

6 steps to offloading diabetic feet;

IN TIME

Identify, **N**egotiate,
Target, **I**mprove, **M**odify, **E**ducate

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Ulcer prevention



Step 1. Identify & include people at greatest biomechanical risk

- Diabetic
- Neuropathic
- Presence or progression of foot deformity
- Limited foot & ankle mobility
- Excessive callus

[Iwgdf prevention-guideline-2023](#)

Van Netten



Step 1. Identify & include people at greatest biomechanical risk



Most active participants were 80% less at risk for foot ulcer than the least active participants

(Le Master et al 2003)

Clinical challenges

Poor patient adherence

< 40% of people with diabetes wear their footwear for 60% of the daytime

>40% of people are confused by basic health information

Step 2.

Negotiate footwear options and readiness for insoles



Shared decision making

What will happen if I wait and see?

What are the footwear and offloading options?

Which options am I eligible for?

What are the benefits and risks of each option?

What should I think about when choosing an option?

Do I have enough information to make a choice?

Hoffman 2014



Step 2. Negotiate footwear options and readiness for insoles

Patient Category	Treatment options	
Deformity, Pressure, Pre-ulcerative lesion	• Do nothing wait and see • Use Offloading insoles • Use extra-depth shoes • Use custom-made footwear	
Recently healed, Ulcer history Ulcer if other offloading devices are contraindicated or not tolerated	• Usual footwear • Extra depth footwear and custom insoles • Custom-made therapeutic footwear and insoles • Support to wear prescribed footwear and orthosis, both indoors and outdoors • In combination with SCF	 

Step 3.

Define the treatment objectives

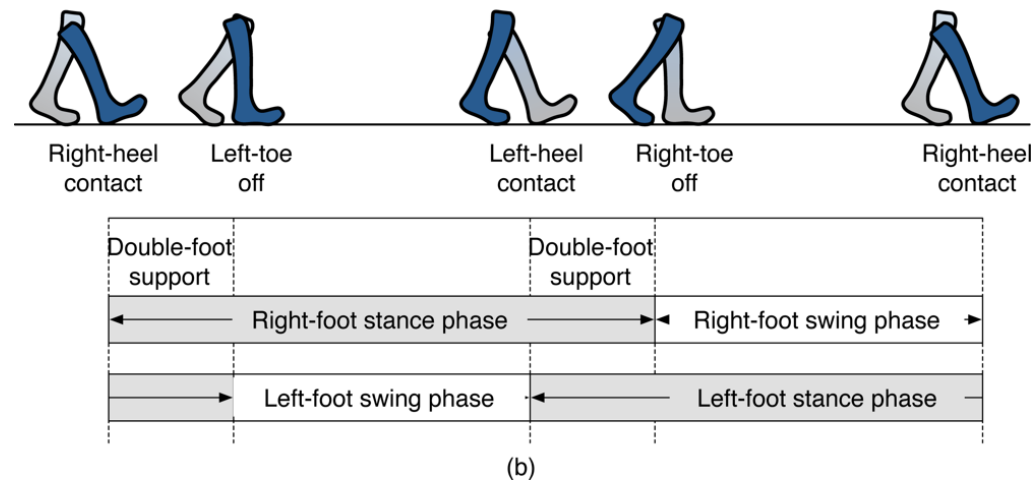
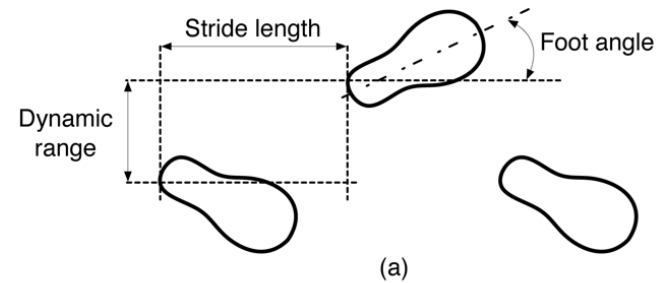
Protect and offload the diabetic foot

- 1) Meet the preferences, cultural and social needs of the patient
- 2) Increase joint mobility and muscle strength
- 3) Maintain postural stability and balance confidence
- 4) Relieve areas of excessive plantar pressure
- 5) Reduce shear



Step 4. Improve joint mobility

Diabetic Foot Biomechanics and
Gait Dysfunction
James S. Wrobel, D.P.M., M.S. and
Bijan Najafi, Ph.D., M.S.



