



# 32<sup>nd</sup> INTERNATIONAL PAK ORTHOCON 2018



Extending Standard Musculoskeletal Care to Less Privileged Areas

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# CHILDREN ARE NOT LITTLE ADULTS

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# CHILDREN ARE NOT LITTLE ADULTS

## Disclosure

Consultant for Lima  
Consultant for Arthrex EMEA  
Consultant for Lavander Medical  
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# CHILDREN ARE NOT LITTLE ADULTS

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Giotto, National Gallery, Washington DC



Raphael, National Gallery of Art, Washington, DC

They have big heads, long trunks and short limbs, as seen in this "Madonna and Child" by Raphael



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# CHILDREN ARE NOT LITTLE ADULTS

## CHILDREN | ADOLESCENTS DO NOT RECOGNIZE DANGER

Pre-ambulatory children are unable to remove themselves from danger

Pre-reading children cannot read warning signs & labels

Pre-adolescent | adolescent children may take unreasonable risks due to cognitive immaturity and "risk-taking" behaviours





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## CHILDREN ARE NOT LITTLE ADULTS

The **participation** of children and adolescents in sports is becoming increasingly **common**, and this increased involvement raises concerns about the occurrence of sports injuries.

It is estimated that **30 to 45 million individuals** between **six and 18** years of age participate in sports.





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## CHILDREN ARE NOT LITTLE ADULTS

Ironically, the combination of **early specialization**, playing on **multiple teams** during the same season, **marathon weekend** travel tournaments, and **year-round participation**, is unlikely to achieve the desired outcome: elite athletes who get accepted for college scholarships and professional careers.





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# CHILDREN ARE NOT LITTLE ADULTS

Quite the contrary, there is **evidence** demonstrating that kids who play **multiple sports** while they're young and wait to **specialize** until the early **teenage** years are actually **better** athletes.





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## CHILDREN ARE NOT LITTLE ADULTS

Young athletes, as with all athletes involved in organized sports, are subject to two basic types of injuries.

Acute injuries are the result of **single-impact macro trauma**.





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## CHILDREN ARE NOT LITTLE ADULTS

The spectrum of macro trauma sustained by young athletes includes fractures, ligament sprains, musculotendinous strains, and soft tissue contusions





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## CHILDREN ARE NOT LITTLE ADULTS

Overuse injuries in sports-active children are divided into four broad categories and include stress fractures, tendinitis and traction apophysitis of tendon insertions, bursitis, and joint disorders



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## CHILDREN ARE NOT LITTLE ADULTS

The early management of these injuries is governed by the **principles** of general paediatric orthopaedic **trauma**.

Complete rehabilitation, however, requires the restoration of both strength and range of movement and has as its goal the expedient but safe return to athletic competition.

Central to this is the concept of '**relative rest**'.



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# Differences in Child and Adult Athletes

## Children Are Still Growing

The young athlete is not a smaller version of an adult. Children's bones, muscles, tendons, and ligaments are still growing, making them more susceptible to injury.

In addition, there are **significant differences** in **coordination**, **strength**, and **stamina** between children and adults.





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## Differences in Child and Adult Athletes

### Children Vary in Size and Maturity

Young athletes of the same age can differ greatly in size and physical maturity.

Grade school students are less likely to experience severe injuries during athletic activities because they are smaller and slower than older athletes.

High school athletes, however, are bigger, faster, stronger, and capable of delivering tremendous forces in contact sports.





# Differences in Child and Adult Athletes

## Children Can Injure Growth Plates

A twisted ankle that might result in a sprain in an adult, could result in a more serious growth plate fracture in a young athlete. Growth plate injuries have the potential to disrupt the normal growth of bone.





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## Acute injuries

Tendons and **ligaments** are relatively **stronger** than the **epiphyseal plate**, and considerably more **elastic**.

Therefore, in severe trauma, the epiphyseal plate, being weaker than the ligaments, gives way. Subsequently, growth plate damage is more common than ligamentous injury (Micheli, 1983; Krueger-Franke et al., 1992; Klenerman, 1994; Stanish, 1995; Maffulli and Baxter-Jones, 1995).





