

# *The Medico-Legal Risks of Missed Paediatric Orthopaedic Injuries:* A Practical Guide for Legal Professionals

This guide distils the specialist orthopaedic insight from the webinar into actionable, solicitor-focused advice. It will help you:

- Recognise clinical red flags in medical records that suggest possible negligence.
- Understand how injury location, fracture type, and timing influence long-term outcomes.
- Identify the importance of timely referral and specialist follow-up in preventing severe consequences.
- Work more effectively with expert witnesses to establish breach, causation, and quantum.

By combining medical understanding with medico-legal awareness, you will be better equipped to assess the viability of claims, anticipate potential defences, and maximise the chances of a successful outcome for your clients.

*This eBook was produced by INNEG based on key clinical insights shared during our Paediatric Orthopaedic Trauma: Missed Injuries and Medico-Legal Risks webinar, led by Mr Max Mifsud, Consultant Orthopaedic Surgeon.*

# Introduction

Growth plate injuries are among the most common fractures in children, accounting for around 15% of fractures in those under the age of 16. The growth plate - a relatively weak area of developing cartilage at the ends of long bones - is vital to a child's future limb length, shape, and function. In most cases, if correctly diagnosed and treated, these injuries heal without lasting consequences.

However, when a growth plate injury is missed or mismanaged, the results can be life-changing. Damage to the growth plate can cause growth arrest, where the bone stops growing normally. This can lead to leg length discrepancies, angular deformities, abnormal joint mechanics, early arthritis, reduced mobility, and the need for multiple corrective surgeries throughout childhood and adolescence. In some cases, the impact extends beyond the physical - affecting a child's ability to participate in sports, influencing career options, and even leading to psychosocial challenges such as bullying.

From a legal perspective, these cases often carry significant claim value. Yet, they are also medically and evidentially complex. Proving negligence requires clear differentiation between the harm caused by the original injury and that caused by delayed diagnosis, inadequate treatment, or poor follow-up. Causation can be particularly challenging, as growth arrest may occur even when care is delivered appropriately.

The transcript from this expert-led session emphasises that breach of duty most commonly arises not from the initial injury management, but from missed follow-up and failure to recognise ongoing risk. Errors such as failing to obtain or interpret the correct imaging, omitting key clinical notes about growth plate involvement, or not referring a high-risk injury for paediatric orthopaedic review can all set a case on a path towards litigation.

# Understanding Growth Plate Injuries

The growth plate, or physis, is a specialised area of cartilage located near the ends of long bones in children and adolescents. Unlike adult bone, which has finished growing, a child's bones continue to develop in both length and shape throughout childhood. This growth takes place at the growth plate.

Because the growth plate is structurally weaker than surrounding bone and soft tissue, it is particularly vulnerable to injury during trauma. While many growth plate injuries heal without long term problems, others can permanently disrupt bone development if the injury is missed, poorly monitored, or inadequately treated.

From a medico legal perspective, growth plate

injuries are important because the full consequences may not become apparent until months or even years after the original incident. A child may initially appear to recover well, only to later develop growth arrest, angular deformity, leg length discrepancy, or abnormal joint mechanics as they continue to grow.



This delayed presentation can create significant evidential challenges within claims, particularly when determining whether earlier diagnosis, referral, imaging, or follow up could have altered the eventual outcome.

The growth plate itself contains different zones responsible for bone development, including:

- Hypertrophic zone - where cartilage cells enlarge and are more vulnerable to displacement during injury
- Germinal zone - responsible for producing new growth cells

Damage to either area can interfere with normal growth and increase the risk of long term orthopaedic complications.



# Why Growth Plate Injuries Matter in Claims

From a medico-legal standpoint, growth plate injuries present significant long-term risks.

Damage to this region can lead to:

- Growth arrest - premature closure of the physis, halting normal bone development.
- Angular deformities - when one side of the growth plate stops growing, causing the limb to bend or rotate abnormally.
- Leg length discrepancies - when one limb grows more slowly than the other, leading to gait abnormalities and pelvic tilt.
- Functional impairment - reduced range of motion, altered joint loading, and early-onset arthritis.

