. Since there may not be time to complete this information with the health care provider, we recommend that you have this portion (pages 4 & 5) completed prior to your appointment and testing session. If you have difficulty locating a healthcare provider in your area, please contact the USTA Sport Science Department by any of the means listed and we will help you find someone who can perform these tests.

These tests were designed for competitive tennis players as young as 11 years of age through adult and senior age players. It is recommended that these tests be performed on a yearly basis, or more frequently if deficiencies are identified during testing, to allow for closer monitoring of progress and ensure that all deficiencies are addressed.

Instructions to the Healthcare Provider

The High Performance Profile was designed to identify strength imbalances and areas of weakness and/or inflexibility that could potentially lead to injury. These tests, described in the following pages, are well researched assessments that can be performed in a single session. However, should questions arise, please contact the USTA Sport Science Department.

These tests require very little equipment and it is likely you have everything you will need right in your office. Specifically the tests require:

- Two light (1-2 pound) hand weights
- Goniometer
- 31 cm (12 inch) box
- Hand held dynamometer (optional)

After the Test

We ask that you return the HPP to the player after the testing is complete. Perhaps the most important part of the testing is not the test results but rather what is done with the test results. The HPP provides important information that can be used in the development of tennis-specific training programs for any tennis player. After performing the HPP, the healthcare provider can provide valuable feedback, including exercises that can be used to improve performance and prevent injury, USTA Player Development website (www.usta.com/playerdevelopment). If deficiencies are identified, we recommend re-testing at regular intervals (e.g., every 4 to 6 months) to assess for progress of the implemented program, or on an annual basis in the event that no significant deficiencies are identified during testing.

Questions? Contact the USTA Sport Science Department

Additional information on the High Performance Profile can be obtained by contacting the USTA Sport Science Department by e-mail at sportscience@usta.com, or by accessing the USTA Player Development website (www.usta.com/playerdevelopment).
**Tennis Performance & Injury Information**

**Player Name:** ______________________________________

**Years of Overall Tennis Experience** __________________

**Years of Competitive Tennis Experience** ______________

(ie number of years playing competitive tournaments)

**Grip Used on Forehand:** (please check box):
- ☐ Western
- ☐ Semi-Western
- ☐ Eastern Forehand
- ☐ Continental

**Current height:** Feet: _____ Inches: ______

**Current weight in pounds (lbs):____________**

Do you use a one or two handed backhand?
- ☐ One handed
- ☐ Two handed

Do you use a one or two handed forehand?
- ☐ One handed
- ☐ Two handed

**Sex of the player:**
- ☐ Male
- ☐ Female

**Date of birth:** Month: ______ Day: _______ Year _______

**Dominant Hand (the arm you hit your serve with)?**
- ☐ Left
- ☐ Right

How many times a week do you practice or play tennis?
- ☐ 1-2 times per week
- ☐ 3-4 times per week
- ☐ 5-6 times per week
- ☐ 7 or more times per week

How much time do you usually spend a week training off the court (not hitting tennis balls)?
- ☐ none
- ☐ 1-4 hours a week
- ☐ 5-8 hours a week
- ☐ 9-12 hours a week
- ☐ 13-15 hours a week
- ☐ more than 15 hours a week

How many days a week do you usually take off from training tennis?
- ☐ None
- ☐ 1 day
- ☐ 2 days
- ☐ more than 2 days

In the past year, have you had any physical injuries that have prevented you from competing in a match or tournament?
- ☐ Yes
- ☐ No (Skip to last question on medical history)

---

**Injury #1**

Please answer the items below based on one injury, the most recent injury you have had. (A physical injury is defined as “An event that forces a player to miss 3 or more consecutive days of tennis play, either practice or competition, or that requires medical attention from a trainer, therapist, or doctor”).

