



Diabetic Foot Clinics

Setting the Standards

MARINA DAVIS BOccThy; MBA (Health Management)
Network Manager, NSW Diabetes Taskforce, NSW Agency for Clinical Innovation

Prof. STEPHEN M. TWIGG MBBS(Hons-I), PhD, FRACP,
Kellion Professor of Endocrinology, Acting Dean of CCS, The University of Sydney
Head, Dept of Endocrinology, Royal Prince Alfred Hospital

VANESSA NUBE Dip Pod, MSc (Med)
Director Podiatry, Sydney Local Health District

SAYED AHMED Cert. Pedorthist CM (Au) B.Sc. in Footwear Eng. MBA (MIS)
Director, Foot Balance Technology Pty Ltd, Honorary Pedorthist, HRFS Nepean

Agenda – 1 hour 15 mins

- PRESENTATION of DISCUSSION TOPICS – 20 mins
 - Time to referral, access and intake *Marina Davis*
 - **Multidisciplinary Approach** *Vanessa Nube*
 - Offloading including Medical Grade Footwear *Sayed Ahmed*
 - **Indicators in quality improvement and translation of evidence**
Stephen Twigg
- DISCUSSION GROUPS x4 – 20 mins (concurrent)
- PRESENTATIONS from GROUPS x4 – 5 mins each
- SUMMARY of KEY MESSAGES and LESSONS LEARNED

1. Time to Referral, Access, and Intake

Why is it important?

- The *National Evidence Based Guidelines* recommend that foot ulceration as a serious complication needs immediate management by a coordinated multidisciplinary service (1)
- Delay in access to treatment are risk factors for failed wound healing and amputation; increased wound size; and poorer outcomes (2)

However....

- There is inequitable access to HRFS with variation in amputation rates across geographical regions and population groups
- Delayed time to referral and presentation to HRFS
 - Patient-related behaviour (no pain = delayed presentation)
 - Health professional behaviour (foot screening; clinical significance)

(1) National Evidence-Based Guideline on Prevention (2011). Identification and Management of Foot Complications in Diabetes (Part of the Guidelines on Management of Type 2 Diabetes). NHMRC: Melbourne.

(2) Prompers, L. et al (2008). Prediction of Outcome in Individuals with Diabetic Foot Ulcers: focus on the differences between individuals with and without Peripheral Arterial Disease. The EURODIALE Study. *Diabetologia*. 51, pp. 747-55.

1. Time to Referral, Access and Intake

What needs to change?

- **Don't be hard to find** – for referrers and patients (e.g. Health Pathways, hospital intranet, signage).
- **Continuity and Coordination of care** – screening and risk stratification in primary care; defined intake criteria with senior clinician input; continuity across inpatient and outpatient care; step-down services.
- **Partnerships** – Primary care and Primary Health Networks, Aboriginal Community Controlled Organisations, community-based and private podiatry.
- **Cultural considerations** – involvement of Aboriginal Liaison Officers & Aboriginal Health Workers; physical environment; education/promotion of services at local events.

2. The Multidisciplinary Team Key players?

Rapid access and prompt assessment (& staging):
Infection, vascular, mechanical/footwear, wound

- **Podiatrist**

Re-vascularisation of the ischaemic limb*

- **Interv. Radiology,**
- **Vascular Surgeon**

Surgical excision & drainage infected tissue *

- **Surgeon (Ortho, Vasc, General)**

Optimise glycaemic control and manage co-morbidities

- **Endocrinologist & Diabetes Educator**

Frequent debridement of callus & necrotic tissue

- **Podiatrist**

Management of infection*

- **Endocrinologist**
- **Infectious disease**
- **Podiatrist**

Pressure offloading (Short & long term)

- **Orthotist**
- **Pedorthist**

Huang 2014: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4232430/>

Fitzgerald 2009: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2680239/>

2. Why a MDT and not referral pathways?

- Debridement → Assessment → Better clinical decision making
- Management decisions can occur with all relevant information available and treatment can be tightly co-ordinated
- Teamwork



2. Pressure Offloading & Footwear

- Pressure offloading essential for healing ^{1,2}
- Strongest evidence ^{1,2}
 - Total contact casting or
 - Removable cast walker made irremovable
- In reality , clinical practice is not closely aligned to the research^{3,4}
 - Many patients are not good candidates for irremovable devices
 - Majority of evidence is for plantar forefoot ulcers
 - In-shoe pressure analysis is not widely accessible
 - Equipment is costly, highly technical
 - Assessments are time consuming

1. <https://www.baker.edu.au/impact/guidelines/guideline-foot-complication>.

