Visual and kinaesthetic approaches to pragmatic, person-centred diabetic foot education

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This review of clinical practice describes a pragmatic, person-centred approach to diabetic foot education that is sensitive to individual adult service users' learning needs and preferences. National clinical guidance recommends foot education for all people with diabetes in the UK. Evidence for the effectiveness of foot education remains limited, particularly concerning long-term behaviour modification and the prevention of ulceration and amputation. The Scottish Diabetes Foot Action Group produces written diabetic foot information and advice leaflets to support verbal patient education, but this approach may not be suitable for all. Individuals with low health literacy and visual or kinaesthetic learning preferences should also be considered. Readily-available, cost-effective and expedient strategies for inclusive diabetic foot education are presented in this article.

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Article points

1. A pragmatic, person-centred approach should consider individual learning needs, including health literacy, and support visual, aural, written and kinaesthetic learning preferences.
2. This approach may enhance diabetes patients' appreciation of protective self-care behaviours, appropriate footwear choices, and when and how to engage with services.

Key words

- Adult learning preferences
- Diabetic foot education
- Health literacy
- Person-centred care
- Pragmatism

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Pragmatism may be seen as a practical, problem-solving approach that essentially side-steps contentious philosophical considerations (Feilzer, 2010). The concept of 'pragmatism' may be familiar to the reader and many will consider themselves to be pragmatic, at least at times. A pragmatic approach may be adopted without explicit recognition of this stance or its underlying principles. The *Cambridge Advanced Learner's Dictionary and Thesaurus* (2016) defines 'pragmatic' as "solving problems in a sensible way that suits the conditions that really exist now, rather than obeying fixed theories, ideas, or rules". This article describes a pragmatic response to the Scottish Intercollegiate Guidelines Network (SIGN, 2013) and National Institute for Health and Care Excellence (NICE, 2015) guideline recommendations for foot care education for all people with diabetes.

Current evidence

Currently, evidence is sparse and inconclusive concerning the effectiveness of education in the long-term prevention of ulceration and amputation among people with diabetes (Dorresteijin et al, 2014). In this journal, Fox and Smith (2015) have recently highlighted a lack of best practice guidelines addressing patient education about the diabetic foot.

In agreement with policymakers, clinicians have not rejected patient education in light of inconclusive research findings. More than faithful adherence to clinical guidance, this speaks to a pragmatic moral stance that patient diabetic foot education should be delivered to those in our care. John Dewey (1922) developed pragmatic ethics from Charles Sanders Peirce's (1878) pragmatic philosophy and proposed norms and principles developed through enquiry. The question of how to deliver effective diabetic foot education deserves such enquiry. While a pragmatic approach to diabetic foot education must ensure outputs are applicable to practice, variation in service user learning needs and preferences must also be considered if we are to successfully implement individualised, person-centred care (Scottish Government, 2010).

Addressing learning needs

Personal learning needs and preferences should be considered to support effective, preventative self-management behaviours in accordance with NHS Scotland's (2011) 2020 Vision and the Institute

Table 1. The content and context of diabetic foot education delivery.

Content	What?	• Self-management behaviours • Footwear advice • Local contacts
Context	Why?	Prevention of diabetic foot disease
	Who?	Those 'at risk'
	When?	Annually or as circumstances change
	How?	• Written and verbal advice • Visual and kinaesthetic tools

of Medicine's (2001) six dimensions of healthcare quality: ensuring care provided is person-centred, safe, effective, efficient, equitable and timely. In England, the Care Quality Commission's Health and Social Care Act 2008 (Regulated Activities) Regulations 2014: Regulation 9 aims to ensure person-centred care takes into account personal needs and preferences concerning care, treatment and choice of provider.

