

Effect of painless diabetic neuropathy on pressure pain hypersensitivity (hyperalgesia) after acute foot trauma- an exploratory study.

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Introduction and objective: It is well established by animal experiments that an acute joint injury immediately reduces mechanical pain thresholds at the injured site (Neugebauer et al., *Molecular Pain* 2007;3:8). To explore the effects of painless (diabetic) neuropathy in a clinical setting, we studied pressure pain thresholds after a skeletal foot trauma in unselected routine patients with and without severe painless neuropathy (i.e. history of foot ulcer or Charcot arthropathy). **Design and Methods:** A prospective observational case-control study was performed on 12 cases with severe painless neuropathy (11 with diabetes mellitus), and on 13 non-neuropathic controls. Inclusion criterion was an acute trauma of the foot skeleton (cases: elective bone surgery; controls: sprain, toe fracture). Cutaneous (CPPPT) and deep pressure pain perception thresholds (DPPPT) were measured at both feet and hands. Vibration perception thresholds (VPT) were also assessed. Established clinical methods (64 Hz 8-grade tuning fork, calibrated pinprick stimulators, Algometer II®) were employed. Measurements were repeated during 7 days after the trauma. Data were analysed per side of foot trauma. **Results:** Cases were older, heavier and more often female than controls. In the controls, DPPPT at the traumatised feet was lower on day 0 than on day 7; it increased steadily by 12-30% within the normal range. CPPPT and VPT at feet and hands were normal and did not change. In the cases, CPPPT and VPT were at or above upper detection limit at the feet, and in the upper normal range at the hands; neither threshold decreased in response to surgery. At the hands, DPPPT was normal and did not decrease postoperatively. At the feet, DPPPT was much higher than in the controls; although it decreased by 15-30% postoperatively at the operated feet, it was on average 50% higher than at the controls' traumatized feet. **Summary and conclusions:** The statistical significance of the data is limited, due to patient heterogeneity and group size. Nevertheless, the data suggest that severe painless neuropathy abrogates the physiologic posttraumatic hypersensitivity (hyperalgesia) that is required to force retraction of an injured limb from any one, even innocuous, mechanical impact in order to avoid additional damage to the injured site.