



Let's be Precice! – the RCH Experience with the Precice Lengthening Nail

Cheryl Dingey – RN / Nurse coordinator
Limb Reconstruction

Melbourne
Children's
Excellence in
clinical care,
research and
education

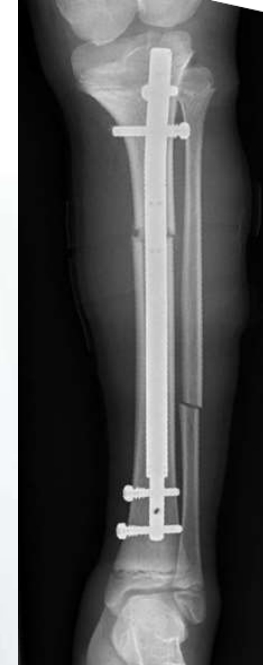


Causes of Leg length discrepancy in children

- Congenital – born with a problem causing slow / poor growth
 - Longitudinal deficiency
 - Fibula/tibia hemimelia
 - Congenital short femur
- Acquired
 - Trauma – physeal injury eg meningococcal disease, accident, infection
- Tumour – as treatment options improve more children avoid amputation and survival rates improve. Bone loss from surgery robs the limb of length.

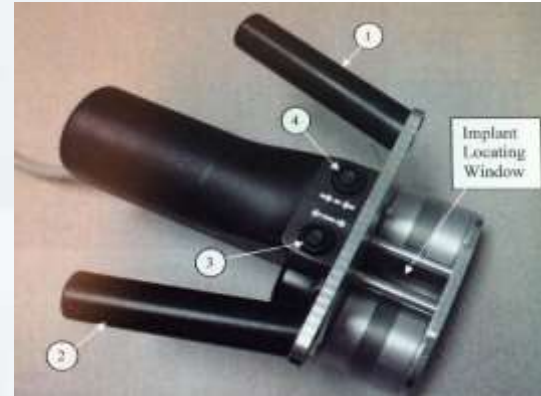
What is Precice?

- Intramedullary lengthening nail which is driven by a programmed magnet held external to the skin
- Has a part that can change length & an extension rod
- Rod gets longer – limb gets longer
- Magnet and gear system that allows lengthening and shortening



How does it work?

- Patient goes to theatre has osteotomy of bone – left for 3- 5 days (latency period)
- Commence lengthening as ordered (0.75 – 1mm / day)
- Hand piece is placed over the mark on the leg
- Ensure handpiece is pointing with arrows toward feet



How does it work?

- Press start
- Lengthening will continue until device stops itself
- Can stop unit at any time
 - Move unit off leg
 - Press any button on unit

The unit



Preparation for lengthening

- Choose area to undertake the lengthening
- Ensure all metal items are removed from pockets and area
- Check over the Unit for any issues
- Connect to power source and follow prompts
- Locate the implant – leg should have an area marked on it in an indelible marking pen



Why Precice? – Pros

- Avoids use of frame
- No pin sites – pin site infection
- No frame after lengthening is complete
- Visually appealing – esp for children & females
- No shoe raise required
- Target length largely achieved /high rate of achieving goals
- Accurate (esp compared to previous nail)



Why Precice? – Cons

- “Victims of our own success” – patient feels & looks so well they can be reluctant to take advice
- On crutches for long period (up to 3 months)
- Must be removed at some time
- Hiccups with programming of Controller
- Bulky carry case and unit
- Crosses physis – only available once growth ceased
- Size – smallest diameter is 8.7 mm
so limits some paediatric cases

Nursing involvement

- Patient must follow the established pre-admission process: no PARC / No surgery
- Patient to be aware of commitment required to treatment success
 - Full engagement required
 - Interruptions to daily life to do the adjustments
 - Frequent follow up appointments
 - Impact on schooling
 - Full commitment to physiotherapy program
 - Ability / willingness to take on board the information and follow guidance

Pre-admission process

- Similar to that followed in preparation for THR / TKR but with paediatric & family centred focus
- All multi-disciplinary team members present
 - Physiotherapist – most important team member through entire journey
 - OT
 - School Teacher
 - And of course..... Nursing coordinator!
- Determine operation date and stick to it
- Inpatient stay of 2 - 3 days

Pre-admission process

- Pain management:
 - Long discussion in preadmission
 - Ongoing issue for many patients after
 - Need for high dose/ regular analgesics
 - Improvement needed for GP involvement

