Biomechanical (Offloading the foot)
Off-Loading The Foot

Managing the Challenges
Off Loading the foot

- Why do we want to offload the foot? Several reasons.
- Corn/callus.
- Prominent bony deformity (bunion, hammer toes).
- Ulcers.
- Foot deformity (Charcot foot).
- Protection.
Off Loading the foot

- Effective offloading of the foot can be difficult to achieve.
- Some feet can be very difficult offload due to their shape or location of wounds.
Off Loading the foot

- Need to consider the forces involved
  - **Shear force**: when a material is moving in two or more directions at the same time
  - **Compression force**: when a material is squashed or squeezed between two or more opposing loads
  - **Frictional force**: when a material moves over a surface of a material while in contact with it creating a drag across the surface
  - **Tensile force/strain**: when a material is stretched by two or more opposing forces
Off Loading the foot

**Goal of offloading**
- To reduce the load or pressure on a given area or deflecting pressure.
- Can be achieved in a variety of methods.
- There is no 100% effective method they all have their place.
Off loading the foot

Considerations to off loading
- Location.
- Size.
- Oedema.
- Prominences.
- Amputations.
- Weight of the patient.
- Desired outcomes vs achievable outcomes.
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- Need to use appropriate off loading and reduce activity by 50%.
- The patients compliant will be the major issue in the healing rate.
- Any offloading device only works if it is used.
- Needs to be suitable for the client.
There are many different off loading techniques.
Off Loading the foot

- Footwear
  - The ideal shoe off loads the foot.
  - Protects the foot from injury.
  - Allows for the smooth transition of force through the foot.
  - Provides stability.
  - Allows normal gait.

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- Features of a good shoe
  - Adequate length and width
  - Good room in shoe/shoe fits the foot
  - Firm heel counter
  - Support in the mid sole
  - Good fastening system on shoe
  - Good outer sole
  - Made of a suitable material
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- How to check shoe size
Off Loading the foot

- Achilles accommodation
- Firm Heel Counter
- Firm Midsole (not able to "wring" out shoe)
- Fastening (lace up/velcro fastening)
- Breathable upper (Leather)
- Deep toe Box
- Slight Rocker sole
Off Loading the foot

- **Rocker soled shoes**
  - Aim to allow a smooth transition of load through the foot
  - Decreases the pressure on the forefoot and the metatarsal heads
  - Decreases joint movement at forefoot, mid foot & ankle joint
  - Spreads weight evenly over plantar surface of foot
Off Loading the foot
Off loading the foot

- **Debridement**
- **Corns/callus**
  - Callus tissue produces pressure on the underlying tissue and can result in tissue breakdown and ulceration.
  - Careful debridement offloads the area.
  - May be combines with some padding to relieve pressure.
  - Toe cap
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- Felt
  - Initially may use self adhesive felt to off load high pressure areas
  - 5mm -10mm felt
  - Simple to apply
  - compresses easily
  - Check if they have any tape sensitivities
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- **Soft Orthotics**
  - Multi density EVA foot support
  - Can be pre-fab or custom made.
  - Allows more even weight distribution across the entire foot.
  - Relieve high pressure areas such as ulcers, amputation areas and callus.
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- Post op shoes
  - There are may different types of post-op shoes available.
  - They often have different features to offload the foot.
  - Often have good depth.
  - Can be combined with insoles or padding.
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- Diabetic post op shoe
  - Has removable peg insole. Remove plugs required to off load area required.
  - Easily adjustable
  - Velcro fasteners
  - Can be modified
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- Wound healing shoe
- Rocker sole, allows smoother transition of forces.
- Has 4 different densities of insole material which can be easily modified or adjusted to offload high pressure areas.
- More durable
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- CAM walkers or Diabetic walkers
- Moon boot
  - There are many styles and types of CAM walkers
    - Foam lined
    - Air cells
    - Toes open / closed
    - + / - foot bed
    - Rocker soles
    - Width and depth can vary
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- Can effectively off load the foot.
- May not fit severe deformity of the foot.
- Most can fit a custom orthoses.
- Limb length discrepancy.
- Balance issue, safety issue.
- Driving can be an issue.
Off Loading the foot
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- TCC (Total Contact Casting)

- Indications
  - Used in neuropathic foot ulcers and Charcot joint destruction.
  - Circulation must be adequate, no infection.
  - Wound must be wider than it is deeper.
  - Helps maintain foot structure whilst consolidation occurs.
Off Loading the foot

- Total contact casting
- Involves serial casting.
- Compliance is assured
- Mobility issues
- Limb length discrepancy
- Not suitable for everyone.
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- **CROW (Charcot restraint orthotic walker)**
  - Is a custom made brace made for foot deformity. Made by orthotists.
  - Foot needs to be stable.
  - Is quite conforming.
  - Used for long term foot deformity.
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- **AFO (Ankle foot orthoses)**
  - Used to off load specific areas of the foot.
  - Used to stabilize joints or deformity of joints.
  - May need custom footwear
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- PRAFO (pressure relief ankle foot orthoses)
  - Useful for heel pressure wounds/ulcers
  - Keeps pressure off heel
  - Maintains ankle position
  - A walking sole allows limited mobility ankle position off heel.
  - Designed to be worn when in bed
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- BRAFO (bed resting ankle foot orthoses)
- Non ambulatory device used in bed
- Maintains ankle position
- Keeps pressure off heel
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- Foam BRAFO
- Non ambulatory
- For long term bed rest
- Useful for pressure care or heel or malleolar ulcers
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- Kneeling walker
  - Usually combined with a CAM walker.
  - Need to be fit to use a knee walker.
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- Wheel chair
  - Sometimes a wheel chair may be the best option.
  - Stability/safety issues.
  - Weight issues.
  - Age.

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Managing the Challenges
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