



**CORIEL
ORTHOPAEDIC
GROUP**



Distraction Osteogenesis for Brachymetatarsia

Antony N Wilkinson

DPodM, MSc, FRCPodS, FFPM RCPS(Glasg)

Consultant Podiatric Surgeon

Chairman Coriel Orthopaedic Group

NHS

Doncaster and Bassetlaw
Teaching Hospitals

NHS Foundation Trust



enquiries@corielortho.com



07946 396194

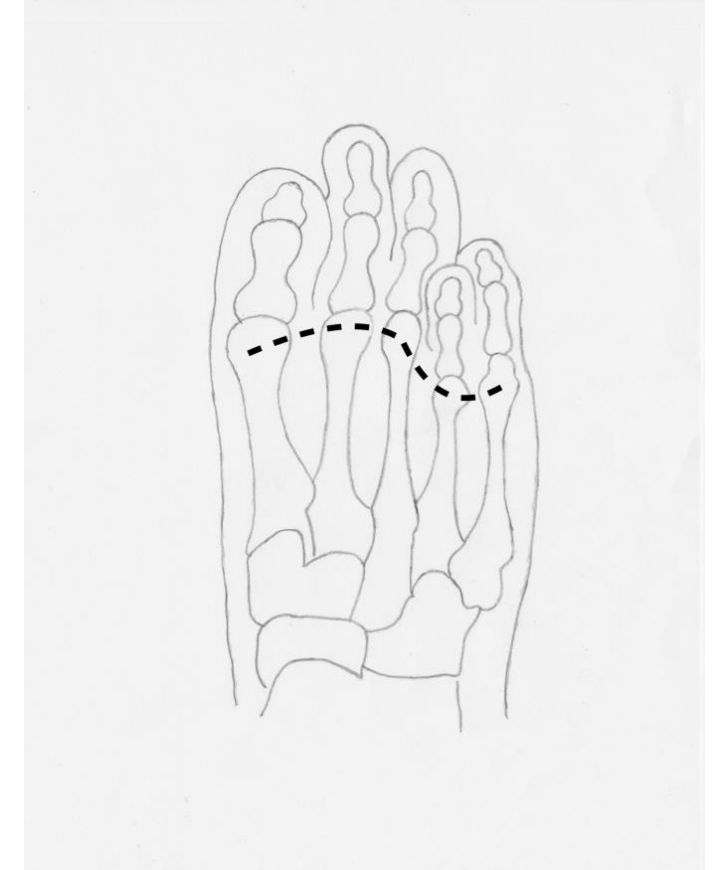
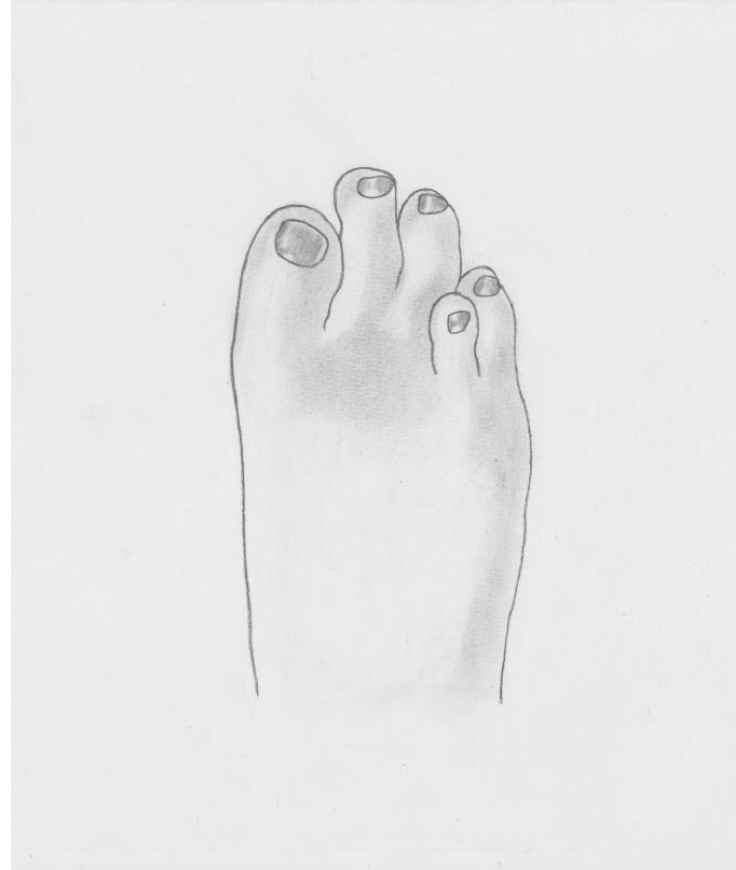


