Tattersall's TALES

Paul Brand and neuropathic ulcers

Professor Robert Tattersall

Today's diabetes world is fast-moving and exciting; knowledge is accumulating at an astonishing rate, new discoveries and understanding lead to new ideas and innovations in treating, managing and preventing diabetes. However, there's nothing new under the sun. To help understand the present, it sometimes helps to examine the past.

Tattersall's Tales will enable readers to do just that. In every issue, Robert Tattersall, renowned diabetes sage and guru, will consider an aspect of diabetes and place it in a suitable historical context. Research, treatment, people and products will all feature.

In this instalment, Robert Tattersall discusses the past pitfalls and pioneers of diabetic neuropathy, focusing on the role of the missionary Paul W Brand.

Foot ulceration in diabetes was well-known in the 19th century. In 1887, Thomas Davies Pryce, consulting surgeon to the Nottingham Dispensary, described the case of a 56 year old framework knitter and hawker who had had pains in his legs for 8 months and said they felt dead. According to Davies Pryce:

'A fetid odour emanated from both feet. The ulcers commenced as corns. One ulcer the size of a two-shilling piece was situated over the plantar aspect of the metatarso-phalangeal joint of the right great toe. Its outline was sinuous and ragged. The bones of the joint could be felt at the bottom of the sinus, the metatarsal bone being eroded. A sinus of the same character but of smaller size was situated over the plantar aspect of the head of the fifth metatarsal bone of the opposite foot.'

Davies Pryce attributed the ulcers 'mainly to vascular disease and malnutrition', and this view prevailed for the next 50 years. From 1920–50, diabetic foot lesions appeared in textbooks under the heading of diabetic gangrene. Treatment was almost entirely by amputation, usually above the knee.

In England the recognition that neuropathy alone could cause gangrene of the toes owed much to the advocacy of the King's College Hospital physician, Wilfrid Oakley (1906–98). In a lecture to surgeons in April 1954, Oakley told his audience that:

'Pressure due to the loss of pain is an equally important cause of foot lesions, which may so closely resemble true ischaemic gangrene that, in the past, needless amputations have resulted from failure to appreciate the difference between the two conditions.'

Trophic ulcers were well-known in tabes dorsalis and leprosy. By the 1950s, the former was becoming rare but it seems strange that a parallel was not drawn between leprosy and diabetes. Perhaps leprosy had the same biblical stigma for doctors as for the general public and was left to medical missionaries.

One such person was Paul W Brand (1914–2003). Brand went to India in 1946 and taught surgery at the Christian Medical College in Vellore where he showed that it was not the 'bad' or 'non-healing' flesh of leprosy which caused toes and fingers to fall off, but that the damage was due to anaesthesia.

Immobilisation in plaster became the standard treatment for leprous ulcers in India in 1939. Brand was impressed by 'the regularity and speed with which trophic ulcers healed in a walking plaster'. To him this supported the concept that 'ulceration is related mainly to mechanical factors'. In a 1966 pamphlet for the leprosy mission, he wrote:

'...the pathway to amputation of the leg is littered with bandages and dressings which have deceived both doctor and patient into thinking that by dressing an ulcer they were curing it... the whole problem is really one of mechanics not medicine... nothing that we can do for the patient will be successful unless the patient understands the problem himself and co-operates.'

To try to get objective measurements, Brand developed a thin transducer which could be fitted in the shoe to measure pressure on the sole. Using this he hoped to design appropriate shoes for anaesthetic feet because otherwise the first sign of pressure was apt to be 'the appearance of a pressure sore'. This equipment was elaborate and expensive but he pointed out that 'it has a much wider implication' (than leprosy).

In 1965 Brand moved to the only specialist US leprosy hospital in Carville, Louisiana where he had generous research funds (Brand and Yancey, 1994). By the late 1970s, however, there seemed a real possibility that the hospital would lose its funding. Brand read an article about 'diabetic osteopathy' which had x-rays showing changes in the foot bones identical to those in leprosy. He went to see the authors of the article and was invited to speak at the Southern Sugar Club. They were sceptical but Brand went back to Carville and invited local doctors to send him their diabetic foot problems. He concluded that the problem was identical in diabetic neuropathy and leprosy, but asked himself: 'How could I, with a background in the rather obscure field of leprosy, get the attention of experts in another specialty?' Luckily, John Davidson of Atlanta had been at the Sugar Club meeting and had found that Brand's methods of pressure relief worked. He arranged for all of his staff to be trained at Carville and asked Brand to write a chapter in his diabetes textbook. The budget of the Carville hospitals was increased and its foot clinic became the Foot Care Center.

Bauman JH, Girling JP, Brand PW (1963) Plantar pressures and trophic ulceration. An evaluation of footwear. *Journal of Bone and Joint Surgery* **45B**: 652–73

Brand P (1966) *Insensitive feet: a practical handbook on foot problems in leprosy.* Leprosy Mission, London

Brand P, Yancey P (1994) *Pain: the gift nobody wants.* Marshall Pickering, London

Davies Pryce TA (1887) A case of perforating ulcers of both feet associated with diabetes and ataxic symptoms *Lancet* **2**: 11

Oakley WG (1954) Diabetes in surgery. *Annals of the Royal College of Surgeons* **15**: 108