Even with correct initial management, some injuries

carry a high risk of these outcomes. Where delays in diagnosis, poor treatment technique, or inadequate follow-up occur, the likelihood - and the severity - of these consequences increases. These sequelae can have lifelong effects, which often translate into substantial claims for damages, including future care, loss of earnings, and pain and suffering.

## Common Injury Sites

Growth plates are located throughout the body, but some sites are more vulnerable to injury and more likely to cause serious long-term effects:

- Wrist (distal radius) - one of the most common sites due to frequent falls onto outstretched hands.

- Ankle (distal tibia) - particularly at risk in high-impact or twisting injuries.

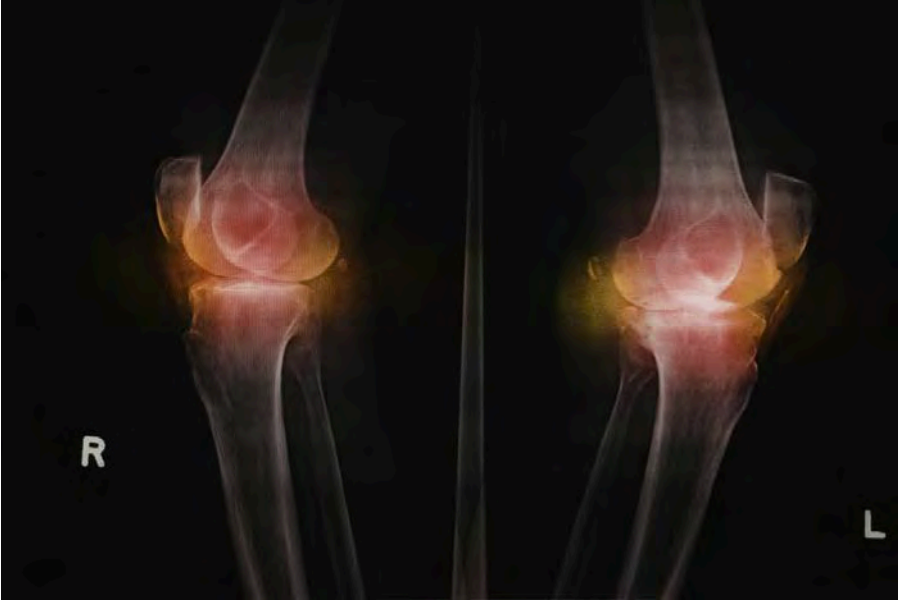
- Knee region -  
Distal femur (just above the knee) - rare to injure, but if damaged, carries one of the highest risks of growth arrest.

- Proximal tibia (just below the knee) - similarly high-risk.

The contribution of each growth plate to limb length is also important.

- Shoulder and wrist growth plates contribute around 80% of arm growth.
- Knee growth plates contribute the majority of leg growth.

This means damage at certain sites can have far greater long-term implications than others.



## Typical Causes and High Risk Mechanisms

Growth plate injuries most commonly occur during high energy or high impact trauma.

While some injuries are relatively straightforward, others carry a significantly higher risk of long term growth disturbance and future medico legal complications.

Mechanisms commonly associated with growth plate injury include:

- Falls from height - particularly trampoline injuries, climbing frames and monkey bars
- Road traffic collisions - especially pedestrian versus vehicle incidents, where the limb may be fixed against the ground during impact
- High impact sport - including contact sport, gymnastics and skateboarding
- Twisting injuries - particularly around the ankle and knee

- Non accidental injury (NAI) - certain severe or unusual fracture patterns may raise safeguarding concerns

The mechanism of injury can provide important insight into the likely severity of growth plate damage. High energy injuries are more likely to result in complex fractures, growth arrest, deformity, and the need for surgical intervention.

From a legal perspective, the mechanism of injury may also influence whether specialist referral, advanced imaging, or long term follow up should reasonably have been arranged. Cases involving high energy trauma often attract closer scrutiny where follow up was limited or growth disturbance was not identified until much later.

