



## Common Injuries/Conditions with Female Tennis Players

**Kathleen Ann Stroia**

*Vice President, WTA - Sport Sciences & Medicine and Professional Development*

The Sony Ericsson WTA Tour is the pre-eminent professional sport for women worldwide, with over 58 million dollars in prize money and players competing in 63 tournaments in 33 countries. The Sport Sciences and Medicine (SS&M) and Professional Development Departments are responsible for providing health care to the professional athletes. The Departments consist of:

1. The Primary Health Care Providers (PHCPs) are all qualified Sports Physiotherapists and Certified Athletic Trainers, who are present at all Sony Ericsson WTA Tour events.
2. Certified Massage Therapists (MTs). (Present at selected Sony Ericsson WTA Tour events).
3. A variety of Sport Sciences and Medicine Advisors, in the fields of sports medicine, sports psychology, hydration, nutrition and podiatry. These advisors are available to consult with individual athletes as needed and to advise Departmental staff.
4. A Professional Development team whose focus is on educating the players and their teams (parents, coaches, agents and others) about managing the stressors encountered in professional tennis which impact upon player health and well-being. (Present at selected Sony Ericsson WTA Tour events).

The expertise, observations and solution-oriented approach to health care of the SS&M and Professional Development Departments can be applied by coaches working with all levels of tennis player's world wide to improve their players' health, well-being and performance.

### **THE STRESSORS AND INJURY TRENDS OBSERVED ON THE SONY ERICSSON WTA TOUR**

In 2004, The Sony Ericsson WTA Tour conducted an extensive study that considered the stressors in professional women's tennis. The stressors identified 10 years ago were external in nature since 1995; programs have been put in place to ameliorate those stressors. Today the stressors that the players identified are more internal in nature; factors that are common to elite sports. (See table 1). These factors are very applicable to coaches working with junior and national tennis teams. These stressors are the focus of current and future preventative programs that the Sony Ericsson WTA Tour will continue to implement.

Players 2004	Players 1994
Injuries	Media
Travel	Parents and Family
Season	Travel
Expectations	Competition
Competition	Loneliness

*Table 1: Stressors reported by Sony Ericsson WTA Tour players*

Injuries are the #1 stressor reported by the pro players. The most frequently treated body parts have been identified through the computer tracking system used by the SS&M Department on the Sony Ericsson WTA Tour. These are in order: Lumbar spine and sacroiliac joint; ankle; thoracic spine; foot; shoulder; wrist; cervical spine and knee. The two top injury types are muscle strains and joint dysfunctions; followed by blisters, ligament sprains and tendinopathies (tendon injuries).

### **WHAT CAUSES INJURIES?**

Injuries at the professional level of tennis are caused by many factors that include:

#### **The Nature of the Professional Game**

- The professional game is faster and more competitive than ever before
- Acute traumatic episodes will happen in any sport (e.g. player falls over or runs into net post)
- The physical and mental demands on the players have never been greater.
- External pressures from media, sponsors, coaches, parents, tournaments.
- Internal pressures from the player's own need to compete to maintain/improve ranking.

#### **Equipment & Surface Factors**

- Changes to racquet technology have altered the style of game and allow the players to hit harder.
- Shoes: most tennis shoes are constructed to fit a man's foot and do not allow a specific enough fit for a women's foot.
- Ball type and inconsistencies.
- The type and amount of play on each surface including number of weeks played on man-made surfaces and surface inconsistencies over a number of weeks (e.g. not every clay court is the same standard).
- Changing surfaces requires adaptation and can lend itself to specific patterns of injuries. The Sony Ericsson WTA Tour has noted an increase of 27% in injury occurrences that corresponds to when players change surfaces (e.g. from clay to grass, grass to hard-court etc).

## Amount of Play and Periodisation

- Number of weeks of participation/per year.
- Inadequate periodisation, rest and recovery increases the chance of injury.
- Number of matches significantly relates to the number of medical withdrawals.
- The Sony Ericsson WTA Tour reviewed the top players' schedules and found that the players' optimal schedule of play is 3 continuous weeks maximum for injury prevention (both dealing with physical and psychological stressors) and peak performance.

## Stroke Mechanics

- Many injury conditions are linked to stroke mechanics, such as: the two handed backhand with some wrists conditions; the open stance forehand leading to increased torque and stress on the Sacroiliac and Lumbar regions; improper serve mechanics that fails to use correct kinetic chain sequencing, more commonly seen in female players (pulling through versus push through sequencing) which contributes to injury.

## Stability, Muscle Imbalances, Flexibility Factors

- The link has been made between many of the injury patterns and occurrences we see on Sony Ericsson WTA Tour with decreased core and scapular stability.
- Muscle imbalances can contribute to both poor dynamic stability control, stress and strain on joints and muscles and poor tennis technique and mechanics. All of these factors can in turn cause injuries.
- Flexibility factors (too much or too little relative flexibility of muscle, joint or nerve structures) at a global (body region) or local (specific joint) level can also contribute to improper muscle and joint function and poor tennis technique and will contribute to injury.

