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Prediction of wound healing after minor amputations of the diabetic foot

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Aim: To determine the usefulness of different physiological tests in predicting wound healing after minor foot amputations.

Methods: A single centre prospective non-experimental study design was conducted. Vascular testing included pre-operative assessment of pedal pulses, arterial spectral waveforms at the ankle, absolute toe pressures, toe-brachial pressure index (TBI) and ankle-brachial pressure index (ABPI). Fifty consecutive subjects requiring a forefoot or toe amputation underwent non-invasive physiological testing preoperatively. There were 3 patients who required intra-operative revascularization and 3 patients failed to complete the study, leaving a total of 44 limbs available for analysis. After 6 weeks, the patients were examined to assess whether the amputation site was completely healed or was healing (group 1) or had developed complications or did not heal (group 2).

Results: Out of the 44 forefoot/toe amputations, 16 amputation sites failed to heal, 13 amputations healed and 15 were healing at 6 weeks after the intervention. There was no significant difference in ABPI between the healed/healing and the non-healing groups. Mean TBI (p 0.031) and toe pressure readings (p 0.014) were significantly higher in the healed/healing group compared to the non healing group. A significant difference was also found in ankle spectral waveforms between the two groups (p 0.028).

Discussion: Although a number of non-invasive techniques such as qualitative waveforms, ABPI's, and TBPI's are available to assist clinicians in their decision making on amputation level selection, none have gained universal acceptance. The originality of this work is the use of a combination of physiological tests to predict minor amputation healing. This has never been reported before and in our opinion this finding may contribute to the development of a clinical algorithm using a combination of toe pressure, toe-brachial pressure indices and spectral waveforms to better predict wound healing or non-healing after minor amputations. Furthermore, this could also help clinicians decide on whether potentially risky revascularization procedures should be performed.

Conclusions: TBIs, toe pressures and spectral waveforms at the ankle appear to better predictors of healing and non-healing after minor amputation than ABPIs. ABPI alone is a poor indicator of the likelihood of healing of minor amputations and should not be relied on to determine need for revascularization procedures before minor amputation.

Biography

Cynthia Formosa is currently working on full-time basis with the University of Malta as a Senior Lecturer and Head of Podiatry Department inside the Faculty of Health Sciences. She was awarded the PhD in Podiatry in October 2009 from the same university. She was also President of the Association of Podiatrists, Malta for two years and is currently helping the association with all the educational activities. She is currently a Member of the International Federation of Podiatrists and a Member of the Clinical Biomechanics and Human Performance Research Team at the Faculty of Health, Staffordshire University. She is also a Founder Member of the Diabetes Foot Research Group, University of Malta. She completed her first Post-doctoral research focusing on the Prevalence Rate of Diabetes Foot Risk Factors and Complications in the Maltese Diabetic Complications. She is currently working on another research focusing on National Diabetes Foot Screening Guidelines. She was also appointed as a Visiting Fellow in September 2011 at the Centre for Sport, Health and Exercise Research, Faculty of Health, Staffordshire University. She is also a Fellow at the Royal College of Physicians and Surgeons of Glasgow.

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