Using the USTA High Performance Profile to Assess Athletes and Prevent Injury

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To ensure that tennis players are able to perform at their highest levels and remain injury free it is recommended that they undergo periodic physical assessments that evaluate strength and flexibility. This is especially true since the repetitive nature of the sport often causes players to develop muscular imbalances, either in strength or flexibility, which could lead to injury if not addressed. To help prevent injuries in tennis players, the medical experts on the US Tennis Association's (USTA) Sport Science Committee developed the High Performance Profile (HPP) - a series of musculoskeletal tests assembled to identify muscular imbalances and pinpoint areas where a tennis player should focus his or her physical training.

The USTA HPP targets areas of the body that are frequently injured in tennis players and includes the following strength and flexibility tests for the upper body, lower body and the core.

Strength Tests

- Shoulder Blade Stabilisation Strength
- Shoulder External Rotation Strength
- Grip Strength
- Core Muscle Strength
- Hip and Leg Strength

Flexibility Tests

- Shoulder Internal/ External Rotation Flexibility
- Hip External Rotation Flexibility
- Hip Flexor Flexibility
- Hamstring Flexibility
- Quadriceps Flexibility

While all of these tests are important for tennis, several deserve special attention because of how they relate to some of the more common tennis injuries.

SHOULDER BLADE STABILISATION STRENGTH TEST

For the shoulder to function properly, the shoulder blades must be lined up and move with the arm in a coordinated manner, yet many tennis players do not possess adequate strength in the muscles that control this part of the body. If the shoulder blade does not move correctly, the shoulder is more likely to become injured. This simple test identifies whether a player has adequate strength in the upper back and torso muscles that control the shoulder blades.

SHOULDER EXTERNAL ROTATION STRENGTH TEST

The muscles that internally rotate the shoulder, the primary shoulder motion in the serve and forehand, tend to be very strong in tennis players because of the number of times these shots are hit in practice or a match. However, the muscles that control the opposite motion - external rotation - are often weak in tennis players. Strength is needed in these muscles since they are important for decelerating the shoulders motion and providing balance to the shoulder joint. This test assesses strength in these muscles that are so essential for injury prevention and performance optimisation.

CORE MUSCLE STRENGTH TEST

The core musculature surrounds the body's midsection and essentially controls the motion of the pelvis. All tennis movements involve the use of the body's core and insufficient strength, or the inability to control these muscles, can lead to injuries of the lower back, abdominal region, and/or shoulder.

HIP AND LEG STRENGTH TEST

Amazingly, despite all of the running and lower body movement, many tennis players exhibit strength deficits in the lower body. Having adequate strength and control in the legs is important to decrease the loads experienced by the knee and other joints as well as allow for explosive starts and stops. The one-leg stability test highlights a player's ability to control the body over a planted leg and is a critical component to the USTA HPP.

SHOULDER INTERNAL / EXTERNAL ROTATION FLEXIBILITY TEST

Many tennis players exhibit a shift in shoulder flexibility on their dominant side – showing increased external rotation with a decrease in internal rotation compared to the arm they do not serve with. This altered range of motion can create abnormal movement in the shoulder joint, which may lead to an injury. Any inflexibility in the shoulder can negatively impact performance by decreasing the "long axis rotation" that is necessary in the serve.

While these tests provide a great way to know where players stand with respect to strength and flexibility, perhaps the most important part of this testing is not the tests themselves, but rather *what is done with the results of these tests.* The USTA HPP provides important information that should be used to help guide players and coaches when developing tennis-specific training programs. The tests included in the USTA HPP are designed to be given by a physical therapist, athletic trainer, or orthopaedist. These professionals should also be able to give valuable feedback as well as provide a list of exercises and/or stretches that players can use to improve their performance, both on these tests *and* on the court. As a final note, it is recommended that players be re-tested every 3-4 months to monitor improvements and identify any potential injuries before

they occur. Use the USTA HPP with the players you work with to improve their games while also preventing injuries.