# The Medico-Legal Risks

## Duty of Care

In paediatric orthopaedic cases, the duty of care is automatically established through the doctor-patient relationship. The key legal question is whether the care met the standard expected of a reasonably competent practitioner, assessed using the Bolam test (as refined in later case law).

In the context of growth plate injuries, the expected standard in most paediatric orthopaedic practices is clear: if there is any injury involving or near the growth plate - whether caused by trauma, infection, or other pathology - the child should be followed up for months, and often years, to monitor for growth arrest or deformity. Failure to arrange such follow-up can fall below the expected standard of care.

## Breach of Duty in Growth Plate Cases

Breach of duty typically arises in two main scenarios:

- Mismanaged injuries at the outset - where the initial treatment was inappropriate or harmful.
- Missed injuries or inadequate monitoring - where a child was not recognised as being at risk and therefore not followed up appropriately.

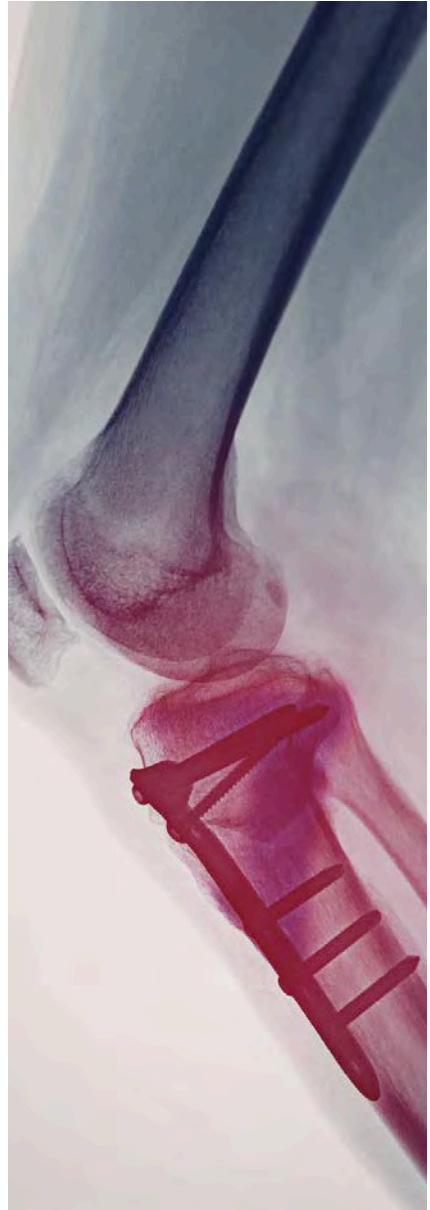
Examples include:

- Missed initial diagnosis - often due to incorrect interpretation of X-rays, especially subtle Salter-Harris fractures or early signs of growth plate disturbance.
- Failure to identify high-risk growth plate involvement - for example, injuries to the distal femur or proximal tibia,

which are known to have a higher risk of growth arrest.

- Inadequate or absent follow-up - discharging a patient without repeat imaging or growth monitoring despite a known high-risk injury.
- Delayed surgical intervention - postponing reduction or fixation beyond 7–10 days after injury can make correction more forceful, increasing the risk of further growth plate damage.
- Poor surgical technique - such as unnecessarily placing screws across the physis or using excessive force during reduction, compounding the initial injury.

These breaches often set the wrong tone for the remainder of treatment: if the initial risk is not recognised, the follow-up is unlikely to be adequate, increasing the chance of preventable long-term harm.



## Causation Challenges

Causation is often one of the most complex aspects of paediatric growth plate injury claims. A poor long term outcome does not automatically mean negligent care occurred. Certain injuries carry an inherent risk of growth arrest even when treated appropriately.

The key medico legal question is whether delayed diagnosis, inadequate treatment, poor follow up, or surgical decisions materially worsened the eventual outcome.

Solicitors must often work with expert witnesses to separate:

1. Harm caused by the original injury itself
2. Harm caused or worsened by substandard management

For example, a high energy Salter Harris IV fracture around the knee may still result in growth arrest despite appropriate

treatment. In these cases, the focus becomes whether earlier recognition, closer monitoring, or different intervention could reasonably have reduced the severity of deformity or prevented additional complications.

