THE NORTHERN HOSPITAL

TODDLER'S FRACTURE

"Child On A Country Road", oil on canvas, Henri Taurel 1900; "..I'm gonna be like you dad..."

My child arrived just the other day
He came to the world in the usual way
But there were planes to catch and bills to pay
He learned to walk while I was away
And he was talkin' 'fore I knew it, and as he grew
He'd say "I'm gonna be like you dad
You know I'm gonna be like you"

And the cat's in the cradle and the silver spoon
Little boy blue and the man on the moon
When you comin' home dad?
I don't know when, but we'll get together then son
You know we'll have a good time then

My son turned ten just the other day
He said, "Thanks for the ball, Dad, come on let's play
Can you teach me to throw", I said "Not today

I got a lot to do", he said, "That's ok"
And he walked away but his smile never dimmed
And said, "I'm gonna be like him, yeah
You know I'm gonna be like him"

And the cat's in the cradle and the silver spoon
Little boy blue and the man on the moon
When you comin' home son?
I don't know when, but we'll get together then son
You know we'll have a good time then

Well, he came home from college just the other day
So much like a man I just had to say
"Son, I'm proud of you, can you sit for a while?"
He shook his head and said with a smile
"What I'd really like, Dad, is to borrow the car keys
See you later, can I have them please?"

And the cat's in the cradle and the silver spoon
Little boy blue and the man on the moon
When you comin' home son?
I don't know when, but we'll get together then son
You know we'll have a good time then

I've long since retired, my son's moved away
I called him up just the other day
I said, "I'd like to see you if you don't mind"
He said, "I'd love to, Dad, if I can find the time
You see my new job's a hassle and kids have the flu
But it's sure nice talking to you, Dad
It's been sure nice talking to you"

And as I hung up the phone it occurred to me
He'd grown up just like me
My boy was just like me

And the cat's in the cradle and the silver spoon
Little boy blue and the man on the moon
When you comin' home son?
I don't know when, but we'll get together then son
You know we'll have a good time then

Harry Chapin, "Cats in the Cradle", 1974.

The road of life is long and hazardous, and sometimes very lonely for children who have distracted "busy, busy" parents. A quite literal physical hazard of the earliest years of life's journey is the "Toddler's fracture" - sustained often without any witness to the actual traumatic event.

TODDLER'S FRACTURE

Introduction

Toddler's fractures are undisplaced or very minimally displaced spiral fractures usually of the lower third of the tibial shaft.

Less commonly the fibula may be involved in combination or in isolation.

As the name suggests the injury is seen in young children, around the time of learning to walk, (hence "toddler"), and so is seen typically around 9 months to 3 years of age, (but is occasionally seen up to the age of 5 years...depending largely on how loosely the term is applied!).

Plain radiological signs can be subtle, or even absent on initial examination.

It is **not** *generally* a sign of physical abuse.

History

These injuries were first described by Dunbar et al in 1964. [1]

Mechanism

One theory says that toddler's fractures result from the new low energy torsional forces associated with early ambulation, and may be a trivial as twisting on the leg whilst walking or falling from an insignificant height. These stresses are applied to the porous bones of infants and young children that have not previously been exposed to these forces.

The extent of periosteal calcification observed in some of cases suggests that, in some instances of missed toddler's fracture the lesion may have been produced by elastic bowing of the bone and consequent periosteal stripping and this would not have been apparent on initial radiography. [2]

Whilst the possibility of abuse must be kept in mind for any fracture in children, the toddler's fracture is not specifically associated with abuse.

Rarely medical conditions may predispose to fracture in children, such as osteogenesis imperfecta or rickets.

Clinical features

The child presents with:

- **A limp**

Or

- **Refusal to bear weight.**
    - ♥ Some younger children may revert to crawling.

Both history and examination in this young age group is (needless to say) problematic.

There may be *no clear history* of any trauma or it may be one of seemingly trivial nature.

It may be very difficult to locate the exact area of maximal tenderness.

Local swelling or bruising is usually absent.

The lack of ability to bear weight is sensitive but not specific for a toddler's fracture.

Ultimately a toddler's fracture may be a *clinical diagnosis* in a young child where a fractured tibia is suspected on clinical grounds but an abnormality is not detected on the initial X-ray. [3]

Differential diagnoses:

Important considerations for a child refusing to use a limb include:

- Irritable hip.
- Subacute osteomyelitis.
- Septic arthritis.

