

Older people and ill fitting shoes

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Background: Foot health is an important issue in older people. Inappropriate shoes increase the risk of callous and ulcer formation, as well as increasing the risk of falls. There are no data defining the size of this problem.

Objective: The aim of the study was to investigate the proportion of elderly people on a general rehabilitation ward wearing incorrectly sized shoes and to look for the presence of complications.

Methods: Sixty five consecutive patients (mental state questionnaire score >6) admitted to a rehabilitation ward had their foot length and width measured, and the size of their current footwear recorded. Sensation was tested with a standard 10 g monofilament. The presence of ulceration was noted. Foot pain was recorded by the patient on a visual analogue scale. Any history of diabetes mellitus, peripheral vascular disease, or peripheral neuropathy was noted.

Results: The median age of the subjects was 82 (range 64–93). Six (9%) had a history of diabetes, seven (11%) had symptomatic peripheral vascular disease, and 17 (26%) had sensory impairment. Ten patients (15%) had foot ulceration present, and 47 patients (72%) had ill fitting shoes (a discrepancy in length of more than half a British shoe size fitting or more than one British width fitting, 7 mm).

Incorrect shoe length was significantly associated with the presence of ulceration (odds ratio (OR) = 10.04, $p = 0.016$). Presence of ulceration was significantly associated with a history of peripheral vascular disease (OR = 11.56, $p = 0.008$). Pain was significantly associated with incorrect shoe length ($p = 0.0238$) and with sensory impairment ($p = 0.0314$).

Conclusion: Most older people on a rehabilitation ward wore ill fitting shoes. An association was found between ill fitting shoes and self reported pain, and between ill fitting shoes and ulcer formation. A straightforward assessment of footwear in older people could improve comfort and avoid preventable foot disorders.

Foot health is an important issue in later life. Poor foot health is extremely common, although the reason for this is not straightforward. With rising age there is an increased risk of conditions such as diabetes mellitus which may predispose to foot problems, but this does not explain why older non-diabetic patients have a similar rate of foot disease to their diabetic contemporaries.^{1,2} Almost half the patients who were referred to one specialist foot clinic over a two year period were not diabetic¹ and most were over 60 years of age. This is important as a significant association has been demonstrated in older people between "trouble with feet" and a decrease in functional ability measured by a decline in performance in activities of daily living over a two to three year period.³ Calls have been made for older people to be offered a similar level of foot care to that of patients with diabetes.^{1,2}

One of the authors (GPL) had noticed that many of the elderly patients attending the diabetic foot clinic wore ill fitting shoes despite the fact that ill fitting footwear is known to be the most common precipitating factor for foot ulceration in diabetic patients—causing up to 20% of ulcers.^{4,5} On searching the literature it was evident that a surprisingly high number of adults wear ill fitting shoes—37% of diabetic outpatients and 24% of general medical outpatients wore shoes of the wrong size in one study.⁶ The American Orthopaedic Foot and Ankle Society carried out a survey of women's shoes in 1993. This revealed that 60% of participants' feet had increased in size since the age of 20 yet 75% people had not had their feet measured in the past five years.⁷ We could find few data relating to this problem in older non-diabetic patients, although an

association has been shown between inappropriate shoes and an increased risk of falls.^{8–10}

Previous studies have examined the type of footwear worn by older people,¹¹ and so our aims were to establish the proportion of elderly people on a rehabilitation unit wearing ill fitting shoes and to see if these were associated with an increased risk of complications such as ulceration or pain, independent of the presence of diabetes, peripheral neuropathy, or peripheral vascular disease.

METHODS

Our subjects were a convenience sample of 65 consecutive admissions to a rehabilitation unit, all of whom had an mental state questionnaire score greater than 6/10 (all patients referred for rehabilitation have cognitive screening as part of the assessment process). The unit offers rehabilitation to people after a variety of problems including orthopaedic, stroke, general medical, and surgical conditions.

All measurements were made by a single observer (SLB) using equipment on loan from the diabetic foot clinic. First, foot length was measured using a standard "Clarks" shoe shop measuring stick. This is calibrated to measure the feet in a sitting position. Foot width was measured with callipers across the widest part of the metatarsal head. The size of footwear used by the patient to attend physiotherapy was then recorded. This was achieved by looking at the size of the shoe and by measuring the internal dimensions with callipers. The two sizes were then compared.

Next, sensation was tested using a standard 10 g (5.07) monofilament.¹² The foot was judged to be insensate if the

Table 1 Subjects categorised by shoe fit

	Too wide	Correct width	Too narrow	Totals
Too long	10	22	0	32
Correct length	10	18	2	30
Too small	1	2	0	3
Totals	21	42	2	65

Table 2 Results of logistic regression analysis

	Associations with ulceration	
	Odds ratio	p Value
Incorrect shoe length	10.04	0.016
Incorrect shoe width	0.75	1
History of diabetes	1.11	1
History of PVD	11.56	0.008
Sensory impairment	1.26	0.713

PVD, peripheral vascular disease.