The Care Quality Commission acknowledges service users' "emotional, social, cultural, religious, and spiritual" needs, however, learning needs should also be addressed (Care Quality Commission, 2015). We should consider our adult service users as adult learners, requiring motivation to learn preventative diabetic foot care, within the context of their personal life experiences (Knowles et al, 2015). Literacy and numeracy should also not be taken for granted, as the 2009 Scottish Survey of Adult Literacies reported that 26.7% of the 1,927 Scottish people surveyed occasionally struggled with literacy and numeracy, while 3.6% were severely challenged (St Clair et al, 2010).

Health literacy describes "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health choices" (Nielsen-Bohlman et al, 2004). Health literacy is supported by the Scottish Government's (2014) *Making it Easy: a Health Literacy Action Plan for Scotland*. The role of the single-item literacy screener (Morris et al, 2006) and 'teach-back' technique have previously been described in this journal in order to address low health literacy among 'high risk' individuals (Bullen and Young, 2016). The single-item literacy screener is an effective approach for determining health literacy. It involves asking people: "How often do you need to have someone help when you read instructions, pamphlets, or other written material from your doctor or pharmacy?" (Morris et al, 2006). While this screening question may identify service users requiring further support with written materials, it does not adequately address those with alternate learning preferences. In order to enhance service users' learning and facilitate person-centred care, additional learning preferences also warrant consideration.

Addressing learning preferences

The Scottish Diabetes Foot Action Group's revised Diabetic Foot Risk Stratification and Triage System allows for the identification of service users considered 'in remission' or at high, moderate, or low risk of developing diabetic foot disease (Stang and Leese, 2016). Armstrong and Mills (2013) have applied the concept of remission to diabetic foot disease, comparing care provision and high recurrence rates for foot ulceration with cancer treatment. A remission analogy is apt, as recurrence affects more than half of these individuals after 3 years (Lavery et al, 1998). Stratifying risk and targeting education accordingly is an inherently pragmatic approach, and the content of written information provided is currently under revision (Stang and Leese, 2016). We believe the time is right to further consider the context of how this information is delivered (*Table 1*).

As adult learners, service users will each have individual learning preferences, be they visual, aural, written or kinaesthetic (Fleming, 2001). In practice, education is primarily delivered verbally and is supported with written materials. The pervasiveness of this approach is evidenced by frequent documentation of "verbal and written advice" in clinical records. The needs of visual and kinaesthetic learners, however, may not be adequately addressed by such an approach. Giuze at al (2012) undertook two sequential, randomised studies comparing control patients receiving standard written and verbal hypertension information with information tailored to health literacy status and both health literacy and learning style. While health literacy-appropriate materials significantly increased participants' knowledge of hypertension, the greatest treatment effect was demonstrated among those

Table 2. Application of adult learning preferences to diabetic foot education.

Adult learning preference	Intervention	Post-intervention
Written 	**Issue** patient education leaflets with individualised instructions and advice	• The individual retains tailored written information for later reference • Individuals are encouraged to contact care providers should concerns arise prior to scheduled review
Aural 	• **Explain** the signs and symptoms of diabetic foot disease • **Describe** preventative self-management behaviours	• The individual retains tailored written information for later reference • Individuals are encouraged to contact care providers should concerns arise prior to scheduled review
Visual 	**Show** the individual signs of foot deformity, insole imprint, shoe wear, and features of a preferable shoe	• Improved confidence in performing preventative foot and shoe inspection • Enhanced appreciation of appropriate footwear choices
Kinaesthetic 	• **Demonstrate** how to inspect the foot and shoe • **Enable** people to examine a preferred shoe style	• Improved confidence in performing preventative foot and shoe inspection • Enhanced appreciation of appropriate footwear choices

Images: Pixabay (2016)

receiving materials matched to both health literacy and learning preference.

Given time constraints, informal questions such as "Do you prefer to read a book or watch a film?" or "Would you like me to draw a diagram?" may be preferable to conducting learning style questionnaires with each individual (Hillier, 2005). It should, however, be remembered that in truth learning preferences are just that, preferences. Many people like to read books, watch films, and get involved when learning a new task. Individuals will likely have a preference for certain types of activities, but this does not preclude all others (Shepherd, 2015). A simpler, more equitable and pragmatic approach should enhance the quality of education for all, while being sensitive to the needs of people with visual and kinaesthetic learning preferences (*Table 2*).

