Cost-Effectiveness of an Easy-to-apply Total Contact Cast System for DFUs

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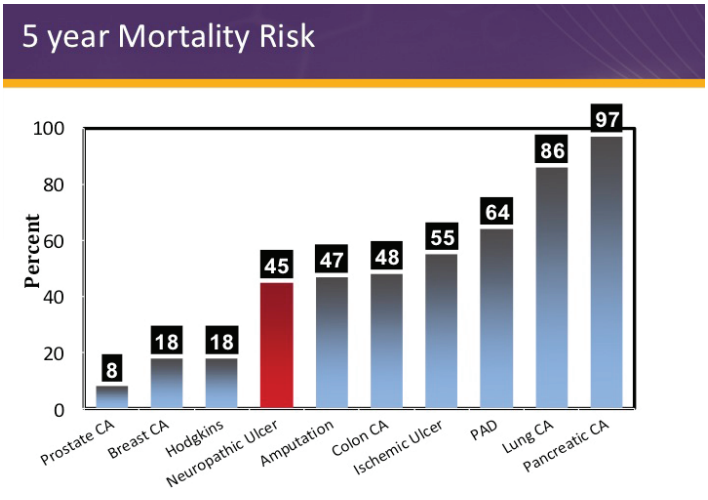
Diabetes can be described as one of the most critical health issues facing Canadians today. In 2015 it was estimated that 3.4 million of our population have diabetes and a further 5.7 million have prediabetes. Over the next 10 years the number of people with diabetes is expected to increase by 44%, a significant burden to individuals and our health-care system.

The complications associated with diabetes are many, due to the effects of elevated levels of glucose on cells of the body. Diabetic foot syndrome is one such complication—and it has profound effects on patients' lives. Diabetic foot syndrome includes the presence of several characteristic pathologies such as infection, diabetic foot ulcer and Charcot, resulting from neuropathy, peripheral arterial disease and immunopathy. As a result of this syndrome a person with diabetes has a 25% lifetime risk of developing a foot ulcer and is over 20 times more likely to be hospitalized for a non-traumatic lower limb amputation. Annual health-care costs range from $11,710 to $16,883 per patient with a foot ulcer in the United States in 2014. Canadian figures are estimated to be $21,371.[1]

A Sad Truth
When it comes to life expectancy it is better to have certain cancers than complications of diabetic foot syndrome.

Mortality and morbidity are high for patients whose foot ulcers result in amputation. If diabetes is one of the most pressing health issues for Canadians, diabetic foot syndrome is undoubtedly just as critical.



Armstrong DG, Wrobel J, Robbins JM. Are diabetes-related wounds and amputations worse than cancer? Int Wound J. 2007;4(4):286–7.

Take a Load Off

The most important part of addressing the management of a diabetic foot ulcer, without exception, is to redistribute pressure from the wound in order to minimize repetitive trauma to the area. The challenge for patients and clinicians is that being in a state of complete non-weight-bearing on the

area of ulceration can be very difficult to achieve in everyday life. As well, it can promote significant deleterious health effects, such as infections and amputations.

Total contact casting (TCC) has long been established as the gold standard to achieve offloading while still enabling patients to maintain some mobility.[2] The benefits are that TCC enables pressure to be transmitted to the cast wall or rearfoot, resulting in decreased forefoot pressure. The device also reduces gait speed and shortens stride length, resulting in reduction of pressure. Ankle movement and the propulsive phase of gait are reduced, resulting in a reduction in vertical loading forces. Unfortunately, traditional TCC typically requires skilled application, and access can be difficult. Other methods, such as removable cast walkers and therapeutic footwear, have been developed and are in common use.

A recent meta-analysis was done in 2016 by Elraiyah et al. that investigated the effectiveness of various offloading methods in the treatment of diabetic foot ulceration.[3] The analysis included 19 interventional studies, of which 13 were randomized controlled trials and pooled the data of 1605 patients with diabetic foot ulcers using an offloading device. Improved wound healing was demonstrated with TCC over removable cast walkers, therapeutic shoes and conventional treatment. There was no advantage to irremovable cast walkers over TCC.

Adherence to offloading devices can be difficult. 57% of Canadians with diabetes report that they cannot adhere to prescribed treatments due to high out-of-pocket expenses; the average costs of these supports is greater than 3% of income.

While TCC appears to be the most effective method for offloading a diabetic foot ulcer, cost is often cited as a prohibitive reason for not adhering to an offloading device. Dr. Woo and his team sought to investigate this conundrum further by doing a cost-effectiveness study.

A retrospective investigation was done at the Quarry Foot Clinic in Kingston, Ontario, between 2014 and 2016. The charts of 15 patients were reviewed: 13 patients with type 2 diabetes, one patient with type 1 diabetes and one patient with a chronic foot ulcer of unknown etiology. The final analysis was done on 11 of those patients, as two patients ended up with infection and two patients had issues with adherence. 60% were male. The mean age was 55. Cost analysis included dressing type and frequency, the cost of the TCC, labour and any antibiotics needed. The patients' treatment history prior to the initiation of the TCC was used as a comparator.

With the TCC treatment, costs ranged from $251.84 to $1236.08. Duration of treatment was 1–5 weeks. Surface reduction was 100%. Ten out of the 11 patients achieved closure. Cost for the patients' conventional treatment ranged from $1090.95 to $10,252.80. The duration of the wounds had been nine to 100 weeks, and surface reduction ranged between zero and 90%.

The total cost of treating 11 patients with TCC resulted in a savings of 75% when compared with conventional treatment.

TCC is effective in managing diabetic foot ulceration. Though the upfront costs of this device could be described as expensive, TCC has lower incremental costs and is far more efficient. Wounds heal faster, overall costs are kept down and patients' quality of life can be improved.

References

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