2. http://www.iwgdf.org/files/2015/website_footwearoffloading.pdf.

3. Raspovic A JFootAnkleRes(2014) 4. Wu SC Diabetes Care (2008)

Individualised and often innovative solutions are needed using the full scope of podiatry, orthotic and pedorthic skills



Total contact cast for DFU and Charcot Neuroarthropathy

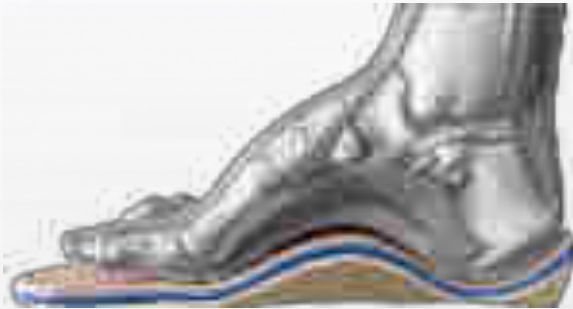


Slipper casts



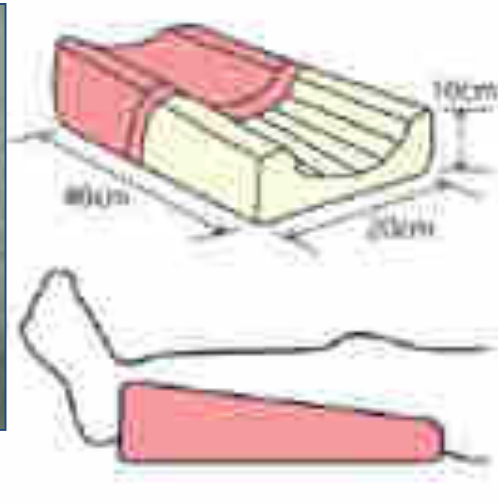
Bi-valved TCC

2. Pressure Offloading & Footwear



**Recommended Pressure offloading:
Removable cast walker and orthoses**

2. Pressure Offloading & Footwear - Inpatient



2. Pressure Offloading – Additional options





3. Pressure offloading: Secondary Prevention

- **Patients require offloading in temporary devices for healing**
 - Increased efficacy in terms of pressure offloading
 - Not feasible long term
- **Appropriate footwear lifelong to prevent re-ulceration**
- **Normal** foot shape ➡ Appropriately fitted comfort/sports
- **Abnormal** foot shape ➡ Medical Grade + Custom orthoses
 - Off-the-shelf
 - Custom made (broad range of modifications to accommodate, support and improve function)

ICM

Effectiveness of a new brand of stock 'diabetic' shoes to protect against diabetic foot ulcer relapse. A prospective cohort study

K. Busch and E. Chantelau



The first year annual rate of foot ulcer relapse was significantly different between the groups: 60% without SDS vs. 15% with SDS

Photo Courtesy: Schein.de

3. Pressure offloading: Secondary Prevention



(Cavanagh et al. 2004)



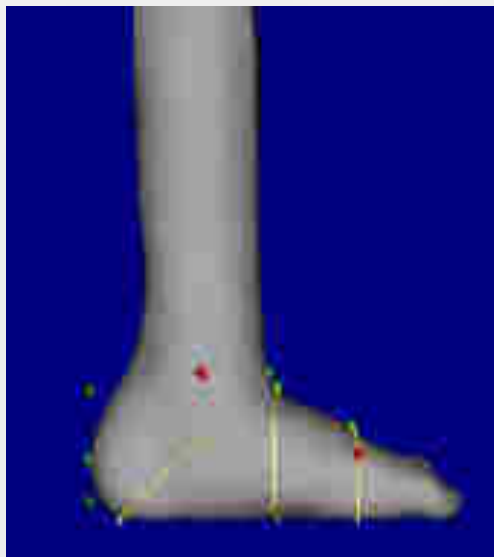
Data driven approach for footwear design specification