**Type of Injury #1:**
- ☐ Back
- ☐ Neck
- ☐ Shoulder
- ☐ Elbow
- ☐ Wrist
- ☐ Knee
- ☐ Ankle
- ☐ Foot
- ☐ Hamstring
- ☐ Stomach muscle
- ☐ Hip
- ☐ Muscle Cramps
- ☐ Other (please explain) __________________________

Specify the injury location (if needed):
- ☐ Left
- ☐ Right

Indicate the number of weeks you did not play tennis as a direct result of this injury.
- ☐ less than 1 week
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ more than 8 weeks

What was done to treat this injury? (check all that apply)
- ☐ Physical Therapy – flexibility and strength training
- ☐ Rest
- ☐ Brace
- ☐ Other (please explain) __________________________

Was this injury a result of tennis related activities?
- ☐ Yes
- ☐ No

---

**Injury #2**

Please answer the items below based on one injury, the most recent injury you have had:

**Type of Injury #2:**
- ☐ Back
- ☐ Neck
- ☐ Shoulder
- ☐ Elbow
- ☐ Wrist
- ☐ Knee
- ☐ Ankle
- ☐ Foot
- ☐ Hamstring
- ☐ Stomach muscle
- ☐ Hip
- ☐ Muscle Cramps
- ☐ Other (please explain) __________________________

Specify the injury location (if needed):
- ☐ Left
- ☐ Right

Indicate the number of weeks you did not play tennis as a direct result of this injury.
- ☐ less than 1 week
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ more than 8 weeks

What was done to treat this injury? (check all that apply)
- ☐ Physical Therapy – flexibility and strength training
- ☐ Rest
- ☐ Brace
- ☐ Other (please explain) __________________________

Was this injury a result of tennis related activities?
- ☐ Yes
- ☐ No

---

**Medical History?**

Please Provide any additional medical history you feel is important for the person completing this test to know about you?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
TEST 1 – SCAPULAR STABILIZATION TEST (SCAPULAR DYSKINESIS TEST)

Importance
The scapula, or shoulder blade, is the base for arm movement and an anchor for muscular attachments in the upper back and shoulder. The scapula must be lined up and move with the arm in a coordinated manner for the shoulder to function properly. This test checks for scapular motion and control of that motion.

Testing Method
In a standing position, the player holds a one-pound weight in each hand. The player begins the test with both arms at the sides (Figure A). The player should then elevate the arms 180° in the scapular plane (Figure C), keeping the elbows straight with the thumbs pointed upward (Figure B). After reaching the "top position" the player slowly lowers the arms back to the sides. The examiner observes the movement of the scapula (shoulder blades), and notes any winging or overuse of neck and upper trapezius muscles during both the ascent and descent phases of elevation. Asymmetry also is noted. This is especially important as the arms are lowered back to the sides. This overhead movement is repeated 3-5 times in forward flexion, as well as in the scapular plane and coronal plane (abduction) to thoroughly evaluate the ability of the player to stabilize the scapulae during overhead arm movements. Asymmetrical prominence of the medial border of the scapula is considered abnormal and indicates potential problems resulting in decreased performance and/or increased injury risk. When abnormal scapular motion is identified, the prominence of the scapular borders are noted and can be classified according to the Kibler Scapular Dyskinesis System, outlined below:

**Type I:** Inferior Angle: The inferior medial scapular border may be prominent dorsally at rest. Additionally, during arm motion, the inferior angle of the scapula tilts dorsally and away from the thorax.

**Type II:** Medial Border: The entire medial border of the scapula may be prominent at rest and with arm motion. Additionally, the medial border of the scapula may tilt dorsally off the thorax.

**Type III:** Superior Border: The superior border of the scapula may be elevated at rest and with arm motion. A shrug type motion initiates the rhythm without significant dorsal protrusion of the scapula.

**Type IV:** Symmetric Scapulohumeral Rhythm: At rest, both shoulder blades are relatively symmetrical. The dominant shoulder may be significantly lower. During arm motion, the shoulder blades should rotate symmetrically upward, such that the inferior angles translate laterally away from the midline and the scapular medial border remains flush against the thoracic wall. The reverse should occur during arm lowering.

Test Results and Comments

Is a Scapular Pathology Noted?
(Yes – Scapular prominence noted in patterns I-III, No – No scapular prominence noted)

Left Shoulder: Y N Right Shoulder: Y N

*Note: When players exhibit scapular pathology, it is recommended that they receive some type of intervention. Type IV, symmetrical scapulohumeral rhythm, is considered normal.