Step 4.

Improve joint mobility and balance



Ankle ROM increased 1.5cm



Ankle and 1st metatarsophalangeal joint mobilisations and a home programme of stretches

Proof of concept RCT: Lepesis 2023



Functional reach increased 3cm

Step 4: Increase muscle strength

- One leg standing
- Sitting to stand
- Heel raises
- Cycling motion with/ without resistance bands
- Alternating dorsiflexion and plantarflexion, inversion and eversion

Van Nattan 2023

Step 5.

Modify the insole and footwear

Identify the region of interest

- Site of pre- ulcerative callus
- Site of previous ulceration
- Area of peak pressure



Peak Pressures are a strong contributing factor in the development and healing of neuropathic ulcer.

Step 5.

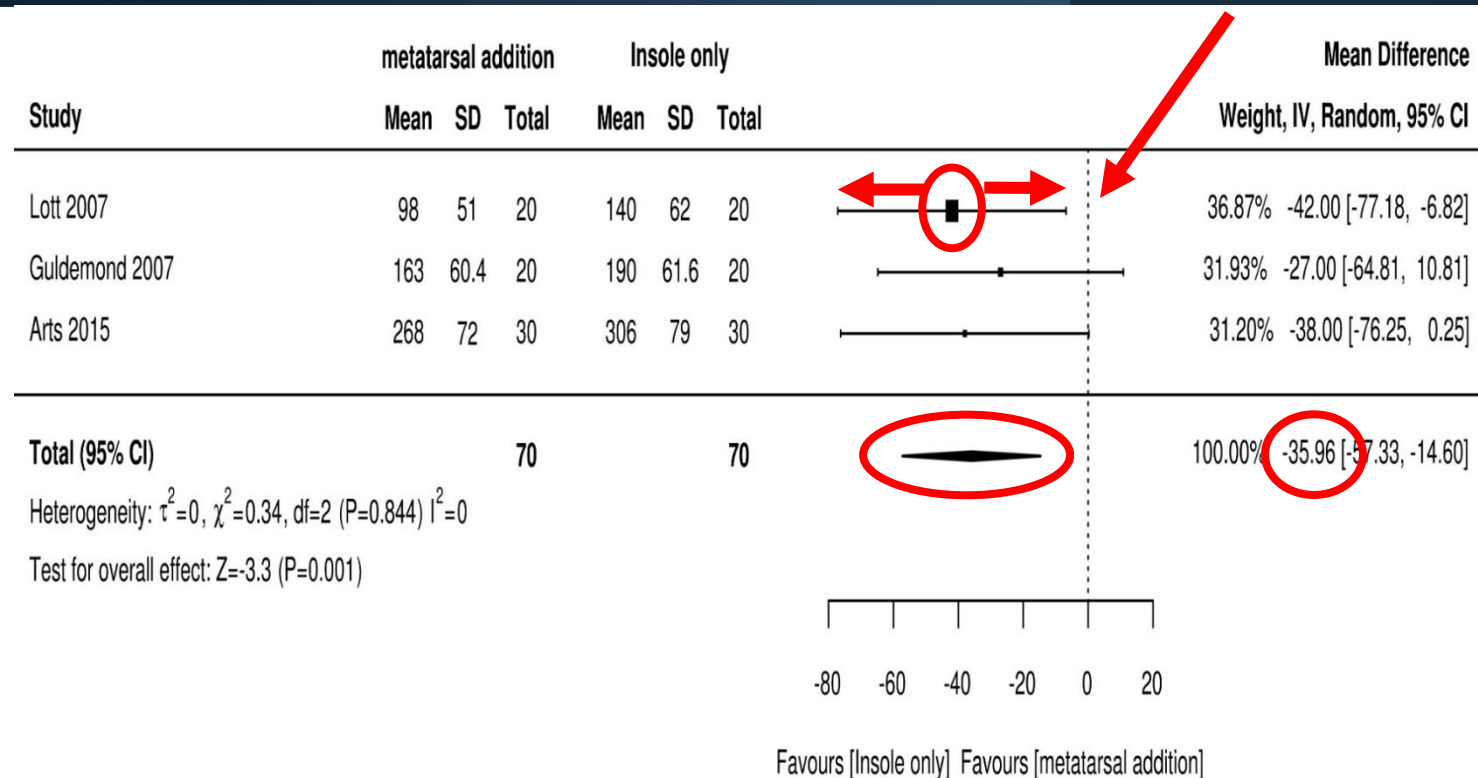
Modify the insole and footwear

Treatment objectives to protect and offload the diabetic foot

- 1) Meet the preferences, cultural and social needs of the patient
- 2) Maintain postural stability and balance confidence
- 3) Relieve areas of excessive plantar pressure
- 4) Reduce shear



Offloading: Metatarsal addition -35.96 kPa (Collings 2020)



Offloading: Arch Profile -37kPa (Collings 2020)