Table 3 Results of regression analysis

	Associations with pain (p value)
Incorrect shoe length	0.0238
Incorrect shoe width	0.199
History of diabetes	0.135
History of PVD	0.318
Sensory impairment	0.0314

PVD, peripheral vascular disease.

monofilament could not be detected at, at least, six out of eight positions on the foot.

The foot was inspected and any ulceration was noted and graded according to the Seattle wound classification system¹³: "presence of ulcer" was defined by a Seattle score of 2 or more.

Foot pain was recorded by the patient on a visual analogue scale from 0 to 10, 0 meaning no pain and 10 representing the worst pain they could imagine. This method has been validated for use in older people.¹⁴

Finally the case notes were reviewed and any history of diabetes mellitus, peripheral neuropathy, or peripheral vascular disease was noted.

The results were analysed using the statistical package SPSS.

RESULTS

The median age of the patients studied was 82 years (range 64–93) with a female to male ratio of 39:26. Six (9%) had a history of diabetes mellitus, seven (11%) had a history of peripheral vascular disease, and 17 (26%) had sensory impairment on testing or a documented history of peripheral neuropathy. Ten people (15%) had foot ulceration present at the time of examination.

Forty seven people (72%) were using ill fitting shoes. This was defined as a difference between shoe size and measured foot size greater than half a standard British shoe size or one width fitting (7 mm).

Table 1 shows that only 18 people studied (28%) had shoes that were both the correct width and length. Four people (6%) wore shoes that were too small (too short or too narrow) and 42 people (65%) wore shoes that were too big (too long or too wide, or both). One person wore a shoe that was simultaneously too short and too wide.

When men and women were compared, 65% of the men (17/26) wore ill fitting shoes compared with 77% of the women (30/39), although this was not statistically significant—perhaps due to the small numbers involved.

Two people had only slippers available on the ward, and one person had shoes which had been fitted by the orthotic department.

None of the six patients with diabetes were wearing shoes of the correct size (compare with Reddy *et al*⁶). This may relate to difficulties in purchasing shoes of varying width fittings—very wide or very narrow shoes are not always readily available.

Tables 2 and 3 show the results of regression analyses. Incorrect shoe length was significantly associated with increased ulceration (odds ratio (OR) = 10.04, $p = 0.016$). Presence of ulceration was significantly associated with a history of peripheral vascular disease (OR = 11.56, $p = 0.008$). Pain was significantly associated with incorrect shoe length ($p = 0.0238$) and with sensory impairment ($p = 0.0314$).

DISCUSSION

Most of the elderly people studied had ill fitting footwear and an association was found between self reported pain score and ill fitting shoes, and an increase in ulceration.

This observational study raises several questions. Firstly, it is not clear whether people with painful or ulcerated feet buy large shoes for comfort or that the large shoes are the underlying cause of the foot problem. However we do know from studies in patients with diabetes that shoes which rub are a cause of ulceration,⁴ and from studies in sports footwear that if the foot can slide about in the shoe the shearing forces on the skin are increased with resultant injury.

Secondly, although inappropriate shoes have been cited as a cause of falls we were unable to record rates of falling during this initial study. We hope to rectify this in future research.

Finally, if we are to recommend new shoes to our patients we must ensure that they have access to facilities where their feet can be measured and shoes can be fitted correctly. White and Mulley found that 25% community dwelling older people were unable to get to a shoe shop.¹¹ These authors suggested the possibility of mobile shoe shops where trained staff can go out into people's homes to fit shoes. Our study population is a frailer group and so difficulties with access are likely to be greater.

Extra wide or extra narrow shoe fittings are not always easily available and specialist companies providing this type of footwear are likely to have more expensive products which many older people cannot afford.

In conclusion, our findings suggest that a straightforward assessment of footwear in older people could improve comfort and avoid preventable foot problems.

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MEDICAL ANNIVERSARY

Prosper Ménière (18 June 1799)

Prosper Ménière (1799–1862) was born at Angers, Maine-et-Loire, France, son of a tradesman. He graduated in medicine in Paris with a gold medal (1826), MD (1828), and became assistant to Dupuytren at the Hôtel Dieu; he eventually became chief physician to the Institution for Deaf Mutes. Just before he died he described a condition of middle age comprising vertigo, nausea, headache, deafness and tinnitus, occurring in attacks. He attributed his syndrome to dysfunction in the semicircular canals.

He married Mlle Becquerel, of a family with numerous links to medicine, otolaryngology, and radioactivity. He died of pneumonia on 7 February 1862.—*D G James*