Scottish Diabetes Foot Action Group: The WIfI Project 2024

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Key words

- Diabetic foot care
- Lower-limb amputation
- WIfI

Article points

1. The WIfI system offers benefits over alternative classification systems due to the incorporation of wound depth, infection severity, and ischemia. However, implementation challenges are reported
2. Two Scottish Health boards audited the impact of introducing WIfI into every day podiatric assessments.
3. Transitioning to WIfI requires new equipment and training but will improve patient outcomes and communication across medical specialities despite higher costs and time investment.

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Diabetes mellitus reportedly affects 5.6% of the Scottish population, a number that is increasing by ~0.1% annually. In Scotland, 4.7% of people with diabetes will experience foot ulceration in their lives, with 0.5% undergoing lower-limb amputation (Scottish Diabetes Data Group, [SDDG] 2018). It is estimated that care costs for people with diabetes account for £1 billion of the £13 billion total spend of NHS Scotland (Colhoun and McKnight, 2020). The main causes of diabetic foot disease leading to amputation are peripheral arterial disease (PAD) in combination with damage to small nerves and blood vessels secondary to hyperglycaemia (Weledji and Fokam, 2014). Many healthcare professionals are involved in the management of PAD and chronic limb-threatening ischaemia, and variability in practice patterns and access to services is high, which contributes to a disparity in assessment, treatments and clinical outcomes. The aim of the study was to assess whether the use of the WIFI classification system is feasible in busy, specialised podiatry wound care clinical settings.

It has been suggested that some of the amputations and early mortality associated with diabetic foot disease could be prevented by more effective diagnostic and therapeutic approaches to foot ulceration (Weledji and Fokam, 2014). However, effective care requires clear classification to aid diagnosis and stratification. This will, in turn, gain consensus and can begin to represent a common language to communicate with other medical professionals who can then inform treatment pathways and support best practice for the right treatment at the right time (Rodgers et al, 2013).

Various wound evaluation, classification and grading systems exist which focus on the assessment of multiple limb-risk factors, such as depth of the wound, vascularity, presence and severity of infection and extent of gangrene. All these systems are similar in merit, but different in the extent and ease of application, and validation within clinical practice (Stang and Young, 2018).

In 2018, the Scottish Foot Action Group and Scottish Care Information-Diabetes (SCI-Diabetes) published their evaluation of four diabetic foot ulcer classification systems (Stang and Young, 2018): Wagner (Wagner, 1981), University of Texas Classification System (UoT) (Lavery et al, 1996), SINBAD (Ince et al, 2008) and PEDIS (Karthikesalingam et al, 2010).

Of these, they chose to adopt the University of Texas classification system for good evidence of external validation within literature for predicting ulcer healing and risk of amputation, ease of understanding and use, and incorporation into their national SCI-Diabetes Ulcer Management System (Stang and Young, 2018). This adoption into a standardised and validated system was to ensure consistency of foot ulcer assessment and treatment across the nation. Integrating the classification system into the national management system aimed to improve audit and evaluation of treatments, leading to better patient outcomes across the country. This commitment to raise the standards of care for diabetic foot ulcers signified a proactive approach to enhancing wellbeing and prolonging life for a vulnerable population.

WIfI

In 2014, the Society for Vascular Surgery published the WIfI (Wound, Ischemia and foot Infection) classification system for staging 'lower extremities at-