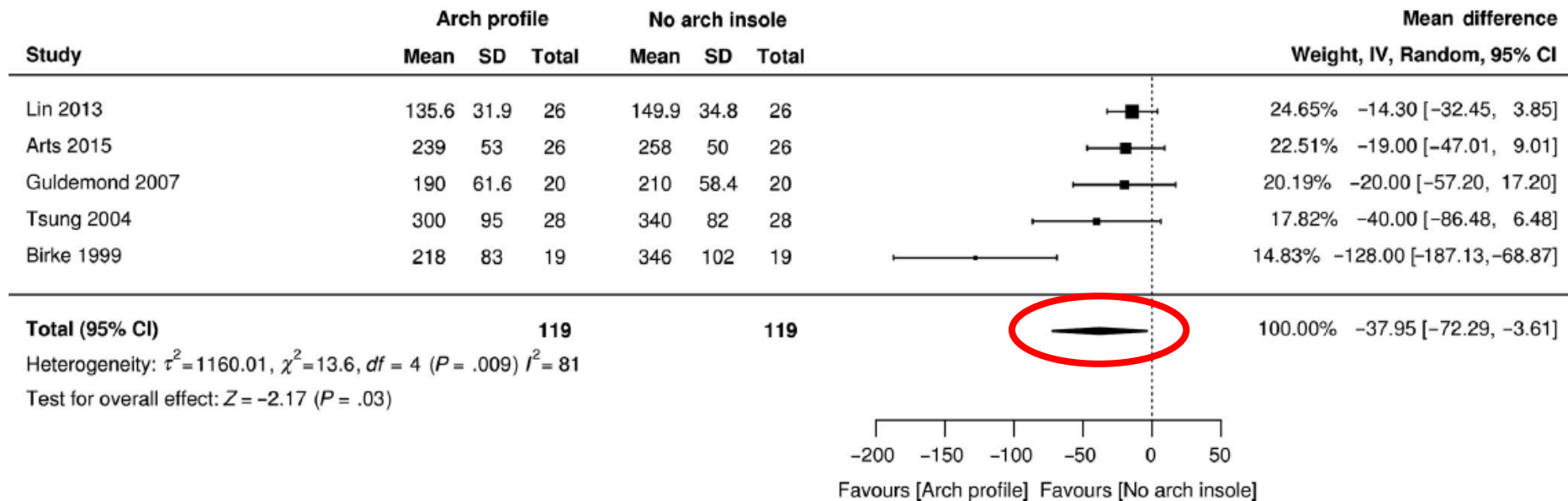
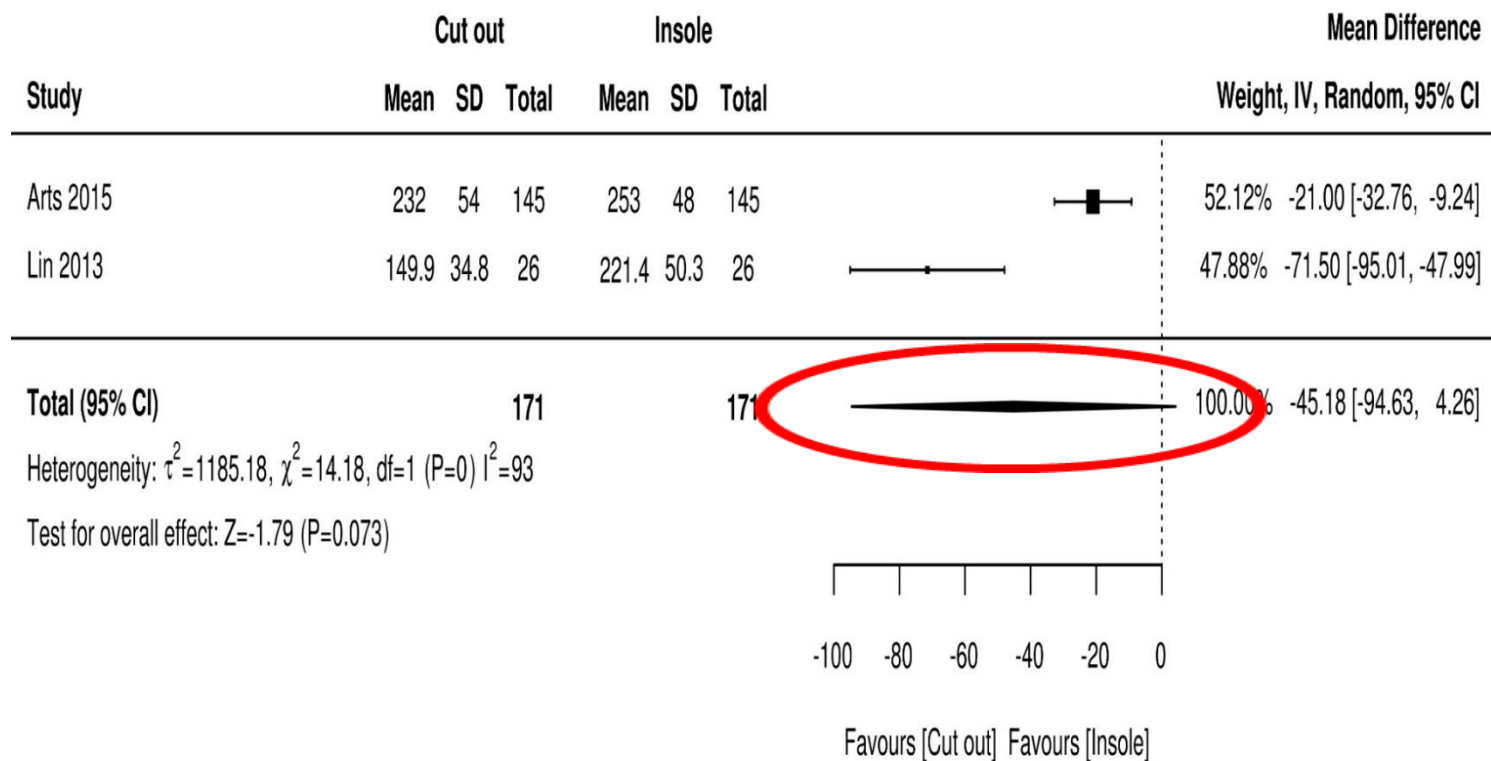