Establishing causation frequently requires detailed review of:

- Initial imaging and radiology interpretation
- Timing of referral and intervention
- Follow up frequency and duration
- Evidence of early growth disturbance
- The expected growth pattern of the affected bone

In many claims, the central issue is not proving that a poor outcome occurred, but demonstrating that the outcome could reasonably have been reduced or avoided had accepted standards of care been followed.

# Red Flags for Solicitors

When assessing a potential growth plate injury claim, solicitors should review the medical records and imaging reports with a critical eye. Certain omissions, delays, or lack of detail can indicate possible breaches of duty or missed opportunities to prevent long-term harm.

No mention of the growth plate in initial A&E or fracture clinic notes.

If the notes from the emergency department or first orthopaedic review make no reference to the growth plate, this can be a serious concern - especially in cases where the injury is near a joint in a child. Even if the clinician suspects no fracture, the fact that a child's growth plate is at risk should be acknowledged, as it directly influences follow-up and monitoring decisions.

## **Lack of fracture classification**

In paediatric orthopaedics, the Salter–Harris classification is a standard tool for describing growth plate injuries. Its absence in the records may indicate that the injury was not properly recognised or evaluated.

Without this classification, it is difficult to predict risk, determine appropriate treatment, or justify the follow-up period.

## **No follow-up scheduled for months or years in high-risk injuries**

Certain injury types - particularly Salter–Harris IV or V fractures, and injuries to the distal femur or proximal tibia - require long-term monitoring to detect growth arrest or angular deformities. If a child with one of these injuries is discharged without planned follow-up at six to twelve-month intervals, it is a significant red flag.

### **Absence of weight-bearing imaging in lower limb cases**

Injuries to the knee, ankle, or leg should ideally include weight-bearing X-rays at follow-up. This is because subtle angular or length discrepancies may only become apparent when the limb is loaded. If all imaging is non-weight-bearing, early deformities can be missed.

### **High-energy injury mechanism with no specialist referral**

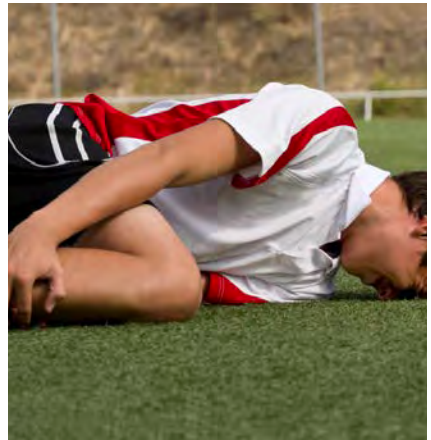
Incidents such as road traffic accidents, falls from height, or significant sports injuries can cause complex fractures involving the growth plate. If the mechanism of injury is high-energy but there is no referral to a paediatric orthopaedic specialist, this could indicate a failure to recognise the potential seriousness of the injury.

### **Delays beyond 7-10 days before reduction of displaced fractures**

Children's bones heal quickly,

and if a displaced fracture is not reduced within 7-10 days, early bone healing can make repositioning more difficult and potentially more damaging to the growth plate. Records showing delays without a clear clinical justification should be closely examined, as this can convert an otherwise treatable injury into one with permanent consequences.

By being alert to these red flags, solicitors can quickly identify cases where expert review is warranted, either to support a claim for breach of duty or to prepare for a robust defence.



# The Long Term Impact

The consequences of a missed or poorly managed growth plate injury can extend far beyond the initial fracture itself. Because the growth plate controls future bone development, disruption to this area may affect a child for years as they continue to grow.

From a medico legal perspective, these long term complications often form the basis of significant claims involving future treatment, ongoing disability, reduced mobility, psychological impact, and loss of future opportunity.

## **Leg Length Discrepancies**

If one growth plate stops functioning normally while the opposite limb continues to grow, a measurable leg length discrepancy can develop.

Small differences are common and may cause no symptoms, however larger discrepancies can alter gait mechanics, pelvic alignment, posture, and joint

loading. Children may develop pain, limping, reduced physical endurance, or difficulty participating in sport.