www.corielortho.com



Aetiology

- Hypoplastic shortening
- Ratio 10.53:1 female to male
- 47% bilateral
- Congenital, Iatrogenic or Associated with syndromes (Apert, Down's, Albright osteodystrophy, Dystrophic Dwarfism, Sickle cell anaemia, Polio)

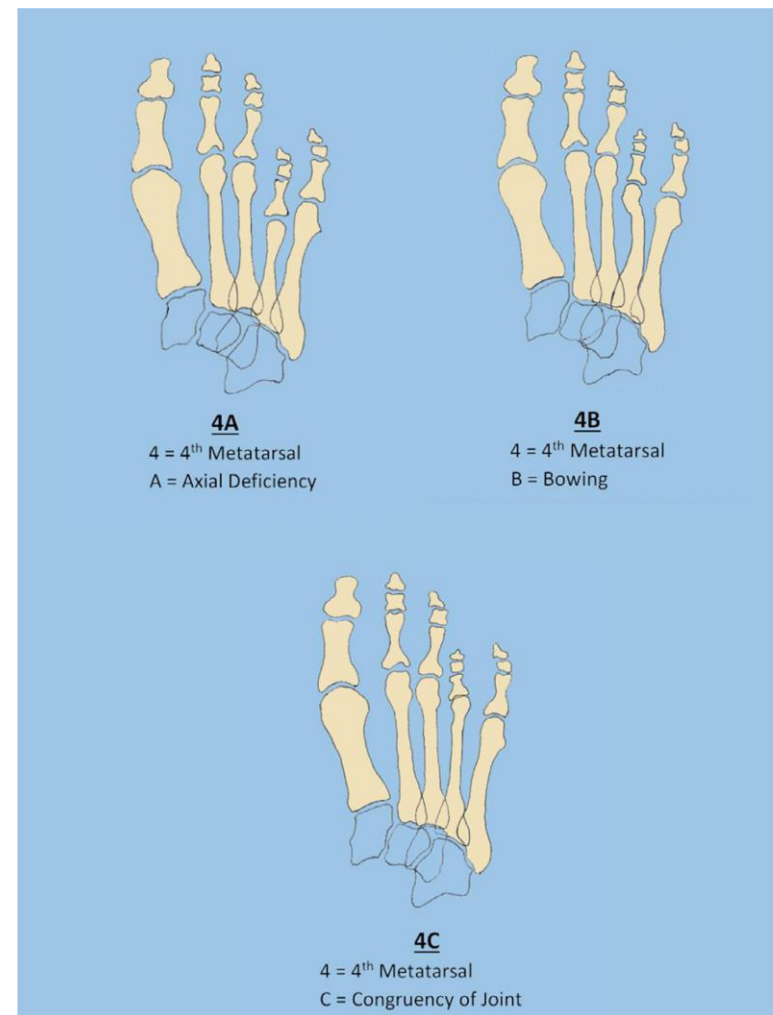




**CORIEL
ORTHOPAEDIC
GROUP**

Classification

- Number denoting the affected metatarsal combined with a letter denoting the following
- Type A –Axial Shortening
- Type B – Angulation of the Shaft
- Type C- Congruency
- Might be a combination of one or all



Brachymetatarsia: A Classification for Surgical Treatment
Bradley M. Lamm, DPM, FACFAS1, Tyler B. Lamm
The Journal of Foot & Ankle Surgery



enquiries@corielortho.com



07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**

Preoperative weightbearing left foot. DP view radiograph of a congenitally short fourth metatarsal. Note the mid-shaft bowing (type B) in the medial direction of the fourth metatarsal. Classification 4AB type on the left.