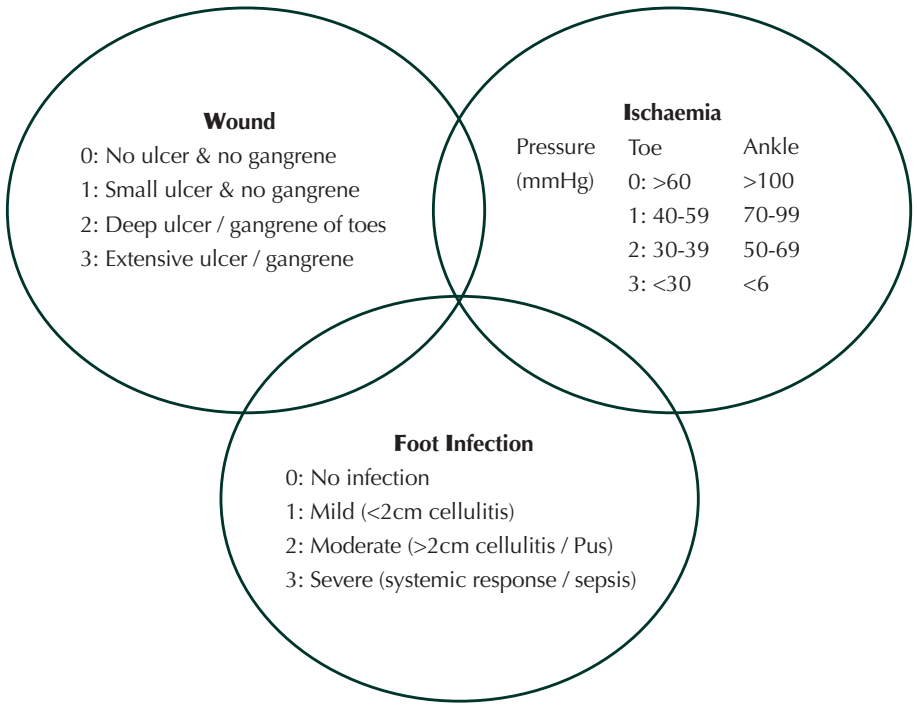


Figure 1. WIfI: Presence and severity of wound, ischaemia and foot infection (Mills et al, 2014)

	Ischemia - 0				Ischemia - 1				Ischemia - 2				Ischemia - 3			
W-0	VL	VL	L	M	VL	L	M	H	L	L	M	H	L	M	M	H
W-1	VL	VL	L	M	VL	L	M	H	L	M	H	H	M	M	H	H
W-2	L	L	M	H	M	M	H	H	M	H	H	H	H	H	H	H
W-3	M	M	H	H	H	H	H	H	H	H	H	H	H	H	H	H
	fl-0	**fl-1**	**fl-2**	**fl-3**	**fl-0**	**fl-1**	**fl-2**	**fl-3**	**fl-0**	**fl-1**	**fl-2**	**fl-3**	**fl-0**	**fl-1**	**fl-2**	**fl-3**

The 1-year risk of amputation can then be summarised using the key below:

Very Low = VL = clinical stage 1

Low = L = clinical stage 2

Moderate = M = clinical stage 3

High = H = clinical stage 4

Clinical stage 5 would siginify an unsalvageable foot

Figure 2. WIfI – Risk estimate of amputation at one year for each combination (Mills et al, 2014)

risk for amputation' (Mills et al, 2014). This system compounds wound depth, severity of infection and ischemia in contrast to the UoT system which only includes the presence of infection and/or ischaemia. A visual summary of the WIfI system is shown in *Figure 1*.

The WIfI system categorises limb threat in a much broader group of people with lower limb wounds. It is relevant for people who have PAD, both with and without diabetes. This is particularly important given that around half of all non-traumatic lower-limb amputations occur in people without diabetes (Causey et al, 2016). Subsequent meta-analyses of WIfI in various publications have supported it as predictive of one-year amputation risk (van Reijen et al, 2019; Armstrong et al, 1998). In addition, it has been adopted by multiple international guidelines, such as the Global Vascular Guidelines (Conte et al,

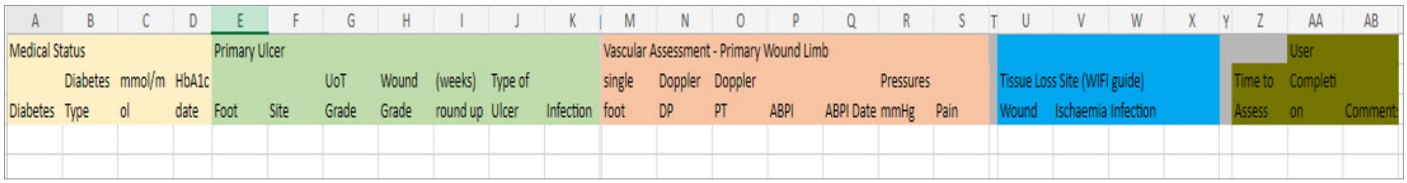


Figure 3. Data collection template prepared by NHS Greater Glasgow and Clyde (GGC) and NHS Lanarkshire