More significant discrepancies may require:

- Orthotic management
- Growth modulation surgery
- Limb lengthening procedures
- Long term physiotherapy

## **Angular Deformities**

Where only part of the growth plate is damaged, one side of the bone may continue growing while the other side arrests. This can cause the limb to bend inward, outward, or rotate abnormally over time.

These deformities can alter joint biomechanics, increase cartilage wear, and accelerate early degenerative change. In more severe cases, corrective osteotomy surgery may be required to restore alignment

and function.

### **Rotational Problems and Early Arthritis**

Growth arrest can also affect the rotational alignment of the limb, leading to abnormal gait patterns, reduced athletic ability, pain, and inefficient movement.

Over time, abnormal joint loading may contribute to early onset osteoarthritis, sometimes decades earlier than expected. This can significantly affect long term mobility, employment, and quality of life.

### **Psychosocial Impact**

The impact is often not purely physical. Children and adolescents with visible deformity, altered mobility, or repeated surgeries may experience reduced confidence, social withdrawal, bullying, or loss of independence.

Sporting participation may be affected, and future career

aspirations in physically demanding professions such as the military, emergency services, or professional sport may no longer be realistic.

These wider functional and psychological consequences can become highly relevant when assessing general damages, future care needs, and long term loss of opportunity.



# *Case One: Missed Forearm Growth Arrest*

An eight-year-old girl sustained multiple fractures to her forearm over a period of four years, all from separate falls. The first injury occurred when she was just two years old - a common type of fracture for a child of that age - and was appropriately treated with a cast.

However, soon after the cast was removed, she suffered another fall and re-fractured the arm.

At this early stage, subtle signs of a problem at the elbow's growth plate were visible on X-rays, but these were either overlooked or not acted upon. Over the following years, the child experienced further fractures, including one that was initially managed non-operatively before converting to surgical fixation. Despite this, the underlying growth arrest at the elbow remained unrecognised.

By the time she was referred to the expert's care in 2022, her forearm bones showed severe deformity. One bone was significantly bent, the elbow joint was misaligned, and there was evidence of abnormal loading patterns causing pain and reduced range of motion.



Corrective surgery was complex, involving bone cutting at two sites, careful protection of nerves and blood vessels, and stabilisation with a metal plate and screws.

Although the surgery was successful and the child eventually achieved near-normal function, the prolonged suffering, repeated fractures, the

prolonged suffering, repeated fractures, and avoidable corrective surgery could have been prevented had the early signs been recognised and addressed. This case demonstrates how a missed growth arrest, even in an apparently “routine” fracture, can escalate into a major orthopaedic problem - and a strong potential basis for a claim.



# *Case Two:* Infection-Induced Hip Growth Arrest

A young child presented with severe pain in both hips, reduced range of movement, and systemic illness. She was diagnosed with osteomyelitis (bone infection) and septic arthritis of the hip, requiring urgent surgical washouts and intravenous antibiotics.

Despite multiple procedures - around seven surgeries in total before referral - the infection in one hip worsened. It spread through the thigh bone, surrounding muscles, and the hip joint itself. Eventually, the weakened bone sustained a pathological fracture.

This fracture, which was intracapsular (within the joint capsule), was initially managed with casting rather than surgical fixation - a contentious decision given the nature and location of the break. The bone failed to

unite, and a later surgical attempt to realign the forces across the hip also failed to achieve healing.