Brachymetatarsia: A Classification for Surgical Treatment
Bradley M. Lamm, DPM, FACFAS
The Journal of Foot & Ankle Surgery



enquiries@corielortho.com



07946 396194



www.corielortho.com



CORIEL ORTHOPAEDIC GROUP

Preoperative weightbearing right foot. DP view radiograph of a congenitally short third metatarsal. Note the lack of joint space in the 3rd metatarsophalangeal joint, which indicates a type C or non-Congruency of joint, as the digit is extended. Classification 3ABC type on the right.





**CORIEL
ORTHOPAEDIC
GROUP**

Acute Vs Distraction

Acute

- Autogenous graft 1st described 1969 McGlamry and Cooper
- Interposition synthetic material, step cut, oblique osteotomy, shortening adjacent metatarsals, toe implants

Risks and drawbacks

- Limited lengthening- 1-1.5cm
- Neurovascular compromise
- Severe soft tissue tensioning
- Need to perform extensive soft tissue dissection



enquiries@corielortho.com



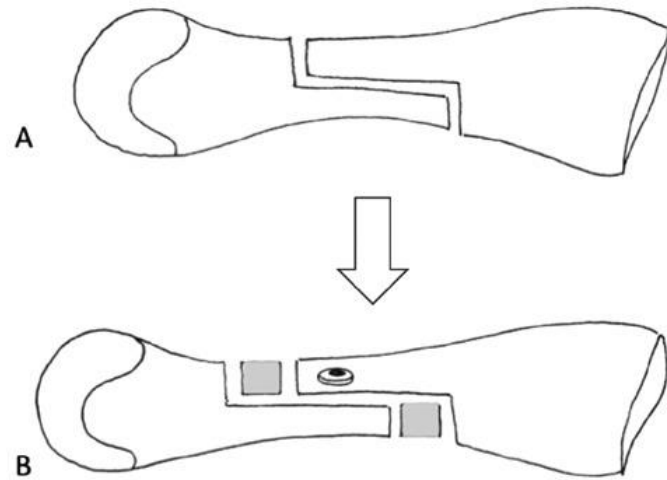
07946 396194



www.corielortho.com



CORIEL ORTHOPAEDIC GROUP



Brachymetatarsia of the Fourth Metatarsal,
Lengthening Scarf Osteotomy with Bone Graft
[Ankit Desai](#), [Surjit Lidder](#), [Andrew R. Armitage](#), [Samuel S. Rajaratnam](#), and [Andrew D. Skyrme](#)



enquiries@corielortho.com



07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**



**One-stage correction of multiple brachymetatarsia
and hallux valgus with calcaneal autograft**



Henrique Mansur¹, Rubens Theodoro Meira², Lucio Gusmão², Cesar Barbosa Gonçalves³, Isnar Moreira de Castro Júnior¹, Felipe Almeida Rocha¹