Comments/Observations: (Insert Kibler Scapular Type) L:/R:

Area of Concern: Scapular pathology is a key risk factor for shoulder and elbow injury and the identification of scapular pathology on this test should result in the player performing specific exercises for the rotator cuff and scapular stabilizers. Failure to address scapular pathology can result in shoulder and elbow overuse injury.
TEST 2 – EXTERNAL ROTATION STRENGTH (MANUAL MUSCLE TEST)

Importance
The rotator cuff is responsible for stabilizing the shoulder during virtually all arm movements. Strength and muscular endurance in the external rotator muscles (back part of the rotator cuff) are essential for the prevention of shoulder injury. This assessment manually tests the strength of the rotator cuff.

Testing Methods
In a standing position, the examiner places the player’s shoulder in 90 degrees of abduction and 90 degrees of external rotation in the coronal plane (90/90 position – Figure A). The scapula should be in a retracted position in the scapular plane as pictured. The elbow is placed in 90 degrees of elbow flexion so the fingers point toward the ceiling. While stabilizing the player’s elbow with one hand, the examiner exerts a force, pushing the arm into internal rotation, while instructing the player to hold the initial 90/90 position. The examiner grades the performance of the test as follows.

5 (Normal) — Ability to maintain 90/90 position without pain against maximal resistance applied by the examiner. The arm does not “break” from the 90/90 position with testing.
4 (Good) — Ability to maintain 90/90 position without pain against moderate resistance applied by the examiner. The hand and forearm move slightly into internal rotation with heavier amounts of resistance applied by the examiner.
3 (Fair) — Inability to withstand any resistance applied by the examiner.
2 (Poor) — Inability to even place arm in the 90/90 position.

Note: A hand held dynamometer can be used and is recommended if available to further quantify external rotation strength. The ability to compare the numerical value representing shoulder external rotation strength can be of value during repeated testing as well as to better compare strength between the dominant and non-dominant extremity. Additionally, if available, an isokinetic test performed with the shoulder in 90 degrees of abduction to simulate the tennis serving position is also recommended to provide additional information regarding rotator cuff strength and muscle balance.

Test Results and Comments

| Area of concern: External rotation strength should be 5/5 in elite junior tennis players and should be approximately equal in strength between the dominant and nondominant shoulders. Any value other than a 5/5 grade or a finding of weaker dominant arm external rotation strength would indicate the need for an extensive rotator cuff and scapular exercise program. |

<table>
<thead>
<tr>
<th></th>
<th>External Rotation</th>
<th>Internal Rotation</th>
<th>Total Range of Motion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dominant Arm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-Dominant Arm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


TEST 3 – SHOULDER INTERNAL & EXTERNAL ROTATION RANGE OF MOTION MEASUREMENT

Importance
Loss of range of motion (ROM) in the shoulder creates abnormal movement of the shoulder ball and socket joint, which may predispose a player to injury. This inflexibility also decreases effective long axis rotation, which can, in turn, negatively affect performance particularly on the serve.

Testing Method
Shoulder ROM is measured with the player lying supine on a treatment table. Abduct the testing arm to 90° in the scapular plane as pictured. The elbow is flexed to 90° and the player’s fingers should point upward toward the ceiling in the starting (0°) position. The examiner should stabilize the scapula throughout the test by placing a hand on the superior aspect of the scapula and thumb anteriorly over the coracoid as pictured (Figure A). The examiner slowly moves the arm into external (Figure B) and internal rotation (Figure C) to the point of tightness with the scapula stabilized. This test measures a player’s range of motion and the examiner should not apply overpressure to the arm. Instead the end range position is maintained by the weight of the arm and consistent force of gravity to allow for an accurate measurement to be obtained without overpressure from the examiner. The examiner measures and records the angle bilaterally using a universal goniometer and records the numerical range of motion measures below. Total rotation is calculated by summing the internal and external rotation measures.

Test Results and Comments

| Area of concern: Increases in external rotation and decreases in internal rotation are commonly found on the dominant shoulder of elite tennis players as compared to the non-dominant arm. However, even though the numbers for internal and external rotation may be very different between shoulders, the total rotation range of motion (sum of external and internal rotation) should be about the same. The side to side total range of motion differences (non-dominant minus dominant) should be less than 5-10 degrees. Side to side internal rotation differences (non-dominant minus dominant) should be less than 20 degrees. Differences outside these limits are considered deficits that may decrease performance and increase injury risk and indicate the need for specific stretches to be performed to increase internal rotation range of motion. These stretches should be performed both before and after tennis play to both improve and also maintain internal rotation range of motion in the acceptable range. |

<table>
<thead>
<tr>
<th></th>
<th>External Rotation</th>
<th>Internal Rotation</th>
<th>Total Range of Motion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dominant Arm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-Dominant Arm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TEST 4 – HIP AND LEG STRENGTH (ONE LEG STABILITY TEST)

Importance
The one-leg stability test highlights a player’s ability to control the body over a planted leg. Having adequate strength and control in the lower limbs is important, in order to decrease the loads experienced by the knee and leg (injury risk) and to allow for explosive starts and stops (performance enhancement). High levels of hip and core strength are also necessary to protect the lower back and hips. Maximum core strength also allows for the transfer of maximal force development to the arms.

Testing Method
The player begins in an upright standing position with his or her arms crossed over the chest as pictured. The examiner instructs the player to bend the non-weight bearing knee to 90º (Figure A) and descend into a partial squat position, bending the weight bearing knee approximately 30-45º (Figure B). This position should be held briefly before returning to the starting position (Figure A). Repeat on each side, as many as 10-times per side, and note any fatigue-related effects. Instructions to the player should be to maintain good postural alignment and a neutral spine throughout the movement. The examiner should report any abnormal movements, some of which are described below:

Proper Form & Common Abnormalities
Several movement abnormalities that are frequently seen when performing the one-leg stability test include: lateral bowing or corkscrewing of the body and lower limb (Figure D), an inability to control the pelvis on the weight bearing side (Trendelenburg pattern), resulting in the dropping of the opposite hip (Figure D), and increased trunk flexion during the movement. The examiner also should note if the knee of the weight-bearing limb translates past the toes during the exercise. The presence of any of these alterations is considered to be a positive test.

Left Stance Limb Comments: _________________________________________________
Right Stance Limb Comments: ______________________________________________

Area of concern: Inability to perform the one leg stability test indicates weakness of the core and hip musculature and can hinder optimal performance, as well as increase injury risk to the lower back, hip and knee. A failed one leg stability test would indicate the need for significant core and lower body training, as well as balance exercise to improve lower extremity proprioception (balance) and provide greater stabilization to the core and lower extremities.

TEST 5 – DROP VERTICAL JUMP TEST

Importance
The ability to maintain controlled leg alignment is critically important to protect the knee and ensure optimal balance and positioning on the court. This is particularly true when changing directions and decelerating and absorbing forces from the court surface. This test measures the ability of the player to maintain proper leg positioning when landing from a vertical jump and then performing an explosive movement upon landing.

Testing Method
The Drop Vertical Jump test consists of players starting on top of a box 31 cm (12 inches) in height with their feet positioned 35 cm (14 inches) apart for consistency. The player is then instructed to drop directly down from the box and immediately perform a maximum vertical jump and raise both arms as if they were jumping for a basketball rebound. The player should be encouraged NOT to jump up off the box, but rather just drop down off the box and then perform a max effort vertical jump.

Test Results and Comments
The examiner looks for abnormal movement patterns such as dynamic knee valgus (knees coming together resulting in an increased valgus angle at the knee) as well as increased forward lean and asymmetrical limb loading. Additionally, when viewed from the side, excessive movement of the knees forward over the toes would also be an abnormal finding.

Comments/Observations Left Leg: ____________________________________________
Comments/Observations Right Leg: _______________________________________

Area of concern: Inability to perform the drop vertical jump properly indicates an increased risk of knee injury and inadequate hip and core strength. The presence of increased knee valgus, forward lean and other compensatory actions would indicate the need for specific exercises to improve neuromuscular control.
**TEST 6 – PRONE HIP INTERNAL AND EXTERNAL ROTATION RANGE OF MOTION MEASUREMENT**

**Importance**
Lack of proper range of motion/flexibility of the hips can increase stress to the hip joint and lower back and result in injury, as well as non-optimal performance on court. This test measures the excursion of the hip through a rotational range of motion in the prone (face down) position.