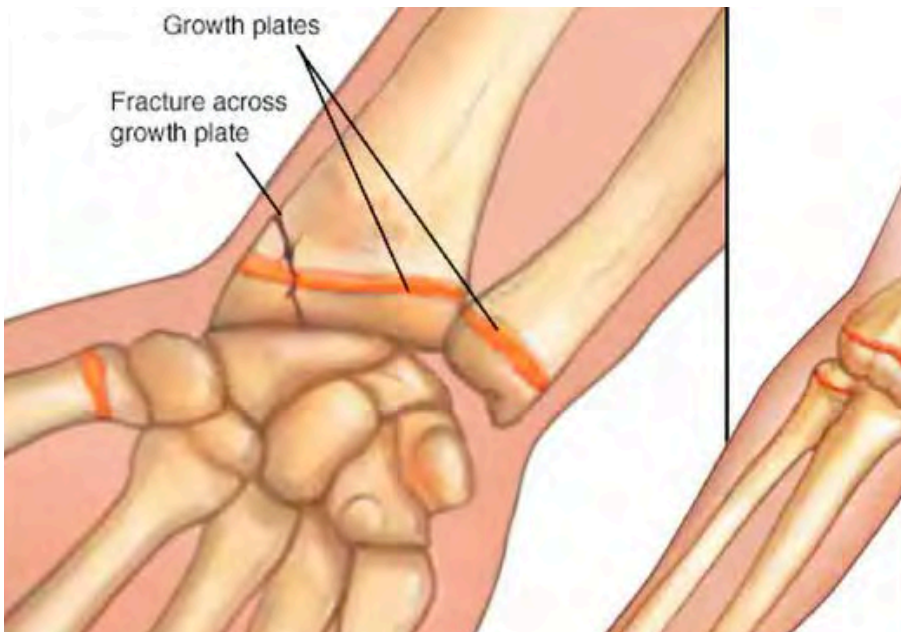
By the time she was referred to the expert's care, advanced imaging showed an unhealed fracture with signs of persistent infection.



The eventual operation involved removing infected bone, reshaping the hip to restore normal anatomy, and stabilising it with significant internal fixation. The procedure also required a complex surgical dislocation of the hip to access and repair the damage.

The child made an excellent functional recovery, even returning to tap dancing, but remains at risk of future

problems - including the possibility of early hip replacement. From a legal perspective, this case raises questions about whether earlier surgical fixation could have prevented prolonged disability and whether the chosen management pathway met the expected standard of care.



# Legal Time Limits

In England and Wales, the primary limitation period for personal injury claims is three years from the date of knowledge - the date when the claimant first knew, or could reasonably have known, that the injury was significant, attributable to another's negligence, and worthy of pursuing a claim.

For children, this period does not start running until their 18th birthday, meaning they have until their 21st birthday to commence proceedings.



In the context of paediatric growth plate injuries, this extended limitation period recognises that the full consequences of the injury may not become apparent until years after the initial event. Growth arrest, angular deformities, or leg length discrepancies often only manifest as the child develops, sometimes long after the original fracture or surgery.

However, solicitors should not assume there is no urgency. Early identification of claim viability is essential to avoid the practical risks of delay. Medical records, imaging, and witness recollections are far easier to obtain and more reliable soon after the events in question. If a claim is investigated late, crucial evidence - such as the original X-rays or contemporaneous clinic notes - may have been lost, destroyed, or archived in inaccessible formats.

In addition, paediatric growth plate injury cases often require detailed expert evidence to establish breach of duty and causation, including analysis of growth trends over time. The sooner these assessments begin, the easier it is for experts to form clear, defensible opinions based on complete records.

From a practical perspective, a solicitor instructed well before the child turns 21 can not only secure and preserve critical evidence but also take early steps to arrange interim payments where appropriate, ensuring that ongoing medical and educational needs are met while the claim progresses.



# Practical Checklist for Case Screening

When a potential growth plate injury claim comes across your desk, a structured review of the records will help you quickly assess viability and determine whether expert input is needed. These cases can appear straightforward at first glance, but subtle omissions in care can have profound long-term consequences.

## **Identify the injury type - was the growth plate involved?**

Examine the initial A&E or fracture clinic notes for any mention of the growth plate. Look for explicit references to a Salter-Harris classification or descriptive phrases such as “through the physis” or “across the growth plate.” In the absence of a clear statement, review the initial imaging yourself or have it screened by an expert - many missed cases arise simply

because the growth plate involvement was never documented at the outset.

## **Check imaging dates and interpretation - any omissions?**

Confirm that appropriate X-rays, CT scans, or MRIs were obtained, and check the radiology reports for accuracy. In some claims, the correct imaging was performed but misinterpreted. This is particularly important for subtle injuries such as Salter-Harris type I fractures, which may not be obvious on plain X-ray but still carry a risk of growth arrest.