## Adolescent Growth and Development Factors

- Younger players are vulnerable to injuries due to overload on immature tissues and still developing adolescent musculoskeletal systems.
- Growing adolescent tissues are uniquely vulnerable with injuries to the growth plates of long bones, avulsion fractures (when a tendon injury causes its bony attachment to be broken away) and traction apophysitis (where tendon loading causes an inflammation at the bony attachment e.g. at the patella or Achilles tendon).
- Training load and overall "dose of tennis" needs to be closely monitored and recovery strategies taught and implemented with younger players to protect their growing tissues from injury.

## Female Athlete Factors

- Young female players are vulnerable to the Female Athlete Triad, a recognised trio of interlinked problems: disordered eating, amenorrhea (the absence of menstrual periods) and osteoporosis (low bone density).
- The Triad has unfortunate and sometimes tragic consequences, which include decreased performance, stress fractures, physical and psychological problems.
- The ultimate cause of the Triad is the pressure on young women to be unrealistically thin. The unprecedented amount of media attention placed upon the young women in the professional tennis world contributes to the pressure many of these young competitors feel about their appearance, at a time when their bodies are undergoing the rapid growth and changes associated with normal adolescent development.

Many of these factors are relevant to ALL levels of tennis, and most are preventable. The SS&M Department has a pro-active philosophy that aims to enhance prevention of injuries and when injuries do occur, encourages early expert care and intervention to maximise recovery and swift return to play. This philosophy can be applied to working with tennis players at any level.

## STRATEGIES TO PREVENT INJURY AND MAXIMISE CHANCE OF HEALTHY PLAYER PARTICIPATION

The Professional Development and SS&M Departments' philosophy is to treat the total athlete. The purpose of the Departments is to promote career longevity and fulfilment and to minimise the physical, psychological and developmental risks of women's professional tennis. The Sony Ericsson WTA Tour has many programs that aim to achieve this purpose (Table 2):

Health Care	Player Education & Health Promotion	Player Team Education
On-site health care services (the PHCPs, MTs, PD staff and Advisor network)	Player Orientation	Agent Registration
Annual Medical Physical Examination	Age Eligibility Rule (AER)	Coach Orientation
Biomechanical Services	Partners for Success (mentor program)	Coach Registration
Therapeutic Exercise	Career Development	Parent Orientation
Athlete Assistance (counselling program)	Media training	
Physically Speaking health topics	Physically Speaking health topics	Physically Speaking health topics

*Table 2: SS&M and Professional Development Initiatives*



Easy access to the expert provision and services of the SS&M and Professional Development department in preventing injury, burnout and facilitating on-court player participation is critically important on the Sony Ericsson WTA Tour. During the Ten-Year AER and Professional Development Review (2004) the players ranked this service as their greatest support system on Tour. They specifically mentioned the injury care, stress mediation, education and prevention role of the Departments. Together, these programs have decreased burnout from 7% to less than 1% since 1994.

## **FUTURE PROJECTS AND DIRECTION**

To minimise the stressors on young players and to promote their professional and personal growth, success and well being is an ongoing commitment of the Sony Ericsson WTA Tour and should be priority for all professional tennis organisations, National Tennis Associations and coaches worldwide. Some "One Game" initiatives that are being conducted by the ITF, ATP and Sony Ericsson WTA Tours include:

- An Introduction to Professional Tennis- an interactive education forum for junior players, their parents and coaches held annually during Wimbledon.
- Coach Education Symposium- an interactive education forum for professional coaches held annually during the US Open.
- Annual Medical Physical Examinations- joint physicals proposed for ATP and Sony Ericsson WTA Tour players from 2006. A comprehensive medical & musculoskeletal examination assists to: prevent & detect career-interrupting injuries & illnesses; enhance performance; educate players and contribute towards off season planning, training and conditioning.

## **APPLICATION FOR COACHES AT THE WORLD WIDE COACHES WORKSHOP**

Coaches cannot produce champions if their players are not healthy. Coaches can use the Sony Ericsson WTA Tour as a model for health delivery programs and take away specific aspects and apply these to their own clubs and Associations. Access to qualified personnel and resources will vary enormously between Associations, regions and countries. Implementation and application of these principles will necessarily vary. The following is recommended as a minimum:

- Attend these conferences so you keep your skills up to date and apply the latest information about proper training and technique with your squads. Share this information with your colleagues upon your return home. (You have already achieved success here!)
- Begin a basic health education program targeting your players and their parents. Keep it simple. Use the resources you can find on the ITF website. Essential components include:
  1. The use of PRICER (prevention, rest, ice, compression, elevation, refer to health practitioner) if a player has an acute injury.
  2. Teach and foster appropriate parenting behaviours. The qualities of a healthy tennis parent- child relationship is described in the ITF publication, "Being a Better Tennis Parent"



3. Periodisation principles: teach your squads about the appropriate activities for in-competition, out of competition and pre-season weeks. Encourage sensible travel schedules for teams that allows for adequate rest, recovery and acclimatisation to other time zones and climates.
  4. Teach and apply the principles of proper recovery.
  5. Attention to proper nutrition and hydration and availability of proper hydration during all practice sessions, off-court training and matches.
- Start some health screening. Ideally have a sports physiotherapy and medical assessment of each player. Then individual targeted strength, stability and flexibility programs can be designed to help each player remain injury free and maximise his/her physical skills and on-court abilities.
  - Hook-up with a trusted sports medicine and physiotherapy clinic that you can refer your players to for when they do sustain injuries. Develop a relationship with these people so you can use them as a resource to help you with your on-court program.