- Point of contact vital for families

The journey

- 22 cases – June 2013 – September 2015
- Median age – 14 years
- 14 males : 8 females
- 15 left : 7 right
- 20 femoral
- 2 tibial

The journey

- 22 Cases – June 2013 – Sept 2015
- Congenital / idiopathic – 12
- Physeal trauma – 4
- Meningococcal septicaemia / similar – 2
- Multiple hereditary exostoses – 1
- McCune Albright – 1
- Tumour - 2

The journey

- 22 Cases – June 2013 – Sept 2015
- Median target length 50 mm (range 25 – 60 mm)
- 19 pure lengthening 3 acute angular correction and lengthening
 - 2 femurs
 - 1 tibial

Surgeons: Chris Harris, Leo Donnan, Ian Torode

The journey

- 22 Cases – June 2013 – Sept 2015
- Median target length 50 mm (range 25 – 60 mm)
- Percentage of original bone lengthened
 - 12.1 (5.8 – 20.3)
- Rate per day
 - 0.94 mm (0.75 – 1.5)

Cases 22 Cases – June 2013 – Sept 2015

- Obstacles – 10 patients
 - 2 premature consolidation of femur rectified by repeat osteotomy
 - 1 premature consolidation of fibula requiring repeat osteotomy / syndesmosis screw
 - 1 proximal fixation revision (day 7)
 - 3 broken nails –
 - 1 rectified by revision to trauma nail
 - 2 replace nail and recommenced lengthening
 - 1 patella dislocation rectified by ITB release and temporary cessation of lengthening
 - 1 calf contracture – rectified by TA lengthening
 - 1 deficient regenerate requiring autogenous bone grafting

Cases studies

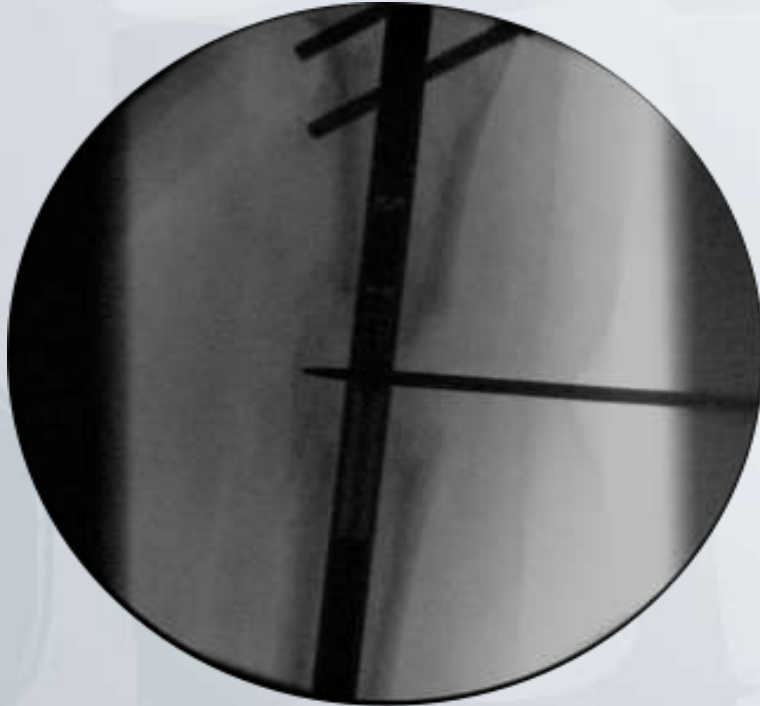
- 18 year old male
- Congenital longitudinal deficiency
- LOS: 3 nights

