

# Foot-care Practices of Persons Living with Diabetes Prior to Amputation



By Kyle Goettl

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**W**hile developing educational strategies and materials for an in-patient amputee rehabilitation population (80 per cent diabetic) at Parkwood Hospital, St. Joseph's Health Care London in London, Ontario, it became apparent that new patients lacked knowledge on living with diabetes and managing foot care. To better assess the level of these patients' knowledge in order to develop more effective educational programs, a survey of self-reported foot-care practices of persons living with diabetes prior to a unilateral or bilateral lower-limb amputation was undertaken.

A questionnaire was developed and administered to a small sample of volunteers with diabetes who were admitted to a rehabilitation program following a recent lower extremity amputation.

The questionnaire included questions relating to foot-care practices prior to amputation, soaps used, and previous education about foot care and diabetes.

The questionnaire also asked whether the participants had loss of protective sensation, and personal knowledge of diabetic blood sugars.

## Results and Discussion

Thirty-three of the 34 surveys given to patients were returned, resulting in a 97 per cent response rate. Results for each question are presented on the following pages as percentages. The results in Table 1 were obtained from chart review and are noted for the purpose of background information. It was noted that 84.8 per cent of participants were male and 15.2 per cent were female. The average age of the males was 62.9 years, with an age range of 42–79, compared to an average age of 64 years for the females and an age range of 58–80.

Fifty-seven per cent of the males and 75 per cent of the females had non-insulin dependent diabetes at the time of admission into the program. The home address for 81.8 per cent of the group was outside of the city of

## Did You Know?

- Approximately 15 per cent of all patients with diabetes mellitus will develop a foot or leg ulcer at some time during the course of their disease.
- The majority of lower limb amputations are preceded by a foot ulceration.<sup>1</sup>
- Eighty four per cent of diabetic foot ulcers can be attributed to external factors, such as ill-fitting shoes and socks, mechanical trauma, stress ulcers and paronychia.<sup>2</sup>
- Providing foot-care strategies for people living with diabetes should be standard at the time of diagnosis. Foot examination with a 10 gram monofilament (Semmes Weinstein test) by a health-care professional should be an annual event at minimum.
- A study by De Berardis et al. found that "those patients who had received foot education and had their feet examined were significantly more likely to regularly check their feet."<sup>3</sup>

London and reflects the regional nature of this program.

Table 1 represents the breakdown of gender with regard to level of amputation:

Level of Amputation	Below knee	Bilateral below knee	Above knee	Through knee
Female	75%	0%	25%	0%
Male	75%	10.7%	10.7%	3.6%

The most direct causes for amputation are displayed in Table 2. Amputations that occurred for ischemia/peripheral vascular disease (PVD) were those that occurred post failed bypass or as a result of extreme claudication pain. Those with “foot wound” as the most direct cause of amputation were those that had their leg(s) removed because of a non-healing, non-treatable wound as determined by the individual surgeon in acute care.

Most Direct Cause of Amputation (n=33)	Percentage
Traumatic	6.1%
Ischemia/PVD	21.2%
Foot Wound	69.7%
Cancer	3.0%

The information in Table 3 and Table 4 (see next page) reflects foot-care practices of 33 volunteers who completed the survey about practices and knowledge prior to amputation. In Table 3, 60.6 per cent of the respondents reported that they were not in the habit of visually checking their feet on a daily basis, and 12.1 per cent reported not checking the skin of their feet at all. Interestingly, 39.4 per cent of respondents reported checking their feet daily prior to amputation. What is unclear from the data is the timeline of daily foot checks prior to the amputation. Did they check daily once a problem with their feet had been identified? Or had they been diligent with daily foot inspections since they were diagnosed with diabetes?

The use of a mirror to visualize all areas of the foot is recommended for diabetic foot inspection. In this study, 72.7 per cent of the respondents reported

having never used a mirror as part of their foot care.

People who live with diabetes are at risk for developing a peripheral neuropathy related to diabetes. This can leave the foot vulnerable to harm from unnoticed pressure. In Table 3, 51.5 per cent of respondents reported having never checked the inside of their shoes or socks for pressure points or foreign objects, a common source of diabetic foot wounds.<sup>1</sup>

Amazingly, in Table 5 (see page 67), 45.5 per cent of the respondents reported having never received information on how to look after their feet, while 30.3 per cent had received foot-care instructions within the previous year. What is unclear is whether that 30.3 per cent received initial foot-care instructions after seeking out help for a foot wound or whether their foot-care instructions were part of a regular ongoing follow-up with their primary care provider or diabetes education centre.

The most striking finding is that 45.5 per cent of the amputees reported having never received foot care education!

A high percentage of respondents reported having their feet examined by a health-care professional (57.6 per cent) and having received education about their diabetes (42.4 per cent) within one year of their admission. What is unclear again is whether these contacts were emergent in nature as a result of a foot-care problem or whether they were part of an ongoing diabetes education and follow-up plan.

The data from Table 5 demonstrate that 16.2 per cent of respondents were unaware of a significant loss of protective sensation in their remaining foot. Testing for loss of protective sensation with a 10 gram monofilament should be performed annually on someone living with diabetes by a qualified health-care professional, and more often if a significant loss of protective sensation is detected.