## **Look for the follow-up pattern - were they seen at 6-12 month intervals?**

High-risk growth plate injuries require regular follow-up for months or years, often with repeat imaging every 6-12

months. If a child was discharged after only a single review, or not seen again until problems became obvious, this may indicate a failure to monitor for growth arrest or deformity.

**Assess delay in treatment - more than 7-10 days for fracture reduction?**

Children’s bones heal quickly, and displaced fractures should ideally be reduced promptly. If more than 7-10 days elapsed before reduction, early bone healing may have set in, requiring greater force to realign the bone - potentially increasing the risk of damaging the growth plate further. Check whether the records explain any such delay and whether it was clinically justified.

**Review surgical notes - was there unnecessary crossing of the physis?**

In many cases, screws or wires can be placed close to the growth plate without crossing it. If

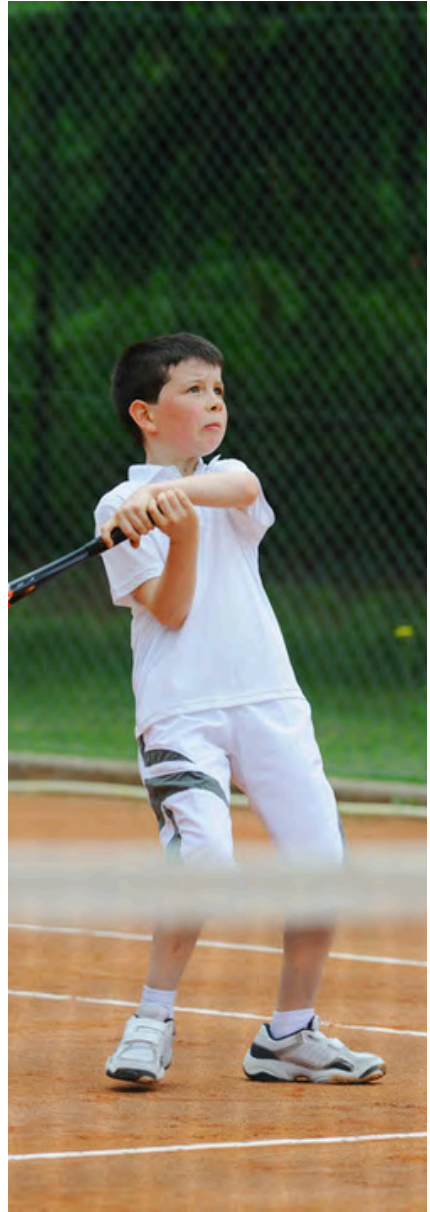
metalwork did cross the physis unnecessarily, this can accelerate growth arrest. Surgical notes and post-operative imaging should be reviewed for evidence of such breaches, especially if long-term deformity later occurred.



**Document functional loss - gait issues, reduced mobility, psychosocial effects**

Establish the real-world impact on the child. Has the injury led to a measurable leg length discrepancy, altered gait, reduced range of motion, or persistent pain? Are there psychosocial consequences, such as bullying, withdrawal from sports, or changes to career aspirations? This information not only supports general damages but can also be critical in quantifying future loss of earnings and care needs.

A methodical review of these elements will help you quickly flag cases with strong potential for breach of duty or causation arguments, while also identifying those where the poor outcome was an unavoidable consequence of the original injury.



# Working with Expert Witnesses

In growth plate injury claims, the input of a suitably qualified expert is critical. A paediatric orthopaedic surgeon brings the specialist clinical knowledge needed to interpret the medical records, assess the standard of care, and predict the likely long-term consequences. Their evidence is often pivotal in establishing breach of duty, proving causation, and quantifying damages.

## **Pinpointing breach of duty**

An expert can review the clinical records, imaging, and operative notes to determine whether the treating clinicians met the expected standard of care. This includes assessing whether appropriate imaging was obtained and interpreted correctly, whether follow-up intervals were adequate, whether surgical techniques

respected the growth plate, and whether delays in treatment were justifiable. The expert's role is not only to identify errors but also to explain why they represent a departure from accepted practice.

