

Early identification of diabetic foot ulcers that may require intervention using the micro lightguide spectrophotometer.

Rajbhandari SM, Harris ND, Tesfaye S, Ward JD.

Diabetes Centre, Royal Hallamshire Hospital, Sheffield, UK.
mdp95smr@sheffield.ac.uk

OBJECTIVE: Adequate tissue oxygenation is known to be essential for the healing of diabetic foot ulcers, but hypoxia has also been shown to be a potent stimulus for growth. There are no studies looking specifically at ulcer oxygen levels during the healing process. We measured the serial microvascular oxygen saturation (SaO₂) of the foot ulcer, the ulcer margin, and a control site using the Erlangen micro lightguide spectrophotometer (EMPHO II; Bodenseewerk Geratetechnik, Erlangen, Germany) to study serial changes during healing. **RESEARCH AND DESIGN METHODS:** Studied over 9 months were 14 patients with neuropathy with a total of 24 foot ulcer sites. Of these patients, four (seven ulcers) had significant ischemia as determined by the ankle-brachial pressure index (ABPI) and transcutaneous oxygen tension. **RESULTS:** Of 21 ulcer sites with serial measurements, only 13 ulcers healed. In those ulcers, a significant reduction ($P < 0.05$) in SaO₂ occurred with healing. SaO₂ dropped from 58% at initial presentation (mean area 2.6 cm²) to 47% at midsize (mean area 1.2 cm² at 5.2 weeks) and finally reduced to 45% just before it healed. Similar trends were also seen around the margin of the ulcers (initial 49%, midsize 45%, and final 41%; $P = 0.1$). However, there were no such changes on the control sites (43, 40, and 40%; $P = 0.5$) or within the eight ulcers that did not heal (46, 42, and 53%; $P = 0.2$). **CONCLUSIONS:** Serial microvascular oxygen measurements may be used to identify at an early stage those ulcers that are unlikely to heal and, therefore, need surgical intervention.

Publication Types:

Clinical Trial

Randomized Controlled Trial