**Testing Method**
The player lies on his or her stomach on a treatment table. The hips are placed in neutral abduction/adduction positioning. The knees are flexed 90 degrees such that the heels are pointing toward the ceiling. This is the starting position. From this position, the hips are internally rotated (heel and foot moved outward) simultaneously. The player is asked to hold the end range position while the goniometer is placed with the movable arm along the anterior aspect of the tibia, stable arm vertical position relative to the supportive surface and axis in line with the long axis of the femur (Figure A). Placing both extremities in this position simultaneously minimizes compensation from trunk rotation. After measurement of internal rotation, straighten one knee such that the limb is completely relaxed in a neutral abduction/adduction position against the treatment table. Keeping the other limbs knee flexed to 90 degrees, externally rotate the limb as pictured (Figure B). The proximal hip and pelvis are stabilized by the examiner during the unilateral movement of hip external rotation to limit compensation through the use of a downward pressure. When a stable endpoint without overpressure is determined, measurement is taken using an identical axis and goniometer arm positioning (Figure C). It is important to maintain stabilization of the hip and pelvis throughout the testing and measurement to ensure accurate results. Complete measures on both lower extremities.

**Test Results and Comments**

<table>
<thead>
<tr>
<th></th>
<th>Internal Rotation</th>
<th>External Rotation</th>
<th>Total Rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Hip:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Hip:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments/Observations:

*Area of concern:* Loss of rotational motion in the hip can indicate an increased risk of hip and lower back injury. Research has shown that the amount of total rotation of the hip (sum of internal and external rotation range of motion) should be approximately (within 5 degrees) equal between extremities. Tightness in either internal or external rotation range of motion would indicate the need for specific stretches to improve hip motion to both prevent injury and to enhance performance.

**TEST 7 – HIP FLEXOR FLEXIBILITY (THOMAS TEST)**

**Importance**
Tightness of the hip flexors, including the rectus femoris, can cause lower back dysfunction and decrease a player’s lower body power and movement capability.

**Testing Method**
The player lies on a treatment table, such that the edge of the table lines up with the middle of the player’s femurs (thighs). Both legs should hang over the edge of the table. The player brings both knees up and as close to the chest as possible (Figure A). The player continues to hold one leg toward the chest and lowers the other leg, having it passively guided by the therapist, allowing it to drop over the edge of the table (Figure B). An inability to achieve neutral hip extension (thigh touching table) signifies the hip flexors are of normal length. An inability to achieve neutral hip extension indicates a positive Thomas test (tightness of the hip flexors) and a goniometer can be used to measure the resultant angle of hip flexion, as measured from the horizontal (Figure C). Additional testing to assess muscle length of the rectus femoris can be performed using the same procedure and ensuring that the leg being lowered maintains 90° of knee flexion, without creating a flexion response at the hip. The contralateral leg should remain against the player’s chest throughout these tests. Observation of the position the leg travels while extending also can indicate the flexibility of the iliotibial band. Flaring outward (abducting) of the thigh during testing would indicate tightness of the iliotibial band.

**Test Results and Comments**

<table>
<thead>
<tr>
<th></th>
<th>Thomas Test +/-</th>
<th>Hip Angle if Positive</th>
<th>Rectus Femoris +/-</th>
<th>IT Band +/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Leg:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Leg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments/Observations:

*Area of concern:* Tightness of the hip flexors, rectus femoris and iliotibial band can limit normal motion of the hip and knee joints. Hip flexor tightness can also produce stress on the lumbar spine and cause postural deviations. Tightness of any of these three structures indicates the need for specific flexibility exercises to be performed by the player. Also of concern is when there is unilateral tightness of these muscles or asymmetric lower extremity flexibility. Stretches to ensure that bilaterally symmetric full range of hip motion is present is the goal and the reason the Thomas test can provide key information regarding lower extremity flexibility.
TEST 8 – HAMSTRING FLEXIBILITY (STRAIGHT LEG RAISE)

**Importance**
Flexible hamstrings allow for optimal hip motion and for explosive power to be developed in the lower body. Hamstring flexibility also reduces the risk of lower back and knee injury.

**Testing Method**
The player lies supine on the examination table with a neutral spine position. The leg not being tested is kept on the examination table with the knee completely straight. The examiner raises the testing leg while monitoring the player’s anterior superior iliac spine (ASIS) of the pelvis. The leg is raised passively until motion is felt or observed at the ASIS or motion occurs in the contralateral limb as a compensation. The hip flexion angle is measured with a goniometer. This test is performed bilaterally. Normal hip range of motion in this test has been reported as 70-80°.