Visual and kinaesthetic learning strategies

Visual learning may be supported through the illustration of important concepts as pictures, diagrams or symbols (Inott and Kennedy, 2011). By drawing a picture or diagram, we may provide information that is relevant to the individual and the discussion at the time. Making learning relevant is a key adult learning need, with pictures and diagrams retained by users promoting subsequent reflection.

Kinaesthetic learners may prefer a physical object, such as an insole, shoe, model or foot skeleton that they can physically manipulate in order to enhance their learning. While educational posters and models can enrich the learning environment and user experience, they are not freely distributed and may not be available within clinical practice. Specialist footwear retailers may provide samples free of charge, however, and these may be effectively incorporated within relevant discussions.

Novel approaches, sensitive to the needs of individuals with visual or kinaesthetic learning preferences, should complement traditional verbal and written education and be readily integrated into practice. To do otherwise may unnecessary complicate the issue, or worse, the baby will be thrown out with the bath water. Educational interventions should also be sensitive to individuals with multimodal learning preferences and offer a combination of learning strategies in order to improve service users' learning (Giuse et al, 2012) and encourage active participation (Russell, 2006). Familiar visual and kinaesthetic learning tools at our ready disposal are hereby discussed.

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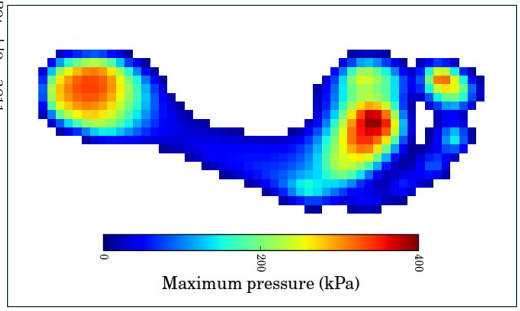

Figure 1. Visualisation of plantar foot pressure.

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Figure 2. Insoles can be used as visual learning tools.

Available learning tools

The first essential tools in the practitioner's educational toolkit are our service user's feet. When discussing risk factors for diabetic foot ulceration, you may consider using the individual's foot to illustrate the advice given. For instance, if their risk status is elevated due to foot deformity or significant callus, the practitioner may show them what they mean by this. Demonstrating areas of increased pressure, such as hammer toes or hallux valgus deformity, and the resultant lesions on the individual's foot illustrates which areas require particular attention throughout routine self-assessment or when purchasing new footwear. Immobility may necessitate the aid of a mirror to demonstrate plantar sites.

Modern in-shoe and force-plate gait analysis systems permit ready appreciation of 'at-risk' sites with colourful visualisations of plantar pressure measures (*Figure 1*). Running shoe retailers are acutely aware of the power of these visual tools and have enthusiastically adopted modern, streamlined force-plate systems to promote footwear sales. While such technologies remain rare in clinical practice, their potential as visual learning tools deserves further investigation. In the absence of such systems, many shoes feature a removable sock-liner or insole that may be utilised in practice. A distinct footprint is common on such materials and the learner can clearly see if their toes override the insole, for instance. Visualising the foot's imprint relative to the shoe itself is a powerful visual tool and provides the opportunity to discuss shoe fit and style.

Well-worn insoles (*Figure 2*) will also demonstrate depressions and wear at sites of increased pressure and stress. Clinicians should use this opportunity to show people why a shoe may need replacing or why an orthotic device or alternate style may be more appropriate. An inexpensive thermoplastic material, such Plastazote®, may be fitted within the shoe, should the insole prove irremovable, in order to facilitate learning at a subsequent review. Deformation of the shoe's upper at sites of deformity and wear patterns on the sole of the shoe may further facilitate discussion of vulnerable, high-pressure areas requiring particular attention.

