CHAPTER 7: PHYSICAL DEVELOPMENT OF YOUNG TALENTED TENNIS PLAYERS

Tamara Kramer
Barbara Huijgen
Marije T Elferink-Gemser
Jim Lyons
Chris Visscher

INTRODUCTION

“Talent” can be defined as ability above the normative average. Talented athletes perform better than peers during training and competition and have the potential to reach elite level (e.g., Elferink-Gemser, Visscher, Lemmink & Mulder, 2004; Helsen, Hodges, Van Winckel & Starkes, 2000; Howe, Davidson & Sloboda, 1998). Talent selection and identification, therefore, become important determinants of success in sport. They have been defined as the prediction of future performance of for example young tennis players or the identification of young players that will achieve success at national or international levels (MacCurdy, 2006). In tennis, there are many aspects that must be well developed to become a professional player. These components are physiological, physical, psychological, technical, and tactical (MacCurdy, 2006). According to MacCurdy (2006), physiological components are considered to be defined by height, weight as well as other anthropometric elements with physical aspects (e.g., running, jumping, agility, and power).

Psychological components are defined by levels of self-confidence, self-esteem, personality and motivation. Technical and tactical skills, however, are probably the most important aspects. Technique is important for being able to execute the correct moves with a minimum of error, whereas tactics refer to the ability to make rapid and correct decisions as play unfolds (MacCurdy, 2006). As might be expected, all of these aspects are better developed in talented as opposed to average tennis players although they must be further developed during youth and adolescence in order for talented players to advance to level of professional. While recognizing the relative importance of the psychological, technical, and tactical components of the skill, this review will concentrate on the physical attributes of a tennis player.
Tennis is an intermittent anaerobic sport, involving quick stops and starts, with an aerobic recovery phase (Fernandez, Mendez-Villanueva & Pluim, 2006). Research with regard to the physical development of young talented tennis players is not extensive. However, it is of relevance to know which aspects are important to become an elite senior player and how these aspects develop through the years from junior to senior elite player. Kovacs (2007), however, proposes that three general physical skills (anaerobic, aerobic and auxillary), and their constituent subcomponents, are important for tennis performance (figure 1). The anaerobic components include speed, agility, strength, power and muscular endurance. Speed refers to the running speed on court and off court and tennis specific speed (Kovacs, 2006). For a tennis player it is important to reach high velocity during the first meters of the sprint to the ball. Agility is the way of moving on the tennis court, for example, sprinting with changes of direction. In tennis you need to be able to change direction quickly to get to the ball (Kovacs, 2006). Thus, speed and agility are the ability to move around the court quickly and smoothly to position for a shot (Roetert, Piorkowski, Woods & Brown, 1995). Strength of the body parts and the power of the body are also anaerobic components and therefore also part of this review. Strength is the amount of weight you can lift or handle at any one time (Roetert et al., 1995). Strength is important for hitting the ball hard, however, also necessary for preventing injuries (Kovacs, 2006). Power is the amount of work one can perform in a given period (Roetert et al., 1995). Power is necessary for all the explosive movements that a player makes on the court (Kovacs, 2006). Muscular endurance is the number of times a muscle can lift a weight or how long muscles can hold an amount of weight (Roetert et al., 1995). Strokes in tennis could be very long, thus requiring good muscular endurance for hitting the ball hard constantly.

The aspects of the aerobic component are muscular and aerobic endurance. Muscular endurance, as mentioned earlier, is the number of times a muscle can lift a weight or how long muscles can hold an amount of weight (Roetert et al., 1995). In a tennis context, this is important for prolonged rallies later in the match. Aerobic endurance, on the other hand, refers to the ability to take in, transport and use oxygen (Roetert et al., 1995). In a study by Banzer, Thiel, Rosenhagen & Vogt (2008) it was found that VO$_2$max is a good indicator for the performance of a tennis player. VO$_2$max is the highest rate at which a player can consume oxygen during exercise, which reflects the aerobic fitness of a player. The higher the VO$_2$max of the player was the higher the rank of the player on the world ranking list was (Armstrong, Welsman & Winsley, 1996). Thus for aerobic capacity, the VO$_2$max is one of the outcome variables.