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## Acute injuries

In children, **bones** and **muscles** show increased **elasticity** and **heal** faster (Ogden, 1982; Rang, 1983; Maffulli and Baxter-Jones, 1995; Stanish, 1995)





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## Common injuries

Dislocations

Fractures

Epiphyseal injuries

Avulsion fractures

Soft tissue injuries



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## Dislocations

### Gleno-humeral

Dislocation is **uncommon** prior to closure of the growth plate, as the growth plate is the weakest area in the event of a fall.

Dislocations in adolescents are typically traumatic but **multiaxial instability** must be excluded





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## Dislocations

### Gleno-humeral





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## Dislocations

### Elbow

Dislocation of the elbow is common in gymnastics and football. It can be associated with fractures of the medial epicondyle of the humerus, fractures of the neck of the radius, or injury to the median or ulnar nerve.





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## Dislocations

### Elbow



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## Dislocations

### Patella

Patellar subluxation or dislocation occurs in one in 1000 children aged between nine and 15 years (Manziona et al., 1983). A common cause is a twisting injury, when the femur is twisted medially with the foot planted on the ground, or direct trauma.





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## Dislocations

### Patella



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## Fractures

### Clavicle



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## Fractures

### Humerus





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## Fractures

### Radius & Ulna





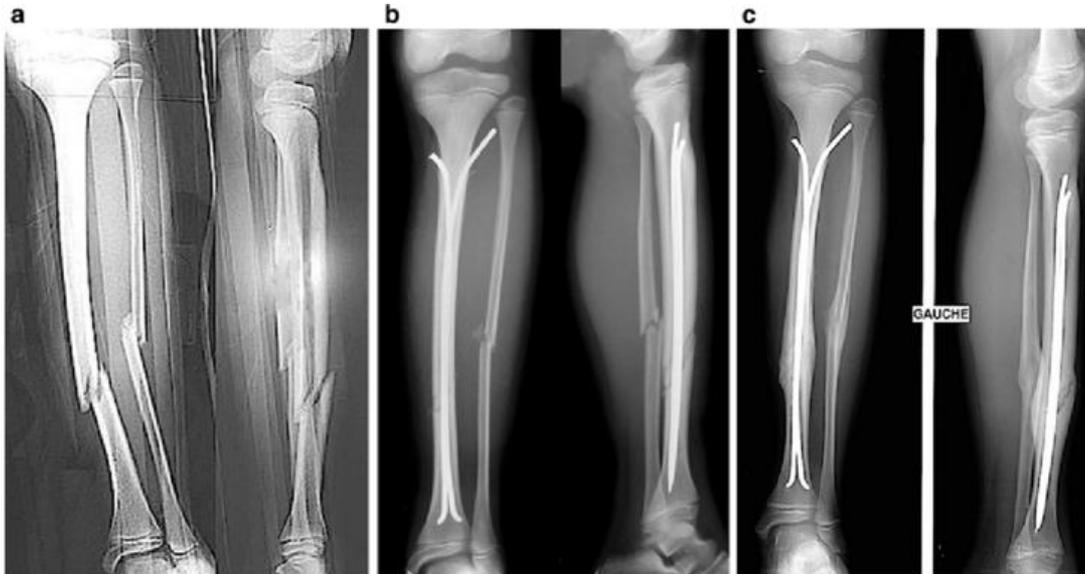
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## Fractures