Feeling inside the toe-box for worn material corresponding to pressure from retracted lesser toes can illustrate and reinforce to service users the connection between foot lesions and wear patterns, facilitating visual and kinaesthetic learning. As previously stated, such interventions may be readily incorporated within clinical practice and should complement existing verbal and written education, permitting a combination of learning strategies. Crucially, such an approach promotes active participation, requires minimal additional training, time and resources, and such tools remain readily available for subsequent individual reflection following this intervention.

Discussion

The delivery of diabetic foot education has yet to be standardised, however visual tools have shown promise in improving diabetes (Hawthorne and Tomlinson, 1997) and wound care (Delp and Jones, 1996) knowledge and self-care behaviours, at least

in the short term. More recently, Baba et al (2015) demonstrated improved foot health after 3 months when written and verbal advice was complimented with a pictorial booklet. Wide variability may currently exist concerning the teaching methods employed, and an opportunity exists to further optimise foot education delivery. Nationally-agreed clinical guidance, education programmes and materials go a long way towards providing the content required by adults with diabetes. An area of research warranting further investigation concerns the context, or how this information is delivered.

As with all adult education, failure to consider a learner's needs and preferences may, perhaps inevitably, result in a surface learning approach for many. Service users struggling to comprehend information provided, or not considering it to be personally meaningful or valuable, unsurprisingly do not demonstrate long-term behaviour change. A clinical scenario familiar to many will be the person who can recite the features of an appropriate shoe, without wearing this style of footwear themselves. Examples of strategic learning may also be demonstrated by those who change out of their heels or strap on a pristine removable cast walker immediately prior to arriving at our clinics. By supporting the full range of adult learning styles and making learning meaningful, deep learning is encouraged that may, hopefully, result in improved clinical outcomes for those in our care.

Conclusion

A pragmatic, person-centred approach to diabetic foot education should consider individual learning needs, including health literacy, and support visual, aural, written and kinaesthetic learning preferences. Practitioners throughout the UK have embraced a need for targeted, standardised information in order to prevent the potentially devastating impact of ulceration and amputation. The success of the Scottish Diabetes Foot Action Group's Diabetic Foot Risk Stratification and Triage System and associated education materials are testament to this. These materials support individuals who prefer verbal and written information, however, others may benefit from an alternative approach.

Several strategies have been described to support the delivery of education that is respectful of the learning needs of people with low health literacy and are inclusive of visual and kinaesthetic learning preferences. By applying a pragmatic approach, it is hoped we may enhance our service users' appreciation of protective self-care behaviours, appropriate footwear choices, and when and how to engage with services as required. Put simply, we know why, when and what information we wish to deliver and to whom; now is the time to address the question of how? ■

Armstrong D, Mills J (2013) Toward a change in syntax in diabetic foot care: prevention equals remission. *J Am Podiatr Med Assoc* 103(2): 161–2

Baba M, Duff J, Foley L et al (2015) A comparison of two methods of foot health education: the Fremantle Diabetes Study Phase II. *Prim Care Diabetes* 9(2): 155–62

Bullen B, Young M (2016) When patient education fails: do we consider the impact of low health literacy? *The Diabetic Foot Journal* 19(3): 138–41

Cambridge Advanced Learner's Dictionary & Thesaurus (2016) Pragmatic. Available at: http://bit.ly/2nAjgEv (accessed 14.03.2017)

Care Quality Commission (2014) *Regulation 9: Person-centred Care*. Care Quality Commission, London. Available at: http://bit.ly/194wylH (accessed 14.03.2017)

Care Quality Commission (2015) *Glossary of Terms Used in the Guidance for Providers and Managers*. Care Quality Commission, London. Available at: http://bit.ly/2mI4Nca (accessed 14.03.2017)

Delp C, Jones J (1996) Communicating information to patients: the use of cartoon illustrations to improve comprehension of instructions. *Acad Emerg Med* 3(3): 264–70