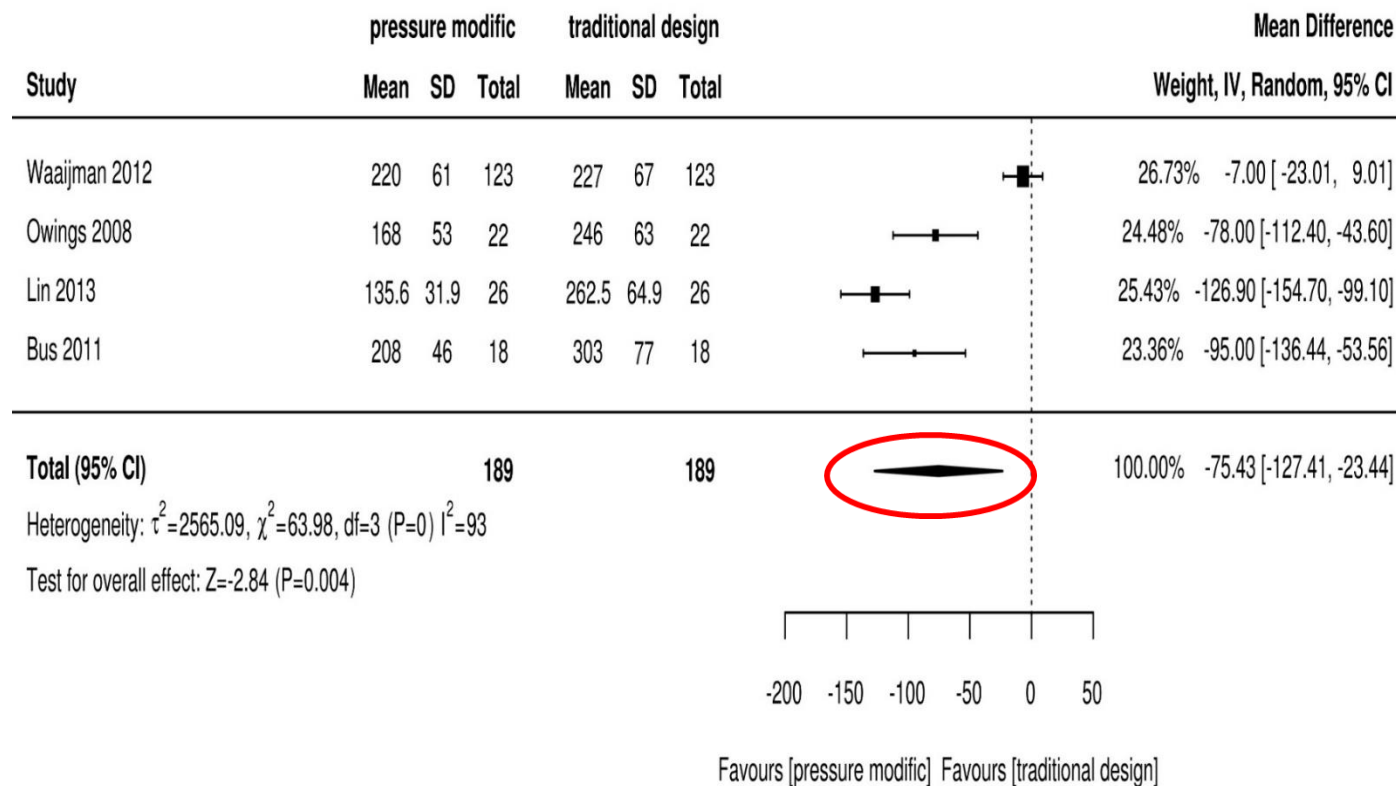


