

The Young Athlete



Injury and Performance Perspectives Peter Georgilopoulos

Peter Georgilopoulos is an APA Sports Physiotherapist currently working out of his private practice on the Gold Coast. He has had numerous involvement with sporting organisations but most notable appointments were with the Australian Olympic Team in Sydney and the Socceroos from 1990 – 2000. In this article, Peter discusses the importance of Screening and what coaches can gain from this procedure.

The increasing trend towards childhood obesity linked to poor nutrition and inactivity is well documented and is regrettably, a rapidly escalating statistic in Australia.

What is generally overlooked however, is the widening chasm between the increasingly inactive majority and the elite minority of children and adolescents who are performing increasingly more intense training and competitive loads to achieve ever higher performance standards.

Performance benchmarks are constantly creeping upward and as a consequence, so are the training and competition demands that need to be met to satisfy these targets. Anecdotal evidence exists to suggest gradual anthropometric increases over time in young athletes in terms of height, body mass and muscularity.

Girls achieve physical maturity generally much earlier than boys with many 15 year olds very capably competing with senior female athletes. By comparison, boys tend to develop later than girls and are generally not considered capable of competing with senior men until 19 or 20 years of age. The degree of muscular development that continues beyond skeletal maturity in males often precludes young male athletes from being competitive with senior males in events requiring power. Even so, just as senior athletes continue to push performance and training boundaries, so do their junior counterparts. The dilemma that this poses for the young athlete is that skeletally they are still undergoing growth with the resultant nutritional and coordination issues that this entails. Growth plates can become dislodged or fuse earlier than the normal maturation process would allow and, most commonly, the insertional points of powerful muscular groups such as the hamstrings, quadriceps and calves can cause traction trauma to immature bone leading to common conditions such as Scheuermann's and Sever's disease, Osgood Schlatter's and Ischial apophysitis amongst others.

Performance Considerations in growing athletes

An often poorly identified consequence of growth spurts in young athletes is the effect on athletic performance. Effectively, the increase in limb length leads to altered biomechanics and a disparity between previously rehearsed movement patterns

and the ability to move the "new" frame within engrained movement patterns and timing.

Growth spurts can pose significant problems to the developing athlete who often struggles to understand why, despite intense training and preparation, performance levels often plummet. The athlete may appear uncoordinated and stumble on movements or tasks that were previously easily performed. Even if movement is not impaired, the apprehension and uncertainty associated with any given task may divert the athlete's focus from "bigger picture" issues such as race tactics to so simpler issues such as foot placement, arm movement or clearing obstacles such as hurdles.

Often the athlete's response is to become frustrated and they may question their true ability especially when a ranking system shows them on a gradual decline. A common response is to increase the speed or intensity of training which under the circumstances poses some risk of worsening their transient inefficiencies to a greater degree whereas a return to simpler training drills may offer a more effective solution to re-educating optimal movement patterns.

Simply being aware that growth spurts issues do exist may help calm turbulent waters when such issues arise and may often be the difference between athletes persevering or walking away from their sport in frustration.

It is important to understand that previous efficiency in movement will return in due course with the added benefits afforded by size and muscularity increases.

A brief overview of musculoskeletal conditions specific to developing athletes

The following list is by no means exhaustive but may offer some insight for coaches and parents who are often the first contact for young athletes.

Scheuermann's disease:

Poorly named as this is NOT a disease but a set of musculoskeletal signs and symptoms centred on the thoraco-lumbar spine (mid – to lower back) affecting between 5%-10% of the adolescent population.

The condition is characterised by an increasingly “slouched” or rounded mid back posture, tightness in the muscles of the chest (pec major predominately) giving the appearance of a “sunken chest” and associated hamstring tightness.

The athlete can often compete without limitations but reports an exacerbated dull ache in the mid to lower back following intense activity which usually resolves within 24-48 hours.

The condition may continue throughout the athlete’s formative years but ceases to be active in adulthood. Erosive changes of the thoracic vertebrae may result in a “wedged” appearance on x-ray (compared to the normal “rectangular” presentation) and can result in permanent postural changes in adulthood.

Management consists of undertaking thoracic spine extension exercises (arching backwards), managing the inflammatory reaction when it occurs using spinal mobilisation through regular physiotherapy and maintaining hamstring flexibility.

Minimising joint impact through supportive footwear and avoiding hard running surfaces may also help.