Investigations

Blood tests

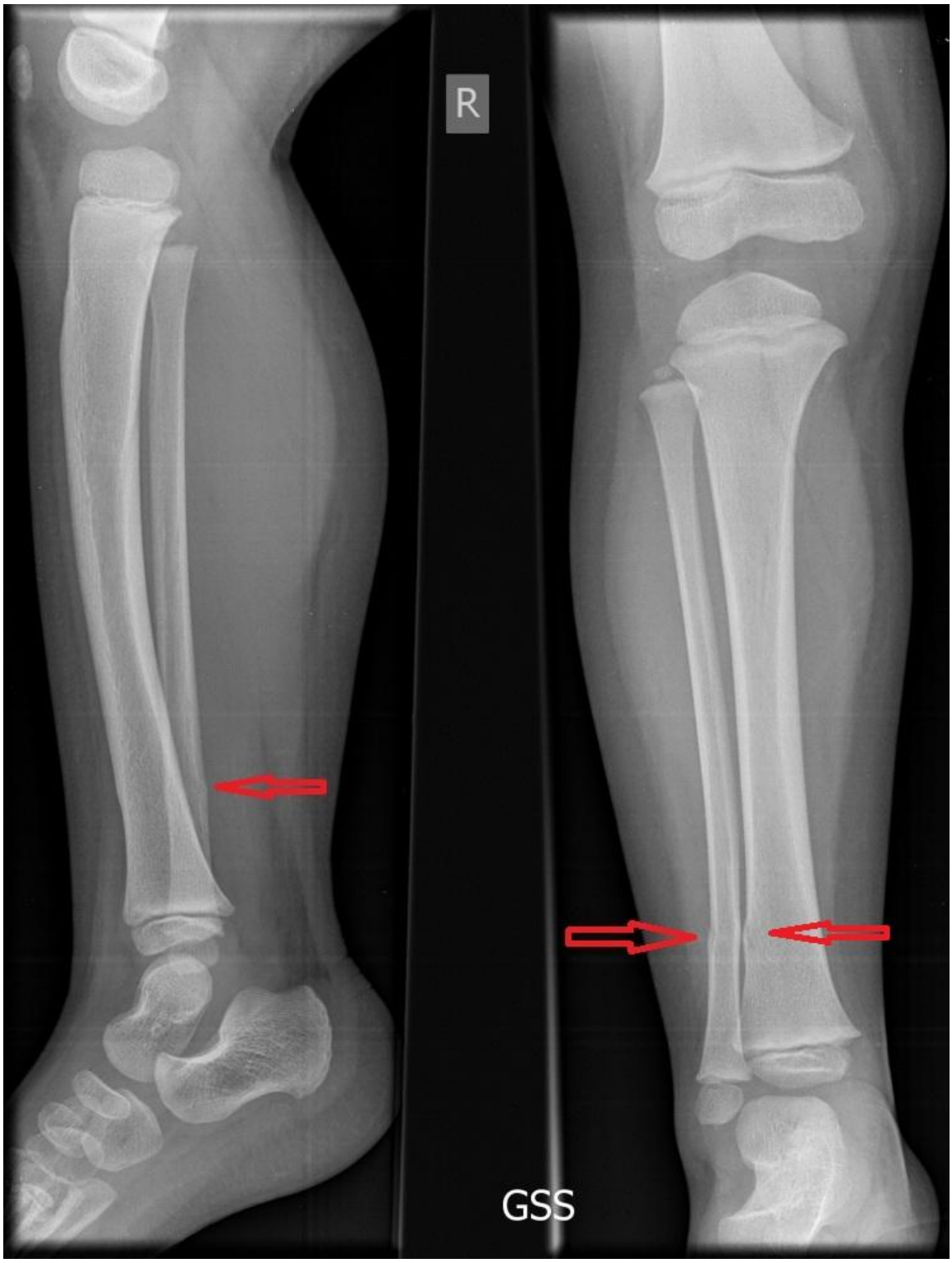
In cases where Toddler's fracture is suspected, but not proven on plain x-ray, other important differential diagnoses will need to be ruled out, and so blood testing may include:

- FBE (infection or haematological malignancy).
- CRP.
- Blood cultures.

Ultrasound

This may be required to help rule out an irritable hip.

Plain radiography



Toddler's fracture of the tibia and fibula in a 28 month old girl.

The diagnosis is usually made on plain radiography, although the signs can be quite subtle and may take multiple views to detect the injury.

Radiology may be done on suspicion only, when there is no clear history of trauma, but the child limps or refuses to use one leg.

It is often not obvious however on clinical examination what the problem is or even where the problem is. Radiographs may need to be done on the whole limb, and sometimes on both limbs.

A-P and lateral are the minimum views required, but dedicated *internal oblique views* are sometimes needed to see the fracture.

Radiographic evidence of fracture may only become apparent 7-10 days after the initial injury when new periosteal bone formation or sclerosis has occurred.

If initial radiographs are negative, these can be repeated in 10 days if symptoms continue.

The subtle, but typical, appearance of a spiral toddle's fracture in the lower tibial shaft

Diagnosis requires a high index of suspicion and is important as it obviates the need for needless ongoing investigations to rule out more sinister aetiologies of a failure to weight bear such as tumour or infection.

Bone scan

This may be considered, when clinical suspicion remains, despite normal radiographs.

Although more sensitive than X-rays, bone scans are less specific.

MRI

MRI is excellent for the detection of occult fractures (and other pathologies such as osteomyelitis) and will avoid exposure to radiation. This investigation however is problematic in young children.

Management

1. Analgesia is given as required:

    - Simple oral analgesia is usually sufficient.

2. Immobilization:

    - An **above knee** plaster should be applied, primarily for pain relief (note that Toddler's fractures usually heal even without treatment).

    - Immobilization is for a period of 2-4 weeks.

    - Young children will not be able to bear weight with their plaster.

    - A plaster may need to be applied on clinical suspicion alone when the radiographs have not shown a fracture. In these cases radiographs can be repeated in 10 days.

      If repeat x-rays are still negative, and the child still has symptoms, other underlying diagnoses will need to be considered, along with referral to the Orthopaedic Unit.

References

1. Dunbar JS, Owen HF, Nogrady MB, McLeese R (September 1964). "Obscure tibial fracture of infants - the toddler's fracture". *J Can Assoc Radiol* 15: 136–44

2. Shravat B.P et al. "Toddler's Fracture", *J Accid Emerg Med* 1996; 13:59-61

3. Limb Fractures: RCH Guidelines, July 2012.

4. Toddler's Fracture in Marx J et al. Rosen's Emergency Medicine: Concepts and Clinical Practice, 5th ed 2002, p. 2378.

Dr J.Hayes

25 July 2012