

# ITF Coaches Education Programme



Coaching Beginner and Intermediate Players Course

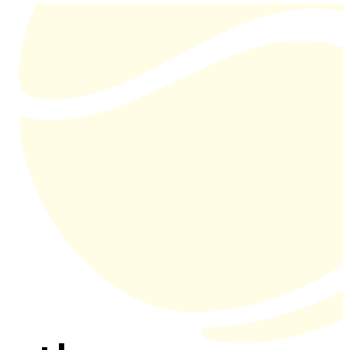
## Sports Medicine and First Aid for Tennis

# Introduction



- Most common and the most serious types of injuries in young and adult beginner tennis players will be discussed.
- Exercises (both on and off court) will be listed
- Safe alternatives discussed.

# Types of injuries



- As increasing numbers of children participate in the game, the likelihood of some children being exposed to inappropriate or excessive training regimes directed by inexperienced or unqualified supervisors has also increased.
- Acute injuries:
  - Result of a single violent impact or event
- Chronic (or overuse) injuries:
  - Product of many repetitive minor insults.
  - Minor, individually insignificant stresses that accumulate
  - The majority of sports injuries in tennis players are due to overuse
  - Repeated micro-traumas of the musculoskeletal system
  - Pain, a key symptom of an overuse injury, is typically a late diagnostic indicator.

# The role of the physician



- Preventative role
- Help coaches detect signals that are indicative of overtraining:
  - One of the first signals is lack of enjoyment in the activity
  - Lead to burnout and an early dropout from the sport.
- Measures that will help prevent overtraining:
  - Early detection
  - Prioritise learning over results
  - Vary training methods
  - Using cross-training
  - Setting short, medium and long term goals.

# Injury factors



- The growth process of the children and muscle imbalances
- Poor technique
- Inappropriate coaching
- Dangerous court surfaces and inappropriate equipment

# The growth process and muscle imbalances



- Muscle strength imbalances: Risk factor for injury.
- Skeletal immaturity.
- Tight and inflexible muscle groups that span growing bones and joints.
- Between the dominant and non-dominant sides (contralateral), between opposing muscle groups on each side of a joint (agonist /antagonist), and between the upper and lower body.
- Contralateral muscle imbalances are common.
- Problems only if the strength difference is severe, or if the non-dominant side is particularly weak.
- Most common sites being the shoulder and trunk.
- Loss of flexibility and an increased potential for traction apophysitis from vigorous or repetitive stress.

# Inappropriate coaching



- Often adult training formulas of volume and progression are applied to adolescents.
- Cardiovascular and musculoskeletal responses to training of both groups are substantially different.
- Excessive levels of specialised physical activity among young players can increase their risk of injury and affect their physical growth and maturation.

# Inappropriate coaching



- Only a well prepared musculoskeletal system can meet the demands of tennis, free from injury.
- No mistakes can be made during tennis player preparation as the price to be paid is the health of the athlete.
- Athletes suffer problems when they practice too intensively, too often, too soon after an injury and when they try to remedy it too little and too late.
- Inadequate warm-up and/or cool-down can also be a common contributor to injuries among beginners and intermediate tennis players.



# Poor technique



- Important in terms of injury prevention.
- Coaches need a sound understanding of biomechanics such that they can identify any extraneous or inappropriate movements that may place players at injury risk.

# Dangerous court surfaces and inappropriate equipment

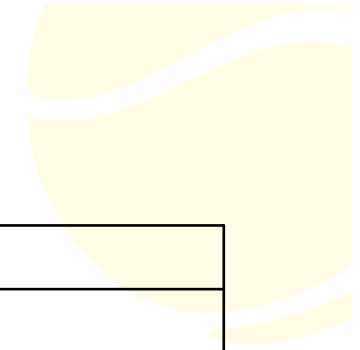
- Difficulties in performing certain activities, especially if the court surface is slippery or uneven.
- Using inappropriately sized or weighted racquets or racquets with grips that are too large or small, may place particular muscles under stress.