The effects of diabetes and natural aging—such as circulation changes—can alter the integrity of the body’s first line of defense, the skin. Dried, cracked skin can promote bacterial growth and possible skin breakdown. People living with diabetes as well as the elderly need to choose their body cleansing products wisely in order to maintain their skin integrity and protective acid mantle on their skin surface. Most soaps and detergents are alkaline and induce an increase in cuta-

TABLE 3

### Before your amputation...

Question (n=33)	7 times a week or more	5–6 times a week	3–4 times a week	1–2 times a week	Less than once a week	Never
How many times a week were you examining your feet?	39.4%	15.2%	12.1%	9.1%	12.1%	12.1%
How often did you use a mirror to examine your feet?	9.1%	3.0%	3.0%	6.1%	6.1%	72.7%
How often did you check the inside of your socks and shoes before you put them on?	27.3%	3.0%	—	6.1%	12.1%	51.5%
How often did you or a caregiver wash your feet?	60.6%	6.1%	21.2%	12.1%	—	—

neous pH, which affects the physiologic protective acid mantle of the skin by decreasing the fat content. In addition, repeated washings with soap may reduce the normal skin flora, leading to an increased colonization of skin with coagulase-negative staphylococci.<sup>4</sup> Information regarding the pH and irritation potential of products marketed for sensitive skin is not usually available.<sup>4</sup> A study published in 2002 compared many popular brands of soaps and cleansers marketed for dry skin and found that only one, Dove Baby™, had a neutral pH of 7, whereas four versions of Zest™ tested very alkaline—between 9.75 and 9.97—with a very high irritation index between 3.713 and 4.99.<sup>4</sup> Responses in the survey (Table 8) highlight the need for people living with diabetes to be better informed so that they can choose their cleansing products wisely in order to adequately maintain their first line of defence.

Over half of the respondents in Table 7 identified a “good blood sugar” range outside of that recommended by the Canadian Diabetes Association.

Over half of the people in this study have had diagnosed diabetes for over 15 years. The mean years

living with diabetes for the males was 18.43, and for the females 9.63. The males ranged from four to 35 years and the females from four months to 20 years of living with diabetes. Anecdotally, several of those who reported living with diabetes for less than five years stated that they first were diagnosed with diabetes after seeking medical help for a foot wound.

#### Clinical Relevance

These results suggest that people with an amputation and diabetes were lacking important information about diabetes management in the time leading up to the amputation. The majority of these individuals who required a lower extremity amputation also did not participate regularly in good foot-care practices. Since people who have had an amputation to one extremity are at much higher risk of amputation of the remaining limb, further education of this population seems to be warranted. Because this population of people with diabetes was sampled after an amputation had occurred, it is not known whether the general population of people with diabetes also lack these important practices and knowledge.

Whether or not enhanced education of this patient population can reduce the incidence of foot wounds and lower extremity amputations remains to be determined. Since these preliminary findings from this pilot study involved a small sample that was not randomly chosen, the results of this work will need to be confirmed by future research.

There is room for improvement in promoting best practice foot care in people living with diabetes. People

TABLE 4

Question (n=33)	Yes	Sometimes	No
Did you wash between your toes with a washcloth?	75.0%	15.6%	9.4%
Did you dry between your toes with a towel?	81.3%	9.4%	9.4%

TABLE 5

### When was the last time you...

Question (n=33)	Less than 1 year	1–2 years	3–5 years	More than 6 years	Never
received instructions on how to look after your feet?	30.3%	3.0%	6.1%	15.2%	45.5%
had your feet examined by a chiropodist, podiatrist, family doctor or nurse?	57.6%	15.2%	9.1%	—	18.2%
received education about your diabetes?	42.4%	—	18.2%	36.4%	3.0%

TABLE 6

### As of today...

Question (n=32)	Yes	No
do you have normal sensation to your remaining foot?	56.3%	43.8%

#### Monofilament test score at the time of admission

- 62% of patients had a score of 6 or less indicating a high risk of further injury due to loss of protective sensation.

TABLE 7

Question	Blood Sugar Reading (n=33)	Percentage
What do you consider to be a good blood sugar reading?	Inside correct range (7)	45.3%
	Outside correct range	54.7%

living with diabetes and those caring for loved ones living with diabetes should be given the opportunity to access current information that can help them to make informed decisions regarding their own foot care.

Education on preventative strategies must be reviewed regularly throughout the course of living with diabetes (not just at the time of diagnosis). Health-care professionals working with people living with diabetes must maintain a current knowledge base on preventative foot care. The health-care professional should be able to adapt the content of their teaching to the specific needs of the learner. They should also employ measurement tools to ensure that their educational efforts have been effective. <sup>10</sup>

#### References

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4. Baranda L, González-Amaro R, Torres-Alvarez B, et al. Correlation between pH and irritant effect of cleansers marketed for dry skin. *International Journal of Dermatology*. 2002;41:494-499.

TABLE 8

### What brand of soap were you using?

Soap name (n=33)	Percentage
Antibacterial Soap	3.0%
Dove™	12.1%
Lux™	3.0%
Glycerine Soap	3.0%
Irish Spring™	15.2%
Ivory™	24.2%
Lever™	3.0%
Oil of Olay	3.0%
Palmolive™	3.0%
Skin-So-Soft™	3.2%
Zest™	21.2%
Unknown	6.1%