2019), as the preferred wound classification system for podiatry, vascular and all lower-limb teams — particularly to support the identification and management of chronic limb-threatening ischaemia (CLTI).

CLTI is a clinical syndrome defined by the presence of peripheral artery disease (PAD) in combination with rest pain, gangrene, or a lower limb ulceration >2 weeks duration (Conte et al, 2019).

Many health care professionals are involved in the management of PAD and CLTI. Variability in practice patterns and access to services is high, contributing to a disparity in assessment, treatments and clinical outcomes.

While WIfI offers considerable benefit as a classification system, there are several anecdotal reports of barriers to implementation across a broad range of services assessing foot ulcers. This is likely due to requirements for measurement equipment such as sphygmomanometers and toe pressure kits along with perceived time constraints.

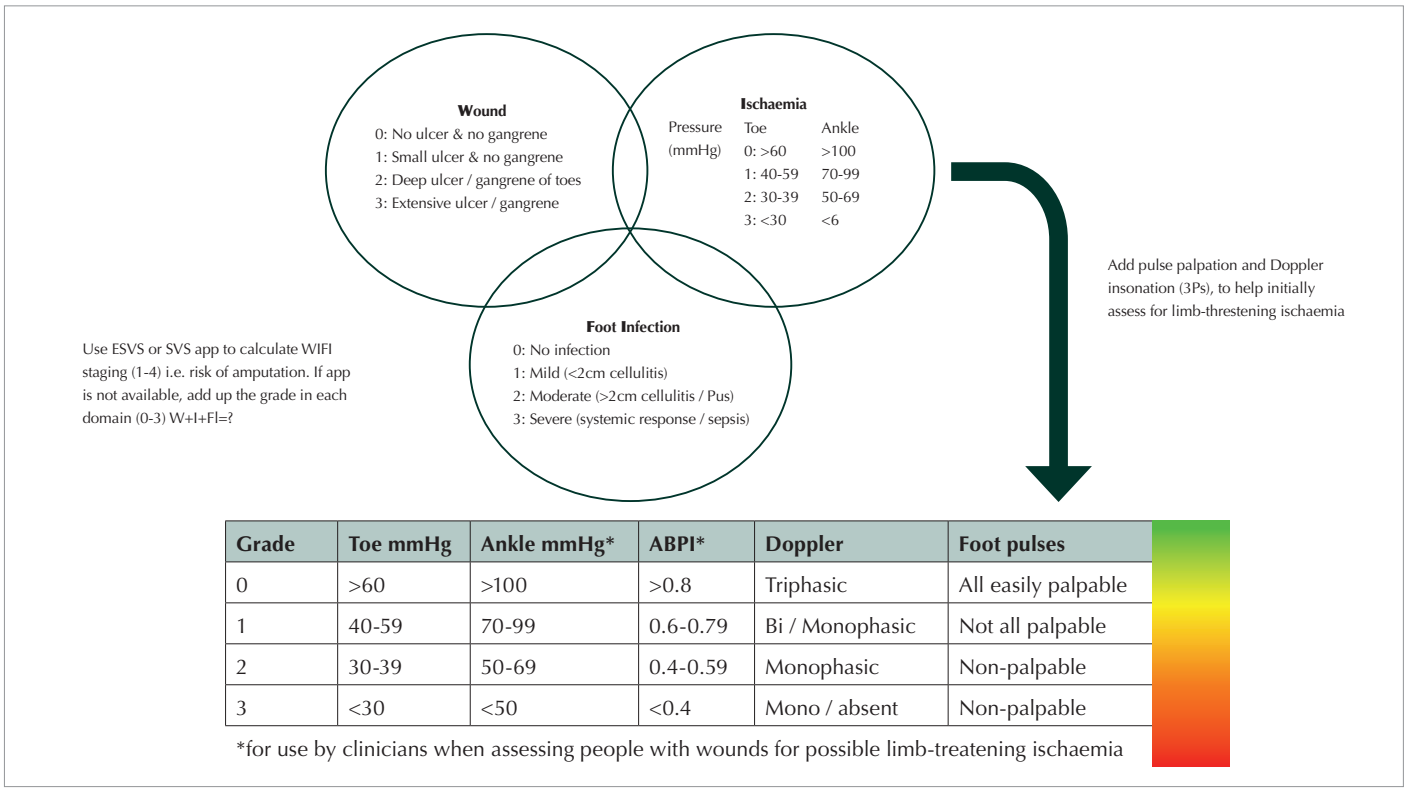
The aim of the study was to assess whether the use of the WIFI classification system is feasible in busy, specialised podiatry wound care clinical settings.