enquiries@corielortho.com



07946 396194



www.corielortho.com



CORIEL ORTHOPAEDIC GROUP



enquiries@corielortho.com



07946 396194

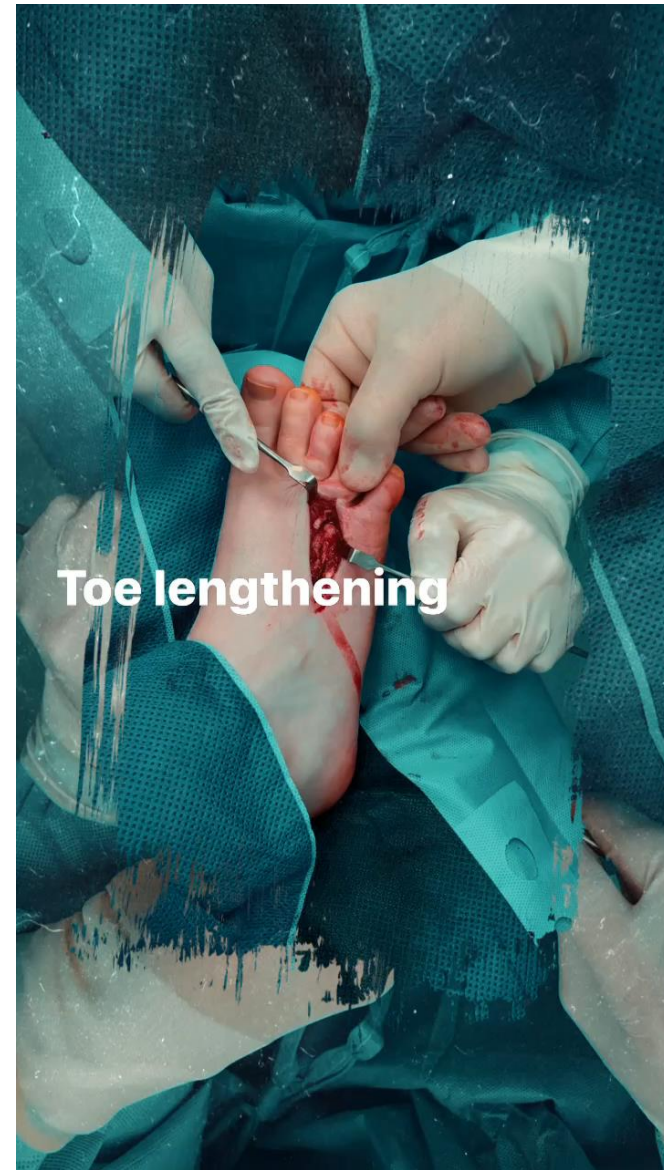


www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**

Acute lengthening requires extensive dissection to allow distraction of bone without limitation of MTPJ



enquiries@corielortho.com



07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**

Distraction

- Preferred when more than 1cm required
- Rate of lengthening can be adjusted
- Pt can fully weight bear
- Bi-lateral option available
- Reduced risk of neurovascular compromise
- Less dissection with MIS option available
- Protection of the MTPJ easier, reducing stiffness
- Can adjust for different classifications



enquiries@corielortho.com



07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**

Open Technique

Careful dissection with minimal disruption to the Periosteum. Toe can be positioned with a K wire or Fixator to the toes.