# Injuries in beginner and intermediate tennis players



- Injury type and incidence vary with player age.
- The types of injuries that are likely sustained by a 10 year old beginner differ to those encountered by a typical 50 year old player starting out.

| <b>Injury</b>                                       | <b>Main characteristics</b>   |
|---|---|
| <b>Injuries of the growth plate</b>                 | <ul style="list-style-type: none"> <li>• The physis or growth plate is located in the ends of growing long bones.</li> <li>• It separates the epiphysis (the portion of bone between the physis and the joint surface) from the metaphysis (or remainder of the long bone).</li> <li>• The epiphyseal plate closure is recognized clinically as bony maturation.</li> <li>• If injury occurs before epiphyseal plate closure, then significant, permanent growth disturbance is likely.</li> </ul>                        |
| <b>Sever's disease (posterior calcaneous)</b>       | <ul style="list-style-type: none"> <li>• Heel pain, usually worse after activity.</li> <li>• Tight calf muscles (gastrocnemius and soleus) are recognised as part of the cause.</li> <li>• Typically presents itself in the 8 to 13-year-old player.</li> <li>• It can be associated with growth and/or biomechanical abnormalities.</li> <li>• Treatment: Application of ice, massage, and stretching of the muscles involved.</li> </ul>  |
| <b>Osgood-Schlatter disease (tibial tuberosity)</b> | <ul style="list-style-type: none"> <li>• Pain associated with swelling over the bony prominence on the lower leg just below the kneecap (tibial tubercle).</li> <li>• Commonly in boys between 10 and 15 years of age and in girls between 8 and 13 years of age.</li> <li>• Worsening of this pain during running, jumping, and ascending or descending stairs.</li> <li>• Treatment: Stretching and strengthening of quadriceps muscle.</li> <li>• The player should not continue activity if pain develops.</li> </ul> |



| <b>Injury</b>   | <b>Main characteristics</b>   |
|---|---|
| <b>Sinding-Larsen-Johansson syndrome (inferior patella)</b> | <ul style="list-style-type: none"><li>• The focus of pain is at the lower pole of the patella,</li><li>• It develops after multiple episodes of microtrauma to the site of injury, but also has been reported to result from a single episode of macrotrauma.</li><li>• The typical patient is 10 to 13 years old.</li><li>• Treatment: Similar to the Osgood-Schlatter disease.</li></ul>  |
| <b>Hip pain</b>   | <ul style="list-style-type: none"><li>• Less common than previous described injuries.</li><li>• Injury on the apophyseal sites around the hip where major abdominal and hip muscles either originate or insert.</li><li>• It results from traction on a growing area of the bone in active adolescents.</li><li>• Treatment: Rest from tennis. A programme of strengthening and stretching of the abdominal and hip muscles should be incorporated into the training.</li></ul> |
| <b>Medial elbow pain</b>                                    | <ul style="list-style-type: none"><li>• Inflammation at the site where the forearm flexor muscles originate.</li><li>• The player experiences pain with resisted flexion of the wrist.</li><li>• Treatment: One month of rest from tennis.</li></ul>  |

| Injury  | Main characteristics  |
|---|---|
| <b>Tennis elbow</b>                             | <ul style="list-style-type: none"> <li>• The most common painful condition of the elbow in tennis players. Inflammation, pain and tenderness on the outer side of the elbow.</li> <li>• Pain and/or weakness with gripping activities, lifting and/or twisting motions of the wrist.</li> <li>• Causes: Poor wrist and forearm strength and flexibility, inadequate warm-up, an incorrect grip, grip size, inappropriate technique (i.e. backhand leading with the elbow), and a sudden change in activity level or intensity.</li> <li>• Treatment: Acute cases (symptoms present in less than four weeks), usually resolvable in two to six weeks. Chronic cases (recurrent cases) may require three to six months to resolve.</li> </ul> |
| <b>Back pain</b>                                | <ul style="list-style-type: none"> <li>• Very common among tennis players.</li> <li>• Causes: Incorrect postures, muscle imbalances and articular dysfunction. The combined rotation, flexion, and extension of the back during the serve may cause problems.</li> <li>• Symptoms: Sudden, sharp, persistent or dull pain in the lower back.</li> </ul>   |
| <b>Muscle tears</b>                             | <ul style="list-style-type: none"> <li>• Occur about the shoulder (rotator cuff). Rotator cuff: Group of four muscles (supraspinatus, infraspinatus, teres minor and subscapularis). It contributes toward the stability of the shoulder.</li> <li>• It is placed under considerable stress during the cocking and deceleration phases of the serve.</li> </ul>   |
| <b>Tennis leg</b>                               | <ul style="list-style-type: none"> <li>• Rupture of the gastrocnemius muscle where it merges with the Achilles tendon. It is caused by forced dorsiflexion from a position of extreme plantarflexion with a fully extended knee.</li> </ul>   |
| <b>Achilles tendinosis and Achilles rupture</b> | <ul style="list-style-type: none"> <li>• It is the result of the chronic repetitive stress of running and jumping. Pain generally felt in an area three to five centimetres above the heel bone.</li> <li>• Symptoms may include pain in the morning and at the beginning of a workout. The pain often disappears during tennis play, but it usually returns afterwards only to worsen the injury and make successful recovery increasingly difficult.</li> </ul>   |