## **Separating injury damage from treatment-caused damage**

One of the most challenging aspects of these claims is distinguishing the harm caused by the original injury from that caused (or worsened) by substandard management. Growth arrest can occur even in cases managed perfectly, particularly with high-risk fracture types or mechanisms. An experienced paediatric orthopaedic expert can weigh the inherent risks of the injury against the consequences of any delays, missed diagnoses, or inappropriate surgical

interventions, helping to clarify the true cause of the poor outcome.

**Providing prognosis timelines based on growth rates of affected sites**

The rate at which a particular growth plate contributes to limb length varies by location. For example, the distal femur grows at around 9 mm per year, meaning problems may become apparent within a year, while the growth plate at the hip grows more slowly, making issues harder to detect in the short term. An expert can provide a medically sound timeline for when symptoms or deformity would be expected to emerge, helping to demonstrate whether earlier intervention might have altered the course of events.

**Estimating future medical costs and functional limitations**

A detailed expert report can outline the child’s likely long-term prognosis, including whether

further surgeries are required, the probable need for orthotics or joint replacement, and the risk of early arthritis. This in turn allows for a reasoned calculation of future medical costs, care needs, and the impact on earning capacity. An expert can also comment on the psychosocial effects - such as restrictions in sports participation, career limitations, and social stigma - that should be factored into general damages.



# Key Questions Solicitors Should Ask their Expert

- Was the injury to the growth plate recognised and classified appropriately at the time?
- Was the follow-up regime adequate given the injury type and location?
- Would earlier intervention or a different management approach likely have altered the outcome?
- Is the current functional limitation attributable to the injury alone, or was it compounded by substandard care?
- What are the short, medium, and long-term implications for the child's mobility, daily life, and employment prospects?

Instructing the right expert early in the case can make the difference between a weak, speculative claim and a well-supported case grounded in clear, authoritative medical evidence.

# Conclusion

Missed paediatric growth plate injuries can have lifelong consequences if not recognised, monitored, and managed appropriately. What may initially appear to be a routine childhood fracture can later develop into significant deformity, functional impairment, repeated surgery, and long term disability.

Many of the strongest claims arise not from catastrophic treatment failures, but from more subtle omissions in care, such as:

- Failure to recognise growth plate involvement
- Lack of Salter Harris classification
- Inadequate follow up after high risk injuries
- Delayed referral to paediatric orthopaedic specialists
- Missed early signs of growth arrest or deformity

For solicitors, identifying these warning signs early is critical.

Careful review of imaging, clinic notes, follow up patterns, and injury mechanism can help establish whether opportunities existed to prevent or reduce long term harm.

These cases are often medically complex and require expert analysis to separate the consequences of the original injury from harm caused or worsened by delayed diagnosis or substandard management.

By understanding the practical medico legal risks associated with growth plate injuries, solicitors are better positioned to assess claim viability, preserve critical evidence, instruct appropriate experts early, and build stronger causation arguments on behalf of their clients.

# Who Are INNEG?

INNEG supports solicitors, insurers, and legal professionals with access to specialist medico legal expertise across complex clinical negligence and serious injury claims.

With a panel of more than 13,000 vetted medical experts across 112+ specialisms, we help legal teams secure the right expert evidence quickly, efficiently, and with a clear focus on claim progression and evidential quality.

Our network includes experienced paediatric orthopaedic surgeons, radiologists, rehabilitation specialists, pain experts, psychologists, and other clinicians frequently involved in complex paediatric injury cases.

Beyond expert witness sourcing, INNEG also provides:

- Expert witness management
- Clinical negligence screening
- Investigative diagnostics and treatment coordination
- Educational webinars and solicitor resources
- Ongoing medico legal support throughout the lifecycle of a claim

Our focus is simple:

***Accelerate your claim lifecycle.  
Reduce unrecoverable costs.***

To learn more about our services, upcoming events, and educational resources, visit:

[www.inneg.co.uk](http://www.inneg.co.uk)