Research: Complications

Data-driven directions for effective footwear provision for the high-risk diabetic foot

Y. Al-Araji¹, M. de Haan¹, J. Wang¹, R. Chinnai², H. Kerschbaum², A. J. J. van't Hof¹ and S. A. Bilby¹

¹Footwear Science Centre, University of Wollongong, Australia; ²Department of Health, Behavior and Society, Johns Hopkins University, Baltimore, Maryland, USA



* University

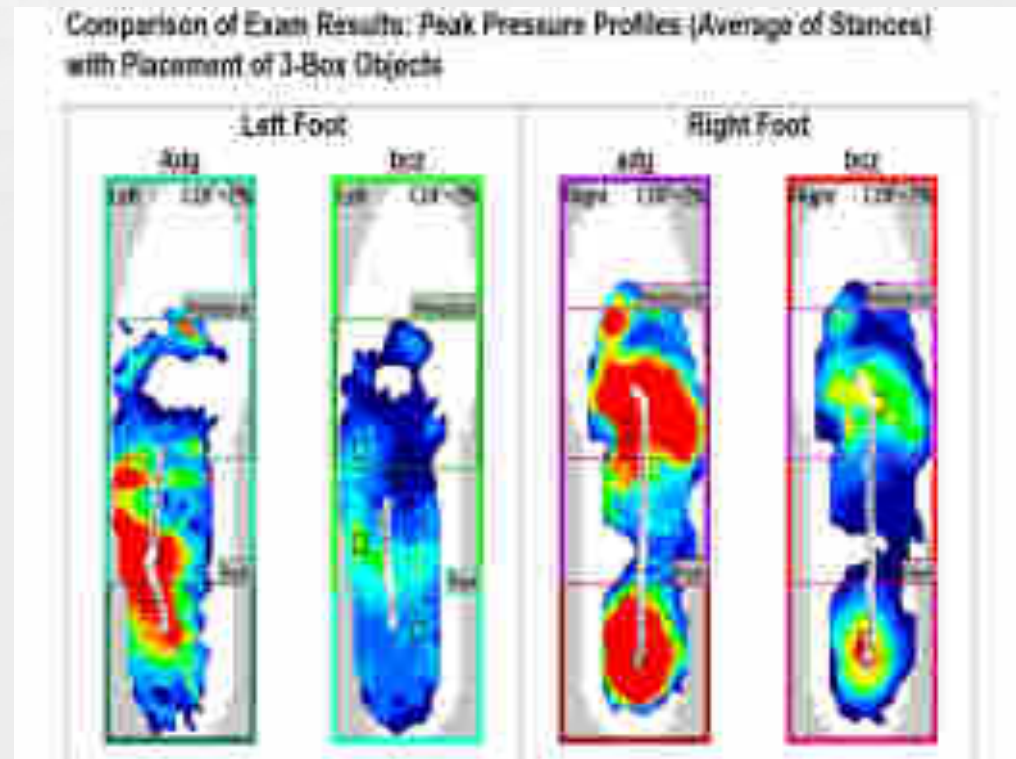


Image courtesy: Tekscan/Bilby Shoes

4. Indicators Supporting Standards, Quality Improvement & Research Translation

- Indicators must be meaningful and relevant, readily documented and able to be addressed/influenced by the service
- Indicators should help to facilitate clinical improvement and provide opportunities for research translation; examples include:
 - 'structural' such as staffing and location and equipment
 - 'process' such as time to referral, or clinical care guidelines usage and review timing;
 - 'case mix' such as patient demographic, ulcer characteristics
 - 'outcome' such as % foot ulcer healing and median time to healing, % amputation – major or minor; patient experiences)

Some High Risk Foot Service Key Performance Indicators

Outcome	Case mix	Process
Healing rate (%) of foot ulcers at 3 and 12 months	Patient demographics	Time to presentation from ulcer occurrence
Time to healing of foot ulcers overall and by Texas stage and grade	Ulcer severity using Texas stage and grade ¹⁴	
Re-ulceration rate for patients attending the HRFS including follow-up period	Past history of foot ulceration	
Rate and level of amputation for patients attending the HRFS including follow-up period		

Developing Meaningful Performance Indicators for Diabetes High Risk Foot Services

Nube V, Veldhoen D, Frank G, Bolton T, Twigg SM.