FIGURE 2 Forest plot of peak pressure for arch profile

Offloading: Aperture -45.18 kPa (Collings 2020)



Offloading: Data driven designs -75.4 kPa (Collings 2020)

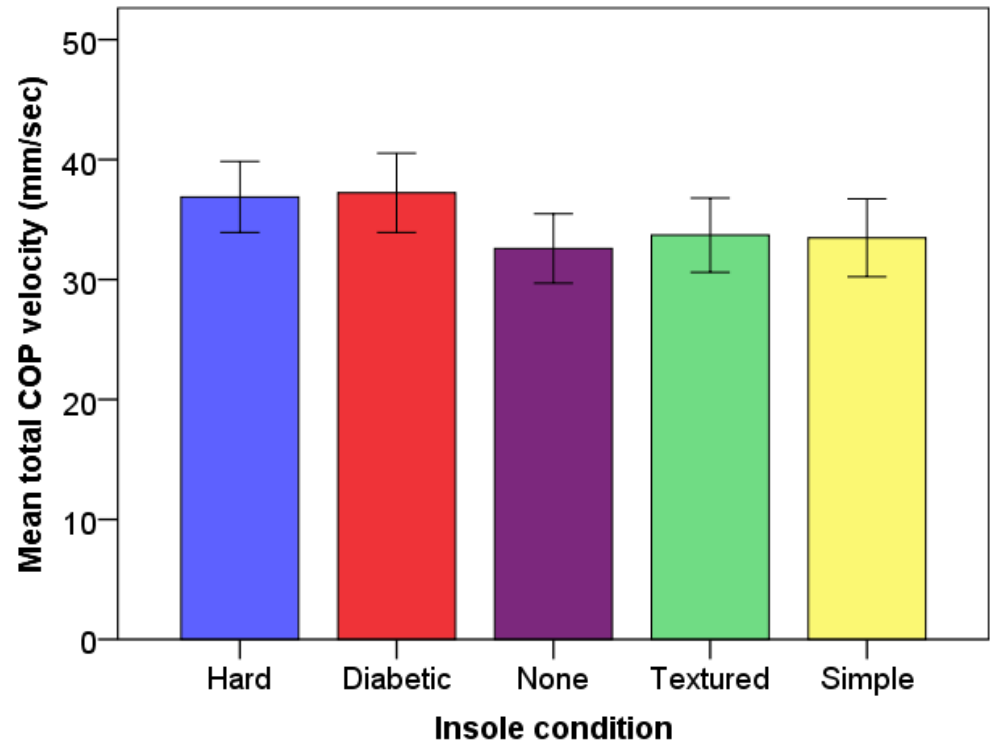


Maintain postural stability

Reduce arch contact