**Test Results and Comments**
Left leg: ___________ degrees  
Right leg: ___________ degrees

**Comments/Observations:** ________________________________________________________________________________

**Area of concern:** Tightness of the hamstrings muscles can not only limit hip mobility but also produce abnormal loads on the lumbar spine. Symmetrical hamstring flexibility should be present, and when one or both limbs present with hamstring flexibility less than 70 degrees, specific static and dynamic stretches should be employed to address this important limitation.

---

TEST 9 – QUADRICEPS FLEXIBILITY (PRONE QUADRICEPS FLEXIBILITY TEST)

**Importance**
Flexibility of the quadriceps is important to decrease knee injury and improve lower body range of motion.

**Testing Method**
The player lies prone on a treatment table with a neutral spine position. The limb not being measured is placed in an extended position resting comfortably against the supportive surface of the table. The examiner passively bends the tested knee toward the buttock for normal results. A goniometer can be used to formally measure in degrees the amount of knee flexion achieved during testing. The test is performed bilaterally. The test is repeated with the player actively bending their knee, trying to touch the heel to the buttock. Measurement technique is identical using a goniometer as pictured. Again, bilateral assessment of this test is performed. During both active and passive testing, it is important to note whether the ASIS on the limb being tested moves away or rises from the supportive surface as the knee is flexed. This indicates tightness of the quadriceps and represents a compensation strategy by the player to create greater motion in the presence of a tight or restricted muscle length of the quadriceps.

**Test Results and Comments**
Left Leg Passive: ___________ Degrees  
Right Leg Passive: ___________ Degrees  
Left Leg Active: ___________ Degrees  
Right Leg Active: ___________ Degrees

**Comments/Observations:** ________________________________________________________________________________

**Area of concern:** Tightness of the quadriceps can adversely affect knee function and limit range of motion of the knee and hip. A finding of less than 135 degrees of knee flexion or asymmetric knee flexion angles would indicate the need for specific stretches to address this deficiency.
TEST 10 – CORE STABILIZATION STRENGTH (PLANK TESTS)

Importance
The core musculature surrounds the body’s center of gravity and controls the motion of the pelvis. All movements involve the use of the body’s core. Insufficient strength in the core musculature, or the inability to control the force in these muscles, can lead to injury and/or less than optimal performance.

Testing Method
The player is positioned prone, resting on their elbows and toes as pictured for the prone plank test. The player is instructed to maintain a straight alignment from the head to legs, avoiding any upward positioning of the buttocks and also extension of the neck. Instructions are to maintain this neutral controlled position for a period of 30 seconds noting minimal wavering or compensation by the player during this period of static hold. Also important to note is the position of the scapula. Scapular winging can often be seen and noted during this test.

After the prone plank is completed, side planks are performed as pictured. The player rests on the ipsilateral elbow and lateral border of the feet with the feet placed directly on top of each other as pictured. The contralateral arm is placed on the player’s hip as pictured. Careful monitoring of the player’s position to identify compensatory rotations and sagging of the pelvis during the 30 second static hold. The opposite side is tested in the same manner.

Test Results and Comments
Player is able to maintain optimal positioning:
Prone Plank: Yes  No
Left Side Plank: Yes  No
Right Side Plank: Yes  No

Comments/Observations:

Area of concern: Inability to stabilize the hip and trunk during these plank positions indicates the need for additional core stability. Lack of core stability can increase the risk of hip and lower back injury and seriously affect performance. Specific exercises to address core stability are indicated if these plank positions cannot be maintained in a solid, stable fashion during the testing procedure.

REFERENCES
Scapular Stabilization (Scapular Dyskinesia Test)

External Rotation Strength (Manual Muscle Test)


Shoulder Internal & External Rotation Range of Motion Measurement


Drop Vertical Jump Test

Hip and Leg Strength (One Leg Stability Test)


Prone Hip Internal and External Rotation Range of Motion Measurement

Hip Flexor Flexibility (Thomas Test)

Hamstring Flexibility (Straight-Leg Raise)

Quadriceps Flexibility (Prone Knee Flexion Test)

Core Stabilization Strength (Plank Test)