Osgood Schlatter’s Disease

A debilitating and common condition (not a disease as suggested by the name) affecting many young runners. The condition involves the secondary growth plate of the tibia (shin bone) at the attachment point of the quadriceps tendon just below the kneecap.

The traction or pulling force of the tendon results in an inflammatory condition at the attachment point which can, in the worst case scenario, cause the attachment point (tibial tubercle) to become dislodged (avulsed) from the tibia. The underlying cause is undoubtedly the malleability of developing bone unable to withstand the forces applied by ever increasing quadriceps strength.

The condition is often unilateral bringing to the question why the other limb is not also similarly affected. Common reasons are:

- Unilateral hamstring tightness: in the swing through phase of sprinting in which the knee is extended before the foot strikes the ground, the lack of posterior thigh flexibility requires the quadriceps to pull with greater force on that affected side. The posterior restriction imitates similar forces that would result from performing resisted knee extension exercises in a gym repeatedly, which coincidentally is a strengthening exercise that should not be undertaken in the presence of this inflammatory condition.
- Direct trauma to the point of the knee such as surf life saving competitors who kneel on surf boards as part of their competition requirement.
- Asymmetrical foot biomechanics. An excessively pronated (flat footed) posture on one side which in turn leads to

questions of whether there is excessive internal rotation occurring at either hip joint due to a tight psoas major muscle (a strong hip flexor and internal rotator of the hip) or true leg length discrepancy (although this is far less common than popularly believed). Excessive foot pronation alters the entire lower limb biomechanics by transferring the weight bearing forces away from the midline position. A transference of weight bearing to the inner aspect of the foreleg is one factor that may be responsible for the onset of Osgood Schlatter’s as well as other conditions such as patella-femoral syndrome (pain behind the knee caps), ITB friction syndrome as the ITB effectively stretches on flattening of the foot and internal rotation of the hip and stress fractures of the foreleg and foot.

Ischial apophysitis

This term describes trauma to the upper attachment of the hamstring muscle group in which the tendon connecting the muscle to the ischium located at the inferior aspect of the gluteals (buttocks) partially, or entirely, pulls away from the bone.

Whereas an adult athlete may incur a tear of the hamstring within the muscle belly, an adolescent athlete is more likely to suffer trauma to the bony attachment.

Another common site for similar trauma to a bony attachment of a muscle is located anteriorly on the pelvis, just above the hip joint, in which a part of the quadriceps muscle group (the rectus femoris) can be dislodged.

Sever’s Lesion

An inflammatory condition affecting the attachment point of the achilles tendon to the calcaneus (heel bone). There are similarities to Osgood Schlatter’s in that both conditions involve excessive traction force in associated muscle-tendon units, in this case the calf muscle.

Deformation often occurs on the bony attachment resulting in a visible, painful swelling. Identifying the underlying reasons for calf tightness and undertaking appropriate intervention procedures as well as treating the inflammatory process provides the best chance of a successful outcome.

Growth Plate Lesions

Disturbances of growth plates are characteristic of the developing athlete and can have devastating long term consequences if mismanaged. Appropriate investigation and management is paramount in achieving an optimal result. Although clearance tests and investigations may be undertaken whenever joint trauma is suspected as a matter of course, it is important to note that these lesions are relatively rare.

Overall, the rule of thumb of injuries to children and adolescents is an “all or nothing” affair – a fall or tackle

which may incapacitate an adult can often be “brushed off” by a child commonly, whereas on the other side of the coin, developing bones can be subject to serious injury (especially to growth plates) through similar traumatic events.

Guidelines for Parents & Coaches:

1. Ideally, pre-participation screening of children would potentially identify possible future problems. Musculoskeletal screening can be undertaken by sports physiotherapists and sports physicians.
2. Most sports bodies require adequate medical/first aid coverage at competition venues. Ask for assistance in case of injury.
3. Continuing education for Coaches. Greater understanding of juvenile development and possible medical, musculoskeletal and psycho-social issues can prevent many young athletes breaking down, failing to perform and ultimately leaving their allocated sport.
4. A child’s overall development takes precedence over possible injury that may result from specific training or competition demands.
5. Obtain professional advice regarding appropriate footwear and orthotics where applicable.
6. Understand that growth spurts can have a significant impact on performance and energy levels as well as body image. Be prepared to take a step back occasionally in terms of training with the view of returning to higher than normal standards once these issues have resolved.