# Injury prevention for beginner and intermediate players

- Diagnosing, treating and/or rehabilitating injuries is not the role of the tennis coach.
- A knowledge of basic anatomy and physiology can better assist coaches prepare safe and challenging tennis practices for their players.
- General preventative measures include:
  - Be sure to warm-up.
  - Introduce greater range of motion through appropriate stretching.
  - Progressively increase strength.
  - Access regular massage.
  - Wear proper footwear.
  - Carefully monitor training.
  - Apply bracing or taping when and where needed.
  - Schedule rest and recovery.

# Injury prevention for beginner and intermediate players



- Remember the acronym - RICER:
  - Rest
  - Ice
  - Compression
  - Elevation
  - Rehabilitation



| Condition                                     | Preventative measurements   |
|---|---|
| <b>Heel pain (Sever's disease)</b>            | <ul style="list-style-type: none"> <li>Avoid exercises that excessively load of the heel, such as jumping rope. Limit the amount of running and sprinting for the player (i.e. have the player stand in a small area, while the other player hits the balls into this area.)</li> </ul>   |
| <b>Knee pain (Osgood Schlatter's disease)</b> | <ul style="list-style-type: none"> <li>Limit excessive sprinting and jumping within the warm-up and tennis training session; Moderate practice of low volleys and other drills that demand that players bend low for successful performance. Temporarily avoid stressing explosive knee action with the serve. In practicing footwork or coordination, regulate the exercising area to <math>\approx 2</math> m<sup>2</sup>.</li> </ul> |
| <b>Hip pain</b>                               | <ul style="list-style-type: none"> <li>Avoid exercises that excessively tract the apophyseal sites around the hip (i.e. stretches).</li> </ul>  |
| <b>Stress fractures</b>                       | <ul style="list-style-type: none"> <li>Avoid exercises with high load and high frequency (i.e. long distance running, walking up and down hills and stairs, weight lifting). Avoid the load elements that have caused the injury (jumping rope, running on hard surfaces). Discuss the training programme with the coach and doctor. Shoes should be checked, and arch supports may be considered.</li> </ul>                           |
| <b>Back pain</b>                              | <ul style="list-style-type: none"> <li>Warm up well before serving. Try using a cloth corset or lumbar heat retainer. Refrain from teaching a kick serve to very young players. Players should participate in a strength and conditioning programme of the back and core muscles.</li> </ul>  |
| <b>Tennis elbow</b>                           | <ul style="list-style-type: none"> <li>Perform an appropriate warm-up and stretch the forearm extensor muscles; Use a composite racquet with good dampening characteristics, an oversized head that is head light and with the largest cushioned grip that is comfortable. Use strings that are thin gauge gut or high quality synthetic gut strung at a low tension. Play with new tennis balls.</li> </ul>                            |

# Heat stress



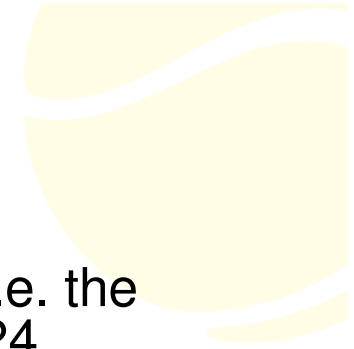
- Children have less effective cooling mechanisms and are less capable than adults of sustained work under hot conditions; a difference that becomes greater as the duration of work increases.
- Coaches need to be aware of the increased risk of heat stress in juniors.

# Heat stress



- Schedule practices for short periods in the morning and late afternoon or early evening
- Acclimatise players (adapt the duration or intensity of practice to the weather conditions).
- Incorporate intermittent rest periods (every 15 or 20 minutes) in the shade into practice sessions
- Encourage players to wear hats, wet their faces with water or to place wet towels around their necks.

# Heat stress



- Allow players to drink plenty of fluid.
- Before they begin to feel thirsty.
- Fluids with carbohydrate concentrations of 2–8% and sodium concentrations between 20 and 40 mmol.l-1 are most appropriate.
- Players should refrain from using salt tablets (more water is lost than salt).
- Using salt tablets without replenishing water will only worsen any existing problem.
- Restoring fluid loss (i.e. the fluid balance) within 24 hours of the completion of the training session or match is important.
- One way to monitor fluid loss is to check the player's body weight before and after the training session or match.
- Players can also monitor their hydration status by checking the colour of their urine, which should be a light yellow.
- The volume of fluid ingested should be at least 50% more than the volume of fluid (or sweat) lost.