### Tibia





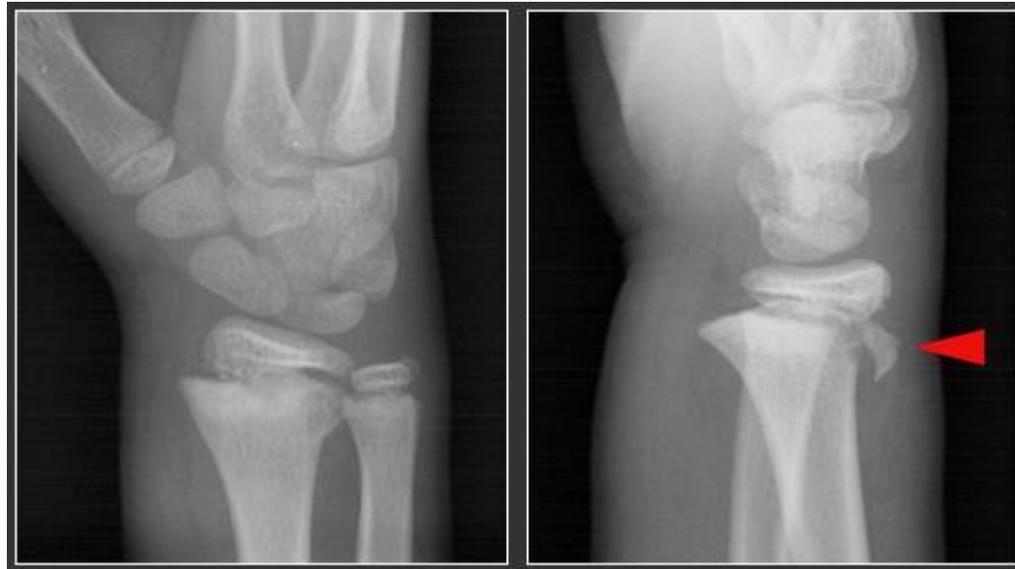
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## Epiphyseal injuries

### Wrist



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## Epiphyseal injuries

### Proximal Tibia



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## Epiphyseal injuries

### Ankle



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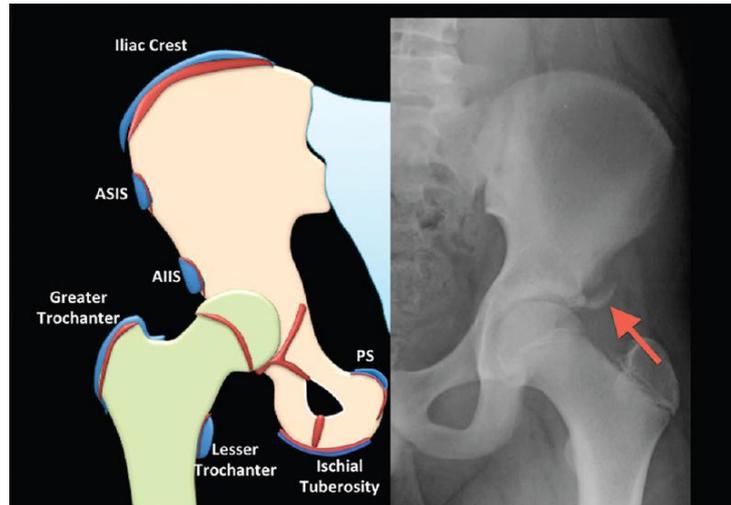
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## Avulsion fractures

### Lesions around hip





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## Avulsion fractures

### Lesions around Knee



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## Soft tissue injuries

### Quads Contusion





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## Soft tissue injuries

### Ankle Sprain





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## Soft tissue injuries

### ACL



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## Prevention

There are several strategies that coaches, parents, and athletes can follow to **help prevent sports injuries**.

Most importantly, athletes should:

Be in proper **physical condition** to play a sport (a pre-participation sports physical examinations can be very useful in screening for potential problems)

Know and **abide** by the **rules** of a sport





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## Prevention

Wear appropriate **protective gear** (for example, shin guards for soccer, a hard-shell helmet when facing a baseball pitcher, a helmet and body padding for ice hockey)

Know how to **correctly use** athletic **equipment**

Always **warm up** before playing

Stay **hydrated**

**Avoid playing** when very **tired** or in **pain**





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## Special Considerations

### Female Athlete

"female athlete triad."  
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Menstrual dysfunction  
Fragile bones

### Steroids

### Supplements





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