Methods

With the direction of the Scottish Foot Action Group, podiatry representatives from two Scottish Health boards, NHS Greater Glasgow and Clyde (GGC) and NHS Lanarkshire, commissioned an audit to ascertain the impact of introducing WIFI into every day podiatric clinical assessment.

A data collection template was collaboratively agreed with both services to highlight (depicted in Figure 3):

- patient demographics
- clinical presentations required for wound assessment
- user ease of recording WIfI within a clinical setting



Grade	Toe mmHg	Ankle mmHg*	ABPI*	Doppler	Foot pulses
0	>60	>100	>0.8	Triphasic	All easily palpable
1	40-59	70-99	0.6-0.79	Bi / Monophasic	Not all palpable
2	30-39	50-69	0.4-0.59	Monophasic	Non-palpable
3	<30	<50	<0.4	Mono / absent	Non-palpable

*for use by clinicians when assessing people with wounds for possible limb-treatening ischaemia

Figure 4. Wound classification adopted by NHS Lanarkshire (provided by Fox, M - Adapted by Manchester Leg Circulation Service from; Mills et al,2014; Tehan et al, 2018; Londero et al, 2016).

- the requirements for transitioning from UoT to WIfI
- the challenges faced when transferring to this alternative wound care classification

Some patients' wounds were initially scored using the Ankle Brachial Pulse Index (ABPI); later, their assessment was performed only through toe pressure assessment.

Data were collected from 100 patients with active foot ulceration (50 patients per site). The patients presented to foot protection clinics (wound care clinics) for pre-arranged wound reviews and care. Informed consent was gained from all patients and all data were anonymised.

Results

The demographics found that 84% of patient's had a diagnosis of diabetes (with 72% type 2). Primary ulcer site was identified as digital (46%), forefoot (32%) and hindfoot (22%) reflective of the pattern of disease deterioration. University of Texas and WIfI wound classification scores were collected for the primary ulcer. Figure 4 was adopted for NHS Lanarkshire podiatry data collection focusing on the pulse palpation method to calculate the ischaemic element of presentation. Figures 2 and 3 were adopted by NHS GGC using toe pressure data for the ischaemic element as well as initially carrying out Ankle Brachial Pressure Index (ABPI).

NHS GGC found that the wound assessment using WIfI took an average of 7 minutes to complete as part of the existing patient assessment. Additional appointment time was not required. Staff highlighted that they initially found assessing using toe pressure machines took longer but the time reduced as the team became more familiar with the equipment. This team calculated the WIfI score using the European Society of Vascular Surgery (ESVS) application on NHS mobile phone devices.

In contrast the NHS Lanarkshire used WIfI with pulse palpation rather than toe pressure measurement. This afforded an ease of assessment as palpation of pulses is common practice in podiatric assessment. This time was therefore reported as less than 5 minutes within the existing wound assessment time. This team calculated WIfI score using the rubric as shown in Figure 2.