- Premature consolidation



Back to theatre

- Re-osteotomised
- 1 night LOS



Case studies

- 18 year old male
- Went on to complete 5cm lengthening



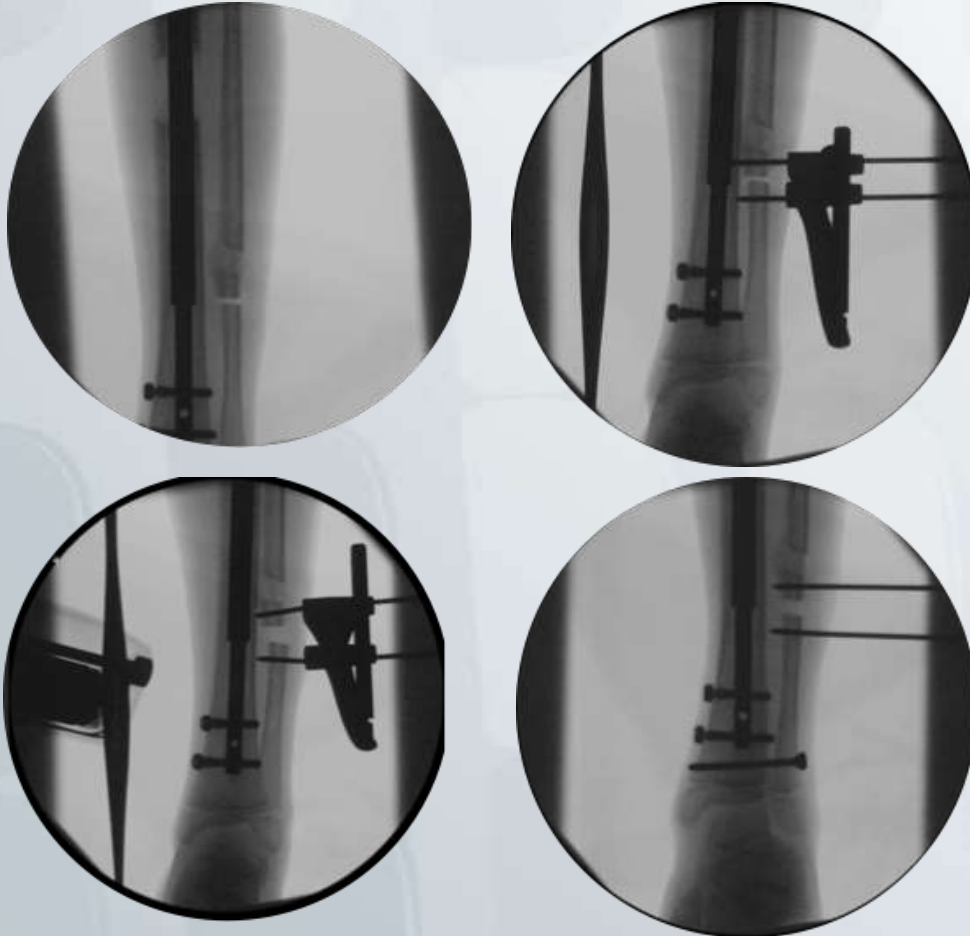
Case studies:

- 11 year old female – tibial lengthening
- Meningococcal septicaemia – LLD



Case studies

- 11 year old female



- Premature consolidation

- Technical error
- Patient factors
- Back to theatre – re-osteotomised

Case studies:

- 11 year old female



- 45 mm lengthening

Case studies

- 13 year old female
- Meningococcal septicaemia
- 5 cm lengthening



Case studies: Ooops!

- Non compliant with PWB status
- Rod is not indestructible!



Case studies:

- 13 year old female



- Changed over to a trauma rod with no loss of length
- 5 cm obtained
- Frame avoided!

22 cases – (June 2013 – Sept 2015)

- Complications
 - 19 patients : reached target length as per goals set at beginning
 - 3 patients : 5 cm lengthening (target 6cm)
 - 1 – we decided to stop in error
 - 1 – we decided to stop because of mental state
 - 1- we decided to stop because of knee stiffness

Summary:



- Niggly problems but not unexpected nor unacceptable
 - Eg: trolley now has wheels
 - Further training to iron out the problems with the computer
 - More sizes now available – increased flexibility
- Fairly typical obstacles in 45% of pts
 - Tightness
 - Frustration
 - Compliance
 - Premature consolidation
 - Low rate of complications / high rate of achieving goals

Handy resources

- Youtube – Dr Rozbruch – USA
- The Precice nail – 10 minute interview and der
- Precice nail – WPBF Interview
- Paley Advanced Limb Lengthening Institute Florida
- Ellipse – Patient information FAQ's / Cheat sheet
- RCH – development of information



Acknowledgements

- Mr Chris Harris –
Consultant Orthopaedic
Surgeon – RCH
- Dr Jimmy Barnes – Limb
Reconstruction Fellow –
RCH -2014
- Ms Mohita Domany –
(Medical Student,
University of Nottingham,
UK)