Wound Practice and Res. 22(4): 221-225.

An Example: Overall Performance of a HRFS (Healing of Ulcers and Amputations)

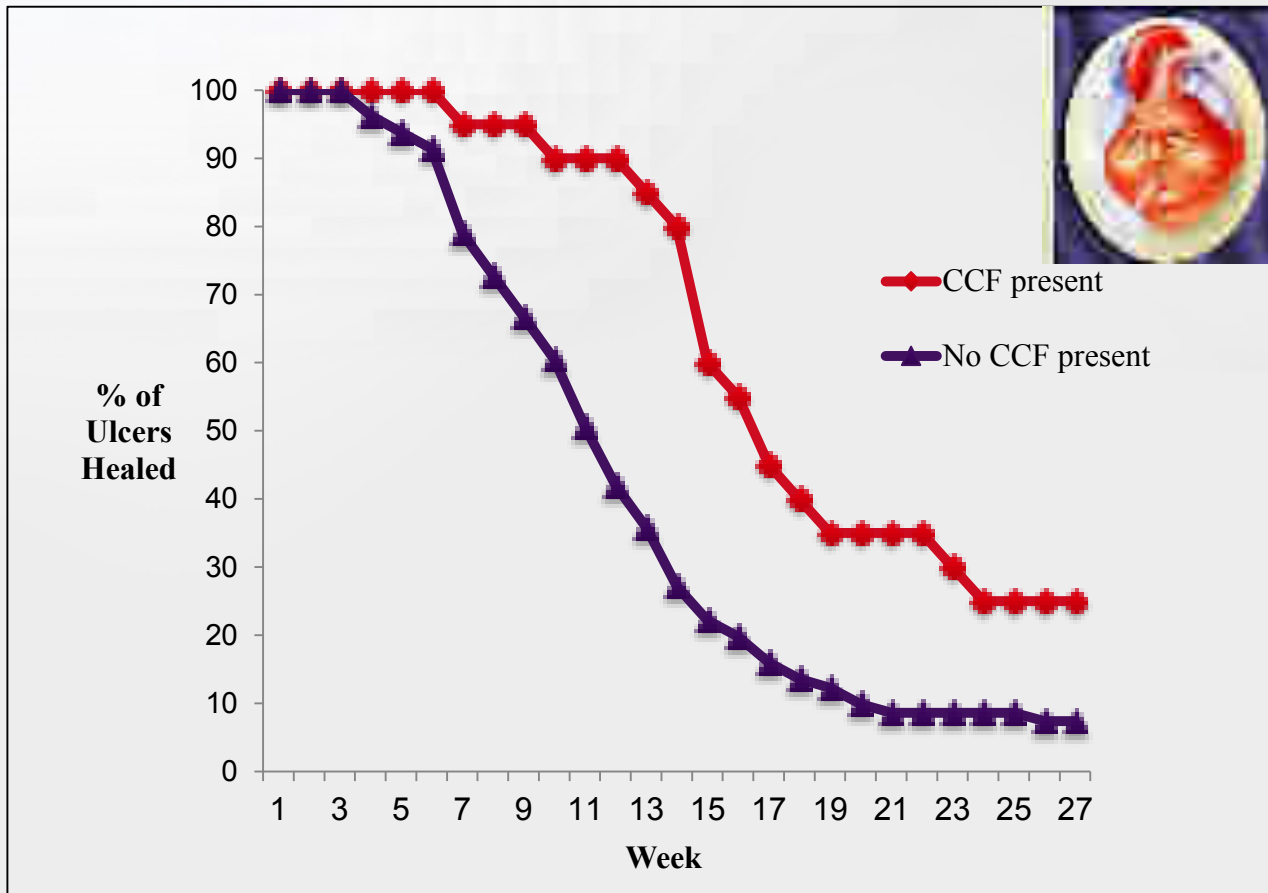
	95-99 (n=294)	'00 (n=388)	04-07 (n=427)	08-12 (n=344)
Overall healing (%)	65	63	64	63 83% (12 months)
Neuropathic (%)	72	72	72	71
Neuro-ischaemic (%)	50	52	50	55
Healing time (days)	80 [36-161]	64 [29-126]	76 [36-147]	54 [28-104]
Amputation (%)	5.8	5.8	8.4	10.8
Toes (%)	76	77	84	89
Forefoot (%)	14	8	9	6
Below Knee (%)	10	15	7	5
Presentation since ulcer onset (days)	55 [17-140]	49 [49-238]	33 [22-122]	30 [17-90]