Overall, average ease of use reported by staff in both teams equated to 7.8/10. However, this includes the 6 patients who initially were scored using ABPI.

Discussion

Several notable observations were recorded in this study. One board found that the wound assessment using WIfI took an average of seven minutes to complete as part of the existing patient assessment. Additional appointment time was not required. Staff highlighted that, in their initial experience, assessment using toe pressure machines took longer but the time reduced gradually as the team became more familiar with the equipment. This team calculated the WIfI score using the European Society of Vascular Surgery (ESVS) application on NHS mobile phone devices.

In contrast, the other service team used WIfI with pulse palpation rather than toe pressure measurement. This afforded an ease of assessment because palpation of pulses is common practice in podiatric assessment. This time was, therefore, reported as less than five minutes within the existing wound assessment time. This team calculated WIfI score using the rubric shown in Figure 1.

Overall, average ease of use reported by staff in both teams equated to 7.8/10. However, this includes patients who initially were scored using Ankle Brachial Pulse Index (ABPI). It is widely recognised that this assessment method requires more time to carry out. Therefore, we can assume that outcomes would have been better if this ABPI had not been included in the initial assessment stages. Notably, all users were comfortable with the assessment techniques and had clinical experience in this speciality. It is, therefore, likely that less experiencesd staff members would need more time and support when undergoing a similar transition.

Although these results suggest that pulse palpation/doppler interpretation appears more time-efficient, this observation may be subjective and is not always reliable (Tehan et al, 2017), making the WIfI score less reliable and utilisable in predicting amputation risk. However, this method can be used when a toe pressure machine is not available or to help assisting with the transition of recording WIfI whilst experience is gained using the toe pressure machine.

The group who had toe pressure measurements noted slightly longer assessment times but arguably this may give rise to more accurate data

Recommendations

The Scottish Foot Action Group aims to update the

SCI-Diabetes ulcer management tool to encourage the national adoption of WIfI.

The following challenges have been identified: financial, educational and staff perception, and welfare concerns.

Investing in costly investigative machines is challenging with the decreasing budgets within NHS Podiatry services. The support for the vascular assessment and use of costly equipment requires industry to support NHS services and their patients to ensure costs are kept low.

NHS services have offered peer support to extend training and education within local areas – a gesture that has been well-received – and engaged local teams have continued to support podiatrists in Scotland. Peer support groups are available and shared learning offered. There is also a financial implication for services to release staff and this must be weighed against the specific needs of both patients and services.

Staff have been offered support and training to help them become confident in obtaining toe pressures, which is helping to eliminate any fears or concerns regarding the change

Next stages

NHS Greater Glasgow and Clyde roll out of WIfI adoption has been initiated and aims to be completed within 2024. Training plans and local support has been put in place. All podiatry referral and documentation will now reference WIfI to support all teams and a WIfI user guide has also been created. Further, NHS phones can now support applications for both ESVS and Society for Vascular Surgery (SVS), and this is currently being enabled on all podiatry services' phones. Finally, training in NHS Lanarkshire Podiatry services has commenced and adoption of WIfI in documentation over the course of 2024 has been arranged.

Conclusion

This study noted that, with the appropriate equipment and suitable education combined with support and experience, NHS podiatry foot protection (wound care) clinicians can realistically obtain WIfI grading within already-allocated appointment slots for patients. With capacity/manpower concerns within services and WIfI cognisance placing pressures on clinicians, it is important to evaluate the impact of any changes toward WIfI. Verbal, post-training feedback from local clinicians has so far been positive and encouraging.

Although obtaining a toe pressure measurement is the gold standard for achieving an accurate WIfI score, pulse palpation and doppler readings can also be used as a substitute whilst new WIfI users gain confidence in obtaining a toe pressure value.

Similarly, toe pressure equipment and education may be considered costly regarding outgoing expenses and time. However, implementing accurate WIfI scores for patients with foot ulceration will help improve patient journeys and enhance communication between different specialities When services are facing increasing numbers of patients with foot ulceration and higher amputation rates, better communication can improve patient outcomes. ■

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