Dewey J (1922) *Human Nature and Conduct*. Henry Holt and Company, New York

Dorresteijn J, Kriegsman D, Assendelft W, Valk G (2014) Patient education for preventing diabetic foot ulceration (review). *Cochrane Database Syst Rev* 12: CD001488

Feilzer M (2010) Doing mixed methods research pragmatically: implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research* 4(1): 6–16

Fleming N (2001) *Teaching and Learning Styles: VARK Strategies*. Fleming, Christchurch

Fox M, Smith L (2015) Communicating the risks to life and limb: what do we say and how do we say it? *The Diabetic Foot Journal* 18(4): 162–3

Giuse N, Koonce T, Storrow A et al (2012) Using health literacy and learning style preferences to optimize the delivery of health information. *J Health Commun* 17(Suppl 3): 122–40

Hawthorne K, Tomlinson S (1997) One-to-one teaching with pictures – flashcard health education for British Asians with diabetes. *Br J Gen Pract* 47(418): 301–4

Hillier Y (2005) *Reflective Teaching in Further and Adult Education* (2nd ed.) Continuum, London

Inott T, Kennedy B (2011) Assessing learning styles: practical tips for patient education. *Nurs Clin North Am* 46(3): 313–20

Institute of Medicine (2001) *Crossing the Quality Chasm: A New Health System for the 21st Century*. National Academy Press, Washington DC

Knowles M, Holton III E, Swanson R (2015) *The Adult Learner: the Definitive Classic in Adult Education and Human Resource Development* (8th ed.) Routledge, London

Lavery L, Armstrong D, Vela S et al (1998) Practical criteria for screening patients at high risk for diabetic foot ulceration. *Arch Intern Med* 158(2): 157–62

Morris N, Maclean C, Chew L, Littenberg B (2006) The Single Item Literacy Screener: evaluation of a brief instrument to identify limited reading ability. *BMC Fam Pract* 7: 21

National Institute for Health and Care Excellence (NICE) (2015) *NICE Guideline 19. Diabetic Foot Problems: Prevention and Management*. Available at: www.nice.org.uk/guidance/ng19 (accessed 14.03.2017)

NHS Scotland (2011) *2020 Vision*. NHS Scotland, Edinburgh. Available at: www.gov.scot/Topics/Health/Policy/2020-Vision (accessed 14.03.2017)

Nielsen-Bohlman L, Panzer A, Kindig A (2004) *Health literacy: A Prescription to End Confusion*. National Academies Press, Washington DC

Peirce C (1878) How to make our ideas clear. *Popular Science Monthly* 12: 286–302

Russell S (2006) An overview of adult-learning processes. *Urol Nurs* 26(5): 349–52

Scottish Government (2010) *The Healthcare Quality Strategy for NHS Scotland*. The Scottish Government, Edinburgh. Available at: www.gov.scot/resource/doc/311667/0098354.pdf (accessed 14.03.2017)

Scottish Government (2014) *Making it Easy – a Health Literacy Action Plan for Scotland*. Scottish Government, Edinburgh. Available at: www.gov.scot/Publications/2014/06/9850 (accessed 14.03.2017)

Scottish Intercollegiate Guidelines Network (2013) *SIGN guideline 116. Management of Diabetes: a National Clinical Guideline*. Available at: www.sign.ac.uk/pdf/sign116.pdf (accessed 14.03.2017)

Shepherd C (2015) *More than Blended Learning: Creating World-class Learning Interventions*. The More Than Blended Learning Company, Hampshire

St Clair R, Tett L, MacLachlan K (2010) *Scottish Survey of Adult Literacies 2009: Report of Findings*. Scottish Government, Edinburgh. Available at: www.gov.scot/Resource/Doc/319174/0102005.pdf (accessed 14.03.2017)

Stang D, Leese G (2016) The Scottish Diabetes Foot Action Group 2016 update of the Diabetic Foot Risk Stratification and Triage System. *Diabetic Foot Journal* 19(4): 182–6