Severity of Foot Disease at the RPAH HRFS

	'00-'03 (n=454)	'04-'07 (n=595)	'08-'12 (n=525)
Texan Grading*			
Epidermis (%)	85.3	86.5	81.8
Tendon (%)	5.0	7.1	9.9
Bone (%)	6.3	5.8	7.6
Texan Staging*			
Infected (%)	54.1	49.4	41.2
Ischaemic (%)	6.6	7.3	13.3
Infected & Ischaemic (%)	17.2	22.2	21.3

* $\chi^2, p < 0.0001$

Example of an Audit HRFS Database: Heart Failure (CCF) Presence as a Co-morbidity Predicts Delayed Healing in Foot Ulcers in Diabetes



n=107

Rhou YJ, Henshaw FR, McGill MJ, Twigg SM.
J. Diab. Comp. 2015; 29(4): 556-62.

1. Time to Referral, Access and Intake

Group 1 discussion

1. What is an acceptable time to referral for new and recurrent patients?
2. What strategies should services be using to support timely and appropriate access to care?
3. How can services measure success (in regards to the above)?
4. Is it useful to relate time to referral to clinical outcomes in each patient case?
5. Are there additional changes needed to facilitate access by Indigenous peoples?

2. Multidisciplinary Approach

Group 2 Discussion

1. Is there a need for both a Co-ordinator and a Champion/Lead clinician, in HRFS? What disciplines may they serve and what key functions can they best undertake?
2. Describe the required quantity and nature of Vascular consultation for a High Risk Foot Service ? Consider the following:
 - a) How many hours do you need?
 - b) Is on call enough or do you need a designated time/session?
 - c) Does it matter if it's a registrar or the consultant?
 - d) Which patients should they see (if not all) – referral criteria?
 - e) Does how they are employed matter (VMO, Staff Specialist)
3. Describe the required quantity and nature of Orthopaedic consultation for a HRFS? Consider the points above

3. Pressure Offloading & Footwear

Group 3 discussion

1. What services and appliances should the HRFS provide for pressure offloading to promote healing ?
2. Should the HRFS be responsible for providing total contact casting?
3. Should the HRFS be responsible for long term offloading (secondary prevention) after healing?
4. How can provision of footwear be achieved?
 - Consider how Medical Grade Footwear and other forms of appropriate footwear can be accessed / funded

4. Indicators to support local standards sustainability, quality improvement and research translation

Group 4 Discussion Questions

1. Does having a system to monitor indicators need to be an indicator?
2. If you had to choose 4 indicators for the HRFS to reflect quality in care, what would you measure and why?
3. Should NADC follow an accreditation model for HRFS or is a self-assessment by HRFS a better approach?
4. Should NADC require evidence of serial patient documentation and/or file audits to determine compliance with standards?
5. What holistic or consumer aspects of patient care may be missing in many QA programs?
6. How can centres of HRFS Excellence or Best Practice, be distinguished from the minimum standards for HRFS?

Wrap up key points and lessons learned

NADC would like to know:

- Are there any new issues that have been identified that **need** to be covered in the standards (have we forgotten anything)?
- What should we focus on with regards to moving the standards forward?



**Thank you for helping to Set the Standard
for **Diabetes High-Risk** Foot Clinics**