enquiries@corielortho.com



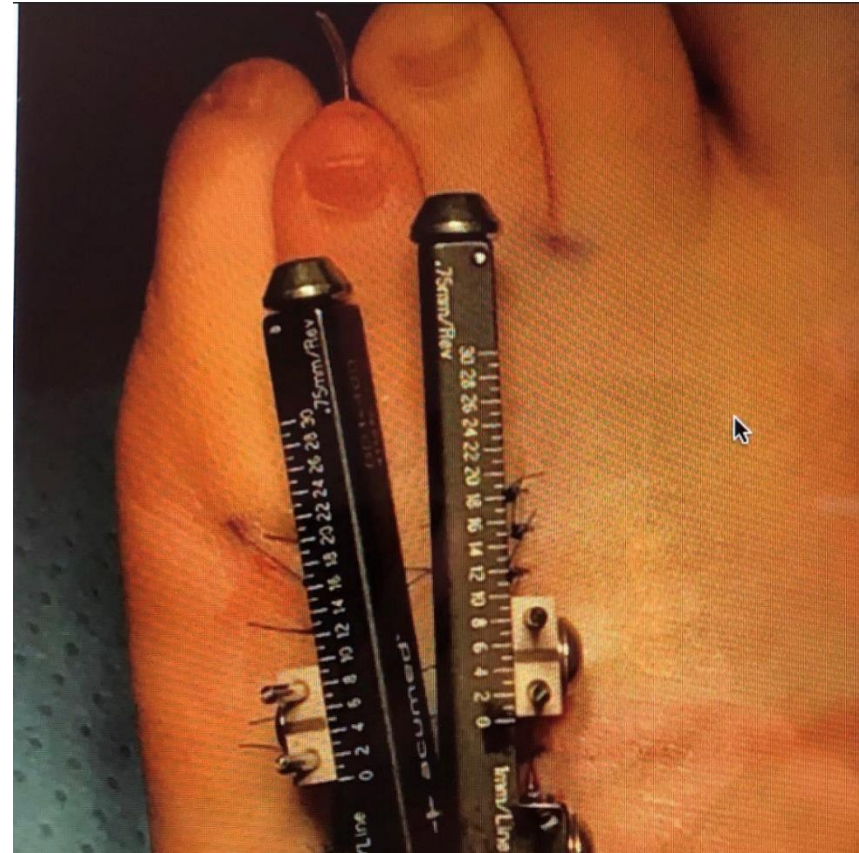
07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**



enquiries@corielortho.com



07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**



enquiries@corielortho.com



07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**



enquiries@corielortho.com



07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**

Technique Percutaneous

Fluoroscopic anteroposterior views showing that the first pin is placed at the distal-most region of the metatarsal metaphyseal-diaphyseal junction. This half-pin is inserted in the center of the metatarsal (bicortical) and perpendicular to the longitudinal bisection of the metatarsal (sagittal plane axis) on the lateral view. Placement of this pin defines the sagittal plane orientation of subsequent metatarsal lengthening.



Percutaneous Distraction Osteogenesis for Treatment of Brachymetatarsia
Bradley M. Lamm, DPM, FACFAS