replace with met
bars/pads/domes

plus Targeted offloading



Arch fills increase fear of falling in some patients

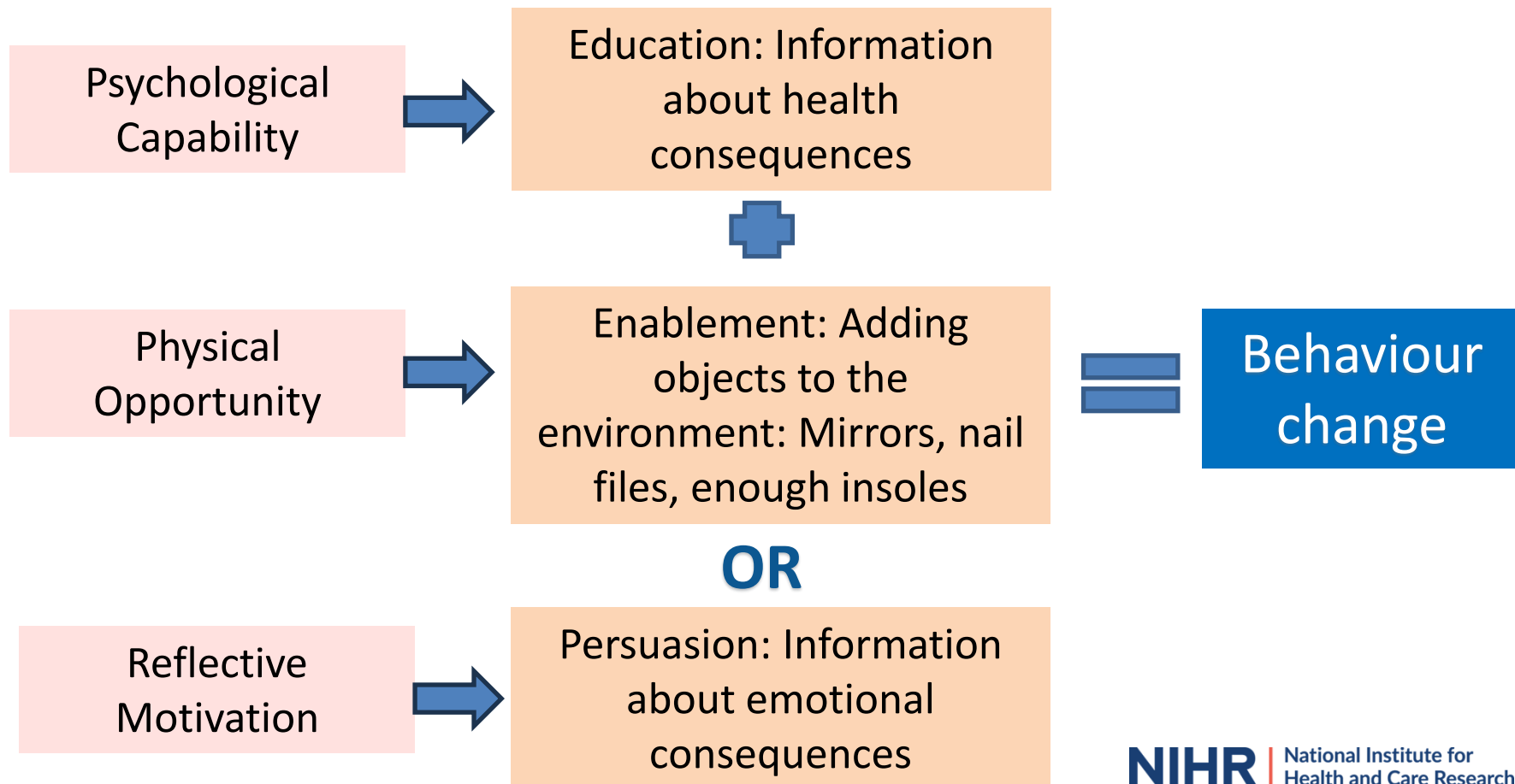
Getting the right balance: insole design alters the static balance of people with diabetes and neuropathy

