

## **An Introduction to Conditioning For Tennis**

With the days of wooden rackets and long trousers now past, modern tennis has become a highly dynamic athletic pursuit where successful performance is a balance of technical ability, tactical know-how, psychological skills and not least physical fitness.

Fresh in the mind for many will be the five hours, fourteen minutes of epic tennis played by Rafael Nadal and Fernando Verdasco in the semi final of the Australian Open this year. Nadal won the longest match in the history of the event 6-7 6-4 7-6 6-7 6-4. We almost expect this level of condition and fitness from Nadal but Verdasco surprised many, unless of course you know he has been working with Andre Agassi's long time fitness guru, Gil Reyes. Fitness is right on the tennis radar at present, the last year has seen many column inches and much discussion given over to the physical training regime of Britain's own Andy Murray. Murray has made no secret of the positive affect of his extensive conditioning regime on his overall game.

With British summer time now upon us, in this article I am going to take a closer look at the role of fitness in tennis performance and highlight some possible methods that might be used in conditioning tennis players across all abilities.

Perhaps the greatest challenge facing the conditioning specialist with tennis is the variations within the game itself. Tennis is by definition a game of unpredictability, whether it is point length, shot type, game strategy (e.g. baseline or net play), weather conditions or the opponent (Kovacs 2006). When we add the variety of playing surfaces used, this presents a range of challenges when designing tennis conditioning programmes.

### **Physical Demands of Tennis**

A point can last a few seconds and involve highly explosive movements and high speed changes of direction; and as with Nadal vs Verdasco, a match can go on for over 5 hours. During the course of a match, players may execute around a 1000 shots and cover in excess of 3km (Reid & Schneiker 2008). Force production in a tennis shot requires a summation of forces starting with the legs and ending at the racket head, with the hips and trunk functioning as the centre of rotation (Kovacs 2007). Evidence suggests that knee flexion/extension and trunk rotation are key to high hitting speeds (Reid & Schneiker 2008). Serves in excess of 200km/h and equivalent ground strokes require high anaerobic ATP production therefore metabolically tennis can be described as a predominantly anaerobic activity with high levels of aerobic conditioning beneficial to avoid fatigue (Kovacs 2007). A  $VO_2max$  of around 55 mL/kg/min appears to be optimal for an elite player (Kovacs 2007).

The potential impact of fatigue on performance is also an important consideration, with reductions in ball velocity, proprioceptive ability, and hitting accuracy reported (Kovacs 2006). The service appears particularly vulnerable to these effects and the physiological strain placed on the bodies systems has a direct impact on an individual's quality of movement patterns, and co-ordinative ability (Kovacs 2006).

## **Designing a Conditioning programme for Tennis**

High performance tennis is a complex interaction of power, speed, and agility, combined with muscular and aerobic endurance; all of which are underpinned by the ability to react, anticipate and decision make (Hornery, Farrow, Mujika & Young 2007).

The unpredictable and multidimensional nature of tennis play, mean that precise programming advice is difficult, however more general guidelines can be offered. Specific training drills should be designed to simulate match play situations. Duration should be in the 5 to 20 second range, with appropriate work/rest intervals selected. Agility drills should be multi-directional with distances covered focusing on distances of 3 to 10 metres.

Although supportive research is limited, resistance training is seen as an important element in tennis conditioning. Its major goals are to increase muscular power relating to tennis performance and to offer a preventative affect in terms of injury (Reid & Schneiker 2008). Basic structural exercises such as squats, lunges, rows, and presses are valid along with more dynamic approaches focusing on power such as those using bodyweight or implements such as medicine balls. It is also important to emphasise the importance of building basic conditioning to create the platform for tennis specific work. An individually periodised approach that involves general as well as specific training is recommended.

The shoulder is a particularly vulnerable area for tennis players. Deceleration in follow through results in high eccentric forces, and the rotator cuff is common location for injury. Training of the rotator cuff is seen as a fundamental of tennis conditioning (Reid & Schneiker 2008) and should be a consideration within all programmes.

Trunk musculature is heavily involved in force production during the serve and ground strokes, and the importance of abdominal and low back exercise has been emphasised (Elliot 2006). This should include plyometric actions, which are key elements of trunk rotations in tennis (Reid & Schneiker 2008).

Flexibility is also an area for consideration in a tennis conditioning programme. Although any intervention must be individualised, evidence indicates limited

range of motion problems can develop in shoulder external rotation of the dominant arm and in the lower back and hamstring areas (Kovacs 2006).

The dynamics of the modern game combined with the negative affect of fatigue mean that physical training has become an important element in the preparation of a tennis player. The unpredictability of the game and its competitive schedule creates programme design challenges for the conditioning professional. Tennis specific drills, based on match play analysis along with individualised resistance training protocols should be the focus of the training programme. Specific shoulder, trunk and flexibility movements should also be included.

### **References and Suggested Reading**

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