enquiries@corielortho.com



07946 396194

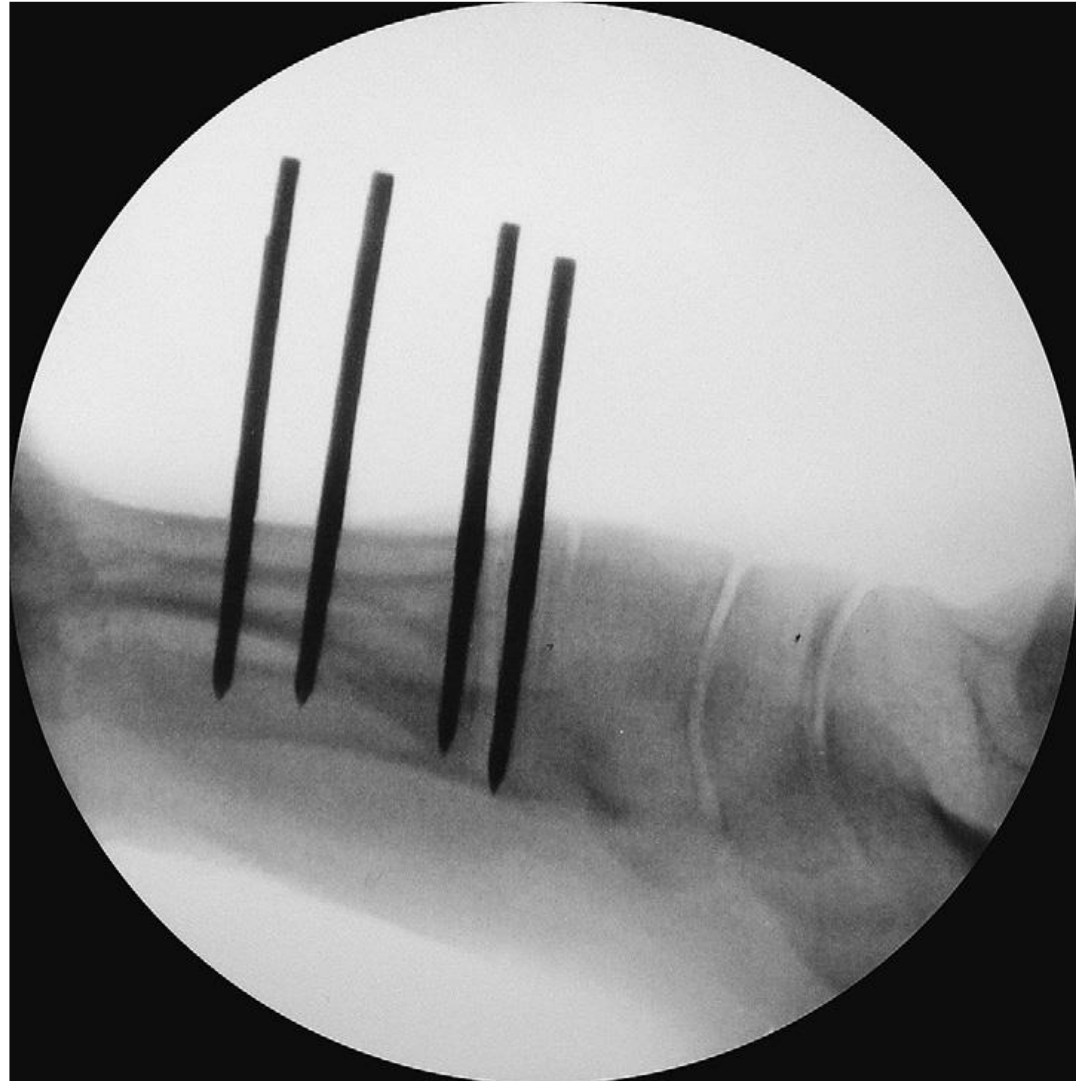


www.corielortho.com



CORIEL ORTHOPAEDIC GROUP

Fluoroscopic lateral view confirms that all 4 half-pins are parallel to each other and perpendicular to the longitudinal axis of the fourth metatarsal. Note the bicortical half-pin placement.





**CORIEL
ORTHOPAEDIC
GROUP**

Fluoroscopic anteroposterior view showing placement of the 4 half-pins in the metatarsal; note that all the half-pins are parallel. The 2 digital pins are also inserted centrally in the proximal phalanx.



