Understanding Tennis Elbow:

Getting to the Root of the Problem

By David Bayliff, PT, MPT

Among tennis related injuries, one of the most frequently treated diagnoses is lateral epicondylitis, or “tennis elbow”. There are several injuries that may present as tennis elbow. The soft tissue that typically becomes irritated is the extensor carpi radialis brevis; a forearm muscle that originates just above the elbow. A quick and easy assessment to determine if one has tennis elbow is to palpate the back of the arm just above the outer aspect of the elbow. If the ECRB is inflamed, the palpation will be painful. One other sure tale sign is that the pain is reproduced when shaking hands.

Recreation and novice players will develop lateral tennis elbow 90% of the time when this particular inflammation occurs. For the highly skilled player, 75% of the cases develop on the medial, or inside portion of the elbow. A third and least common form of this injury is when there is inflammation in the posterior aspect, or back of the elbow. Medial and posterior inflammations are often attributed to the stresses imparted on the medial (inside) forearm muscles and the triceps during forceful and repetitive serving.

The primary causes for all three forms of tennis elbow include: faulty mechanics, timing breakdowns (such as hitting out of the strike zone) and forces imparted by the equipment. When all three coincide, then the elbow is sure to endure “the perfect storm”. Interestingly, players who utilize a two-handed backhand are less likely to develop tennis elbow. It is believed that the stability provided from the other arm greatly reduces the stress imparted on the injured tissues. It is also possible that the additional arm may compensate for weakness of the biceps and the brachioradialis (forearm muscle). Although research has yet to be done on the effect of the biceps and the brachioradialis with tennis elbow, I hypothesize that it is this weakness that contributes to tennis elbow. The theory is that with such weakness comes a loss of deceleration of the forearm during a slice backhand (for the one-handed backhand) or the serve. The elbow is then forcefully extended as a result. The stroke mechanics and timing can be easily addressed by a skilled certified teaching professional. A professional can also provide excellent feedback on equipment evaluation and modification.

It first must be pointed out that while no definitive relationship between tennis elbow and racquet head size, stiffness, and balance has been identified, a causal relationship has been identified between these factors. The following are some simple tips that one may find beneficial.

A favorite racquet among recreational and club players is the oversize wide body frame. The advantages to this style of frame are that the size generates more power with less effort, and they provide greater vibration dampening. The stiffer the racquet, the less forgiveness there will be on those ill-timed shots. Conversely, a more flexible racquet will provide a softer feel of the initial impact. Additionally, a light to medium weight racquet (10.6 – 12.5oz) with a head-light or evenly balanced frame will afford more forgiveness.

String type also plays an important role in tennis elbow. For a softer feel, choose a gut or a mutifilament string. A lower tension will also enhance the softness. Also, a lower tension creates greater post-impact ball velocity and greater power with less stroke effort. It is recommended that players returning to the game following a bout of tennis elbow restring their racquet 2-3 pounds lighter than their usual tension.

Dampners are effective for decreasing high frequency string vibration. But they seem to have no impact for lower frequency, more damping frame vibration. It has been shown that vibrations from the racquet that may cause injury are transmitted through the racquet head itself.

Finally, it is widely accepted that there is less effort required to hold a larger size grip. Research has substantiated this notion. It has been found that there are lower activity levels in the forearm extensors (the large muscles on the posterior side of the forearm that become inflamed; the ECRB, for example) during execution of a backhand with a larger racquet handle. Despite the findings of the research, one should take into account one's personal comfort when selecting a grip size. A perfect example: it has been reported that Rafael Nadal uses a 4 1/8 grip! Probably the most dominating factor regarding grip is the importance of a loose grip versus a "death" grip. A loose grip will diminish the impact force of the racquet while aiding in generating more power, depth, and control with the shot.

When all these factors have been addressed, licensed physical therapist will then be able to assist one in resolving the inflamed tissues and to identify any other strength or range of motion limitations in the body which may have contributed to the cause of the symptoms. An effective home program should include icing 10-20 minutes, or a 4-5 minute ice massage to the sore muscles two or three times daily. When strengthening, first exercise the muscle group opposite of the affected muscles. Begin strengthening the involved areas once the pain begins to subside. Stretching and cross-friction massage (deep rubbing against the muscle/tendon grain) helps to flush out the inflammation and to prevent tightening of the tissues. Other areas to strengthen, which have not been fully addressed in previous literature, are the scapular (shoulder blade) muscles, biceps, hips, legs and trunk rotation. As in any sport, the "core" musculature is where an athlete generates his or her power. A weakness here and one is sure to develop compensatory pain or consequential symptoms. A weak core will lead to a break down in stroke mechanics.

In review, what is essential to recognize is that the ultimate cause of tennis elbow is one of the following factors: faulty mechanics, hitting out of the strike zone, too stiff of a racquet (including the player's grip and the string type and tension), or any combination of these.

About David Bayliff:

David Bayliff has been a practicing physical therapist since 1994. He has worked at Spooner Physical Therapy since 2003, where he is the clinic co-director and physical therapist. A North Carolina native, David was a 3-year member of the tennis team at Wake Forest University (Winston-Salem, NC) where he earned his BS in 1988. After receiving his Masters degree in Physical Therapy from Shenandoah University (Winchester, VA) in 1994, David and his wife relocated to Arizona. David enjoys working with and treating all age groups and considers himself a "generalist" with regards to his orthopedic skills. His love for, and knowledge of tennis have given him the opportunity to work with tennis players from adolescent-beginner to professional (ATP Tour). In addition to his passion for playing tennis (5.0 rated), David is also an avid runner, and has come to enjoy competing in half marathons. His primary goal with each and every client is to assist the individual in returning to their functional lifestyle. David is motivated, inspired, and supported by his wife, Amy (a fellow Shenandoah PT grad), his son, Reece (2002), and his daughter, Sydney (2004).