

GROWING PAINS

Did You Know...

You can still be physically growing into your young adult (early 20s) years?

Tennis players, whose bodies are still growing are at risk of unique injuries associated with physical growth and overuse injuries?

If you are the owner of an athletic body that is still growing; your training or doubles partner is still maturing; or if you are the parent, coach, or fitness trainer of a young growing tennis player, then you need to pay attention to some important guidelines to help prevent injuries associated with this life stage.



Musculoskeletal Growth

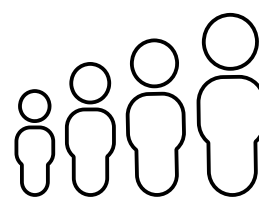
A wrist x-ray can determine if you are still growing. If the growth (epiphyseal) plate (cartilage that promotes bone maturation located at the end of the bones) is still visible, it means your skeleton is still growing. When you stop growing, the growth plate closes and is replaced by solid bone. The growth process relating to bone length stops in early adulthood (your early 20s) while bone thickness may continue to increase in response to muscle activity and participation in sports.

Your bone growth is influenced by a number of factors:



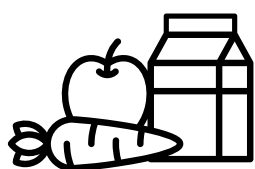
Genes

- The biological code material you inherit from your parents. You are genetically programmed to become a certain height, size, and shape.



Hormones

- Growth hormone (from the pituitary gland), thyroxin (from the thyroid gland), and the reproductive or sex hormones (androgens & estrogens), all stimulate human growth.



Nutrition

- Poor dietary habits, restrictive eating practices, and disordered eating are major factors that contribute to reduced growth and delayed skeletal maturation.



Training Load

- Intense training can delay skeletal maturation in some female athletes, especially when combined with poor nutritional practices (read the section on the next page on Female Athlete Triad).

Over-training in frequency and/or intensity, such as practicing twice a day before the player is 12 years can:

- Cause irreversible (lifelong) damage.
- Close growth plates early and result in decreased adult size.
- Contribute to injuries later on during the player's professional career.

Growth Hot Spots

The risk of injury for young athletes is related to many factors, listed in this topic. Specific factors related to immature tissues of the musculoskeletal system include:

- The growth cartilage, a type of dense connective tissue, is at higher risk of injury with repetitive stress and load. This special cartilage is found at the growth plate, the cartilage inside joints, and at sites where a tendon attaches to a bone (called apophyses).
- With the rapid change in bone length, there may be a mismatch between the bone length and that of the muscle-tendon unit. Joint tightness can develop when bones lengthen faster than the muscle-tendon units, creating a relative lack of flexibility and muscle imbalances, which can lead to injury.
- Increased load and force at the apophyses can also cause injuries in the young player especially at the knee, ankle, and elbow.

Grow Up Strong! Other Contributing Factors

Overuse Injuries

- Common in young athletes. Studies indicate that up to 60% of injuries sustained during adolescence (between 12 and 24 years old) relate to overuse.
- These injuries happen when the tissue is repeatedly, and gradually loaded.
- Fatigue of the loaded tissue (e.g. muscle, tendon, or bone) occurs.
- Without adequate recovery time to allow tissues to adapt between training sessions, this causes trauma that increases over time, eventually resulting in tissue breakdown and injury.

Biomechanics

- Body alignment and muscle imbalances are common in tennis players due to the repeated use of some muscles and the one-sided loading that occurs in tennis strokes. They can lead to tennis injuries for ANY player.
- You can correct alignment problems with improved postural control and dynamic stability.
- Health care providers can help you with corrective and preventative exercise programs.
- When appropriate health care providers can recommend using tape or devices like orthotics to improve alignment.

Psychology

- Pressure from others, especially adults leading the training process such as parents, coaches, and fitness trainers, plays a critical role and can lead to injuries.
- Excessive intensity and "no pain, no gain" and/or "win at all costs" philosophies are very detrimental to health.
- Expecting players to value winning over the joy of competing can be physically and emotionally abusive and contributes to injuries.