Joanne Paton*, Sam Glasser, Richard Collings, Jon Marsden

JFAR (2016)

Step 6. **Educate** to build-up wear and promote self-care

Behaviour change techniques used to prevent diabetic foot ulceration: A scoping review. Paton, Abey, Hendy, Callaghan, Creanor. JFAR 2021



Step 6. **Educate** to build-up wear and promote self-care

Intervention function and BCT

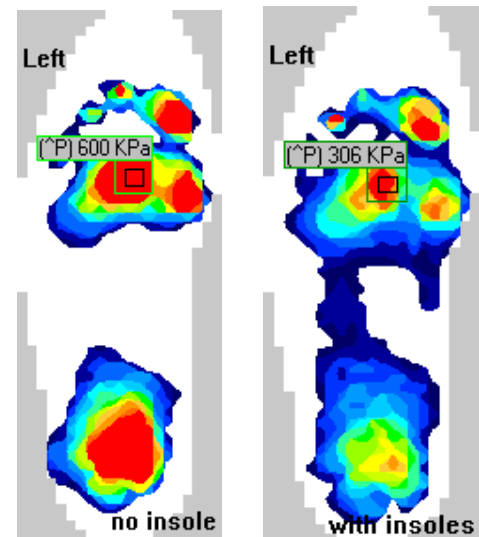
Education: Information
about health
consequences



Intervention Content

Visual feedback pressure map 'hot spots':
Personalised education about ulcer risk
and insole benefit

How to 'break-in' my insoles and/or footwear
Phased programme of increasing wear
What are the danger signs
What action is needed
Who to contact, when and how



Step 6. **Educate** to build-up wear and promote self-care

Intervention function and BCT



Enablement: Adding objects to the environment

Training: Instruct how to perform a behaviour



Intervention Content



Fit enough insoles into enough appropriately fitting shoes.

Instructions on how to self-review insoles and get replacements.

Step 6. **Educate** to build-up wear and promote self-care

Intervention function and BCT

Enablement:
Commitment. Action
planning. Goal setting

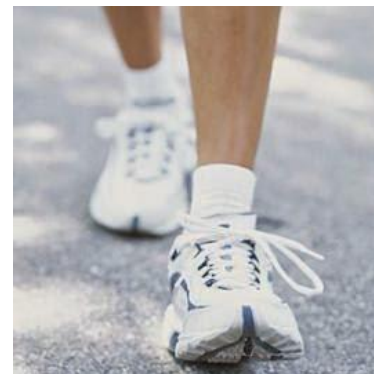


Intervention Content

At follow up: Review comfort

Explore footwear usage, make treatment decisions, plan how to incorporate insoles into a typical day.

At follow up: Review adherence modify goals



Practice Points



6 steps to offloading diabetic feet; **IN TIME**

1. **I**dentify and include people at greatest biomechanical risk
2. **N**egotiate insole acceptance
3. Define the **T**reatment aims
4. **I**mprove joint mobility and **I**ncrease muscle strength
5. **M**odify insole and footwear for pressure, balance, shear & acceptability
6. **E**ducate to build-up wear and promote self-care

Community of clinicians with a
passion to make a difference

Acknowledgment:

My team for their contribution



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Collings R, Freeman J, Latour J, Hosking J & Paton 2023
'Insoles to ease plantar pressure in people with diabetes and peripheral neuropathy: a feasibility randomized controlled trial with an embedded qualitative study' Pilot and Feasibility Studies

Paton J, Abey S, Hendy P, Callaghan L & Creanor 2021
Behaviour change techniques used to prevent diabetic foot ulceration: A scoping review. JFAR.

Paton J, Glasser S, Collings R & Marsden 2016
Getting the right balance; Insole design alters the static balance of people with diabetes and neuropathy. JFAR.