enquiries@corielortho.com



07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**



enquiries@corielortho.com



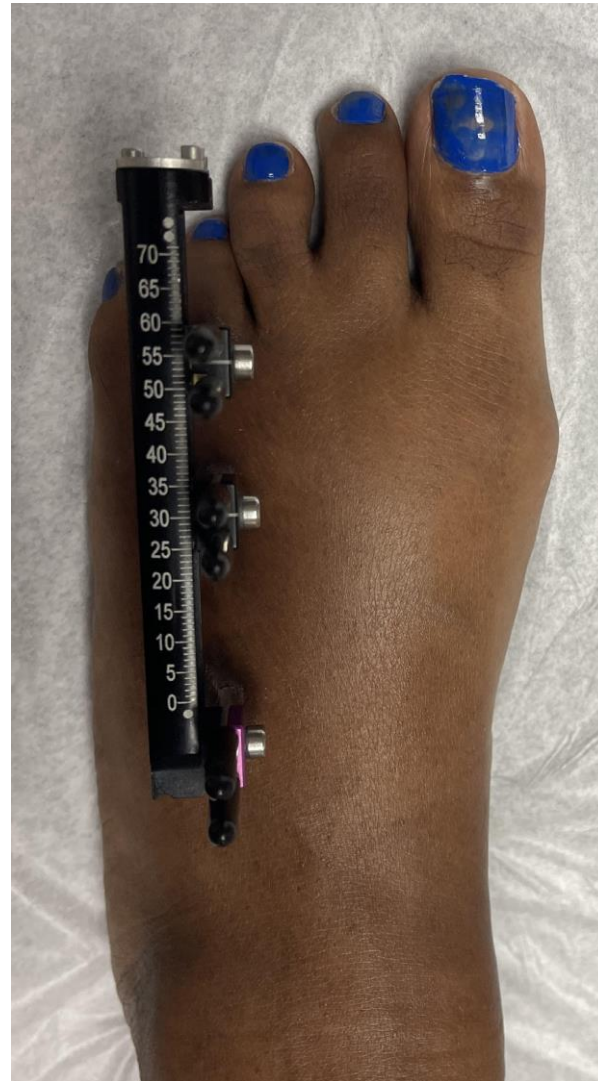
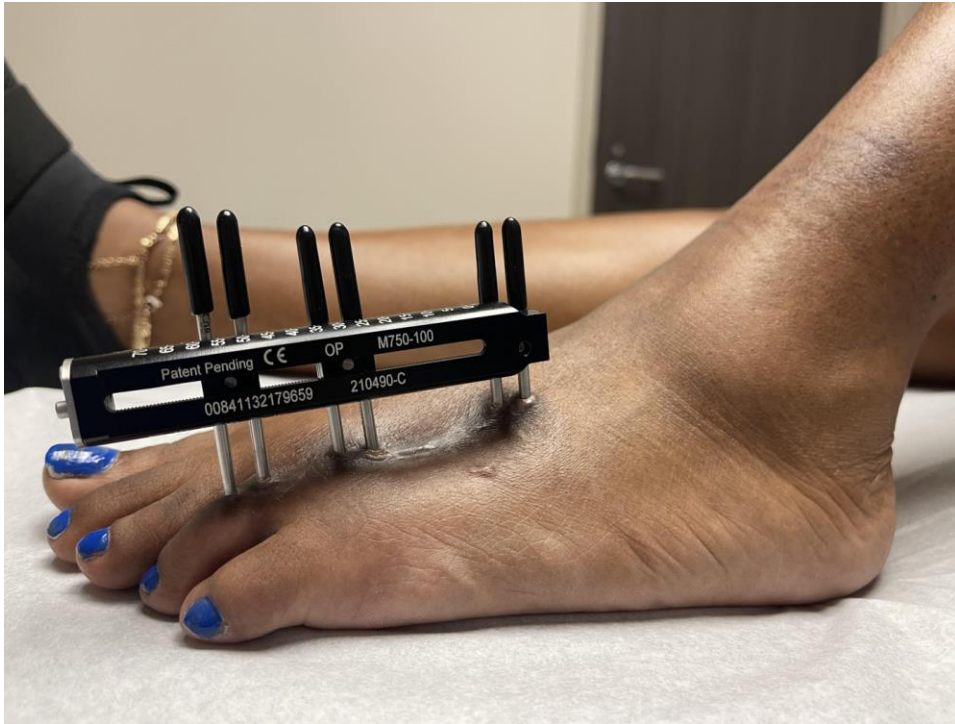
07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**



enquiries@corielortho.com



07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**

procedure

Osteotomy

- Ideally pre-drilled holes and osteotome
- Saw increase risk of poor bone formation

- Latent period 5-10 days
- Turning period 0.5mm-1mm per day
- Consolidation period- 1 month for every cm gained



enquiries@corielortho.com



07946 396194



www.corielortho.com



**CORIEL
ORTHOPAEDIC
GROUP**

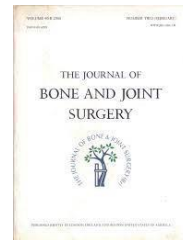
Conclusion

Gradual lengthening:

- Less soft tissue dissection
- More control
- Better functional outcome
- Better cosmesis

We conclude that the gradual lengthening by distraction osteogenesis after osteotomy using an osteotome produces the most reliable results for the treatment of fourth brachymetatarsia.

W.-C. Lee, J. H. Yoo, J.-S. Moon



enquiries@corielortho.com



07946 396194



www.corielortho.com