Training Load

- Varying intensity, frequency, and length of training sessions all help performance.
- So do REST and Recovery. Sudden increases in training without proper rest and recovery will cause injury.
- Young athletes require individual programs due to vast differences in physical, mental, and emotional maturity.

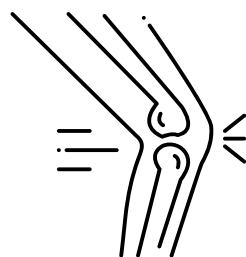
Common Growth Injuries

The Female Athlete Triad (also known as Relative Energy Deficiency in Sport)

- Is a group of three interrelated medical conditions often observed in physically active females and includes:
 - low energy availability with or without disordered eating,
 - menstrual dysfunction.
 - low bone mineral density.

Stress Fractures

- Younger players are at increased risk of stress fractures if they have the female athlete triad and due to excess training loads without adequate recovery which damages growing bones.



Osteochondritis Dessecans

- This is a lesion of the cartilage in the joint (commonly seen at the knee, elbow, and ankle) that relates to repetitive training. This condition is difficult to treat and very slow to heal, requiring many months of rest. Sometimes you need surgery to heal the joint. Any persistent pain at the joints should be promptly evaluated by your doctor.



Traction Apophysitis

- Caused by the overload stress where tendons attach to bones. Usually found at the attachment of the patella tendon into the bone below the knee cap (known as Osgood Schlatter's Disease) and the Achilles tendon into the heel (called Sever's Disease).

Avulsion Fractures

- These bone breaks occur from large traction forces caused by a sudden, forceful muscle contraction. The most common site is at the hamstring insertion at the ischial tuberosity (the bone you sit on).

Tendinopathies

- Overuse injuries of the tendons can occur at any age. Improper training load and technique combined with inadequate rest and recovery is the most common cause. The young player's risk increased with the muscle imbalances that occur during growth spurts and if she follows training techniques and intensity suitable for physically mature players.

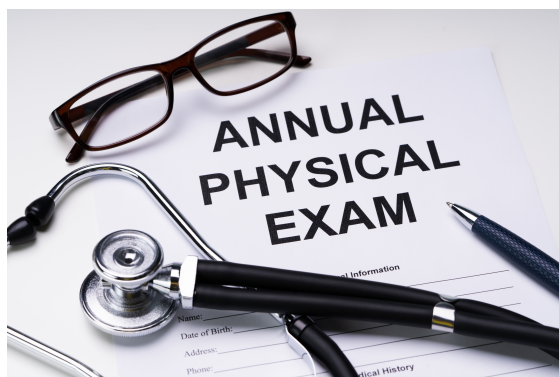
Triangular Fibrocartilage Injuries

- The two-handed backhand stroke causes an increased load on this cartilage structure in the wrist joint on the non-playing side. This can affect players at any age, with poor technique or excess play often the cause. If you experience wrist pain, get help quickly; these can be slow to heal and may need surgery.

Prevention

Prevention of injuries is important for the long-term physical and tennis development of young players. Start good health habits early and prevent career interrupting injuries at any stage of your career. Some basic principles might include:

- **Annual physical:** identifies risk areas.
- Gradually increasing **training load:** The "10% Rule" = Total training (amount, time, and intensity) to increase slowly by 10% over time.
- **Periodize:** lighter training during rapid growth.
- **Intensity of training:** young players (under 24) cannot cope with the same intensity as mature adults.



Thanks to Rogério Teixeira Silva, MD | Federal University of Sao Paulo, Brazil, Orthopedics & Sports Medicine | Chief Medical Officer, Brazilian Tennis Federation

The information provided within this "Growing Pains" topic is for informational purposes only and should not be treated as medical, psychiatric, psychological, health care or health management advice. If you have my health or related questions or concerns, please consult your physician or other qualified health care professional.