# Eating habits



- Beginner and intermediate tennis players should have a varied and balanced diet in which all essential nutrients are sufficiently present:
  - Carbohydrates (55-60%) of total calorie intake.
  - Fat ( $\approx 30\%$ )
  - Protein ( $\approx 15\%$ )
- For individual players, the composition of particular meals that form their diet will differ depending on factors such as training loads, fitness, weather conditions, and body weight

# Eating habits



- Balanced meals to avoid vitamin deficiencies.
- Vitamin supplements may be advisable for tennis players with lesser balanced diets such as vegetarians.
- Variety of different minerals:
  - Sodium (kitchen salt)
  - Potassium (potatoes, vegetables, and fruits)
  - Calcium (dairy products)
  - Iron (fruit juice)

# Eating disorders



- Mainly affect young females and generally start in puberty
- Adolescent girls that may think that weight is an issue for them may engage in disordered eating practices
- Frequent fasting or bingeing and purging which can harm their health, self-esteem and psychological development.

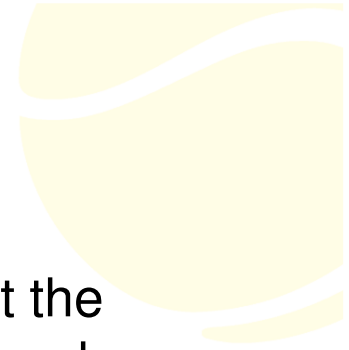
# Eating disorders



- **Anorexia nervosa:**
  - Diagnosed when there is severe weight loss (more than 15% below ideal body weight) by self-starvation, an intense fear of gaining weight, and primary or secondary amenorrhoea.
  - Obsessive preoccupation with food, strict monitoring of food intake, a disturbed body image and excessive exercise are common symptoms.
- **Bulimia nervosa:**
  - Patients with recurrent episodes of binge eating, followed by inappropriate compensatory behaviours such as self-induced vomiting, misuse of laxatives, diuretics or other medications; fasting; or excessive exercise.

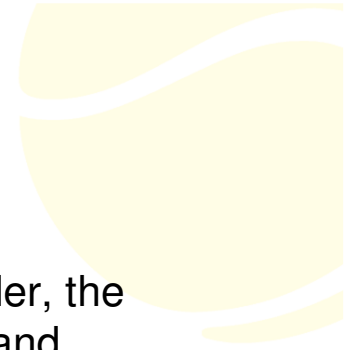


# Eating disorders



- The risks associated with eating disorders are:
  - Nutritional deficiencies
  - Decreased bone density
  - Infertility
  - Decreased immune function
  - Electrolyte disturbances
  - Low blood pressure
  - Slow or irregular heart beat
  - Gastrointestinal problems
  - Psychiatric problems.
- Coaches may suspect the presence of eating disorders in young players who appear excessively thin, who have a distorted body image (i.e. they are convinced they are too fat when in fact they are extremely thin), or who present with absence of menstruation.
- Prompt recognition and referral are important to prevent eating disorders.

# Sports first-aid for tennis



- Important that immediate first-aid attention is available and, if necessary, an ambulance called.
- Minimise the prospect of minor injuries becoming more debilitating, and even save lives.
- Participate in a certified Sports First Aid or Sports Trainer course.
- As a qualified Sports First Aider, the tennis coach's broader roles and responsibilities involve:
  - Prevention of Injury.
  - Crisis Management.
  - Immediate Injury Management.
  - Referral.
  - Maintenance of fitness records.
  - Development of professional relationships with members of a Sports Medicine team.
  - Communications.
  - Provision of first aid equipment/ first aid kit.
  - Formulation of an emergency plan.
  - Advice to visiting players and teams.
  - Understanding their legal responsibilities.
  - Continuing education.

# Conclusion



- Factors such as age, gender, physical condition, playing standard, playing technique, court surface and inappropriate equipment can all relate or contribute to injury.
- A knowledge of basic anatomy and physiology as well as the prescription of training according to sound training principles is essential.
- Coaches should educate players on preventative strategies to minimise the risk of heat stress.
- Coaches should become qualified Sports First Aiders so as to provide the safest training environments.