Hindfoot Arthrodesis

Introduction

This is basically a post on something that I have come across recently. It's presented in the form of a write-up of this treatment method including relevant anatomy and also the physiological reasons for this operation.

I will then link this to the original reason for looking this up - my patient! I will therefore present a mini case study of my patient and how she progressed following this treatment and also how come she ended up in my care.

Hindfoot Arthrodesis is basically a fusion of one or more of the joints that make up the hindfoot (the rear of the foot by the heel).

Simple enough - so lets delve a little deeper into this.

Anatomy

- Hind foot
  - talus
  - calcaneus

- Mid foot
  (b.t chopart’s&lisfran’s joints)
  - coneiforms
  - cuboid
  - navicular

- For foot
  - metatarsal
  - phalanges

Photo sourced from Taiz University, faculty of medicine and health sciences By Dr : Lamees Abdulrhman

The hindfoot is made up of:

- The Talus
- The Calcaneus
- The Cuboid
• The Navicular
• The Cuneiforms

There are 3 main joints that form the hindfoot:

• Subtalar Joint
  – Between the Calcaneus and Talus
• Talonavicular Joint
  – Between the Talus and the Navicular
• Calcaneocuboid Joints
  – Between the Calcaneus and Cuboid

There are of course other joints from these bones onto the lower limb and metatarsals to name just a few, however these aren’t relevant in a hindfoot arthrodesis.

Physiology - Why fuse the joints?

There are three main reasons that this operation is performed:

• Pain
• Deformity
• Stability

Often all of these factors come hand-in-hand. They are typically the result of arthritic changes and therefore this operation is often used to treat these problems, however it is also commonly used to treat congenital deformities (e.g. club foot) and also to treat several other foot conditions as you can see from this podiatry journal quote:

"Speaking in broad terms, the indications for this procedure include post-traumatic changes, inflammatory arthritides, advanced posterior tibial tendon dysfunction (PTTD), Charcot arthropathy and progressive neuromuscular disease. All of these etiologies cause a structural deformity including pes plano valgus, cavovarus, equinovarus and hindfoot varus or valgus."


The idea behind the operation is to create a stable and painless foot for performing all activities of daily living. However, return to all activities may not be possible due to a massive loss in the flexibility of the foot. This is because the patient will effectively no longer have up to three of the joints in their foot being fully functional. However having said this the benefits of pain-free mobility often outweigh this factor.

The surgery can be performed on a single joint, two joints or all three joints. Single arthrodesis is comparatively rare compared with double and triple. There is a lot of contradictory evidence as to which approach is best (double vs triple) as for a long time a triple arthrodesis was the gold standard for correcting hindfoot deformity, however evidence is showing that a double arthrodesis is just as effective (DeVries and Scharer 2015)
1) Incisions are made to allow the surgeon access to the joints to be fused. The location of these is dependent on various factors such as the number of joints to be fused and the surgeon’s preference. Usually these are located on each side of the ankle.

2) Worn and unnecessary cartilage and bone is trimmed and the two bones are positioned together with screws to stimulate them to grow together.

3) Allografts or Autografts may also be used. These are bone grafts either taken from ‘banked bone grafts’ (Allografts) or from the patient’s own bone (Autografts). Autografts are often taken from the iliac crest.

4) The skin and tissue is then closed.

5) The patient is then usually placed in a below knee backslab which is then converted to a full cast at a later stage. The patient is then educated on non-weightbearing.

6) Physiotherapy can then begin to allow the patient to at least transfer with a walking aid and some patients can be progressed to mobilising non-weightbearing.

Physiotherapy

These appear to be good guidelines to follow from The Royal National Orthopaedic Hospital NHS Trust:

Rehabilitation guidelines for patients undergoing subtalar and hindfoot fusion

It sets out the stages of post surgical recovery especially in regards to what the patient should be doing at different stages of weight bearing.

As you can see most of the Physiotherapy interventions are focussed around improving mobility, however as an MDT we often get involved in another way - discharge planning. That then leads me on the the case study that this research was in aid of.
Case Study

Photo by G. Crescoli / Unsplash

Background

- The patient is a 68 year old woman.
- She has suffered from severe OA and osteoporosis for many years.
- She has had multiple joint replacements in the past including bilateral knee replacements and a left hip replacement
- She had struggled with reduced mobility due to severe pain in her left foot and some left foot instability
- Options were discussed with the patient by her orthopaedic surgeon and a triple hindfoot arthrodesis with allograft

The Surgery

- Allograft was possibly chosen due to the poor nature of the patients bone (due to osteoporosis)
- Triple arthrodesis was chosen due to the amount of pain and the instability of the joints
- Surgery was uneventful and the patient recovered well
- No complications were reported
The patient was placed in a non-weightbearing below knee POP
The patient was advised of an initial non-weightbearing duration of 6 weeks and then this will be reviewed at clinic
The patient was progressed in hospital to transferring with a wheeled zimmer frame (WZF) and assistance of 1 (AO1)

Why ICB?

The patient was transferred to ICB as she was unable to complete stairs safely as non-weightbearing, was medically fit for discharge and was unable to return home downstairs living due to the home situation being unsuitable.
Therefore the goals for ICB were to progress her mobility and transfers as able whilst she was non-weightbearing and potentially look to do stairs
She would also stay in ICB until stairs were possible and transfers and short distance mobility were independent in order to discharge plan as needed - this may also mean that she is able to weight bare prior to returning home, however this isn’t part of the criteria for discharge.

Current Progress

Patient is 4 weeks through her non-weightbearing
She is able to complete all transfers independently and adhere to her non-weightbearing
She is able to mobilise short distances with a WZF independently
Future goals/prognosis

- Stair assessment and practice needed
- Fracture clinic review is planned for 2 weeks time and at this stage she could be PWB which could make stairs easier
- We may need to take the patient on a home visit in order to do her own stairs
- OT and Social Work assessments need to be completed in order to review any care needs and equipment needs for home and to make the patient as independent as possible with all ADLs

Conclusion

This operation is used to relieve pain, improve foot stability, stabilise fractures and improve quality of life.

In my patient, so far, this has worked very well and currently my patient is progressing well and we will be looking at progressing for a discharge home soon. The Physiotherapy side of this is currently more functional until the cast is removed and then the focus will shift to mobility (both of the patient in terms of walking and the ankle and foot).

Reference List


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