programmes is becoming more important with the approach of the elimination deadline for leprosy, and the increasing importance of the mass media.

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SENSORY TESTING USING NEUROTHESIOMETRY

Editor,

As colleagues at the West Midlands School of Podiatry, we are curious about the use of vibration perception measurements as a clinical tool for the determination of neurological dysfunction in conditions such as diabetic neuropathy and leprosy. Our curiosity is not with the use of vibration perception thresholds (VPT) per se, since this technique is well documented, but the site at which testing is performed.

It is our understanding that in a neurological setting, vibration perception is assessed by holding a vibrating device (tuning fork or neurothesiometer etc.) firmly against the malleolus or some other bony prominence. However, it is known that whilst skin has a variety of somatic sensory receptors, bone has none.

Therefore, the action of placing a vibrating device against a bony prominence has a number of pitfalls. Firstly, the skin is likely to be ‘thinner’ at this site, with little underlying subcutaneous tissue. This suggests that the number of sensory units per unit area is lower than at other sites where there is a greater ‘body’ of tissue present. Secondly and more importantly is the role that the underlying bone will play in the vibration transmission. It has been pointed out that a bony site will act as a sounding board and hence it would be difficult to know which receptors were being activated. In fact, it was reported as a common experience that vibration in the fingers was felt when a tuning fork was held against a ‘bone protuberance at the elbow’.

The variation in the ‘damping and spread’ of the vibration is determined by the ‘stiffness’ of the tissue. These workers reported in their study that ‘care was taken to apply the stimulator where the subcutaneous tissue was so thin that the stimulus would be transferred maximally to the underlying bone’. These two comments from the same report appear at odds with each other. Surely if it is known that vibration is damped by a ‘stiffer’ tissue (such as bone), it would more prudent not to apply it to a ‘stiffer’ tissue such as a bony prominence. Goldberg and Lindblom have reported a series of vibration amplitudes, where it can be seen that the malleolus and tibia all damp the signal to a much lesser degree.

In the well-known report by Bloom et al., the centile charts for vibration thresholds for the thumbs and medial malleoli may possibly be explained by this damping effect. The vibration threshold is lower in the thumb, which unlike the medial malleolus, has no bony prominence.

The ramifications of this damping effect are obvious. Firstly, it will be impossible to get a true determination of VPT when using a bony prominence. Secondly, a situation might arise in a neuropathic patient where the stimulus is felt as a consequence of transmission of the vibration along the bone in the lower limb away from a neuropathic area, to an area where the vibration is perceived not as a consequence of the initial cutaneous stimulus, but as a secondary effect of transmission to the sensory receptors ‘outwards’ from the bone, from ‘underneath’ as it were.

We would welcome discussion on this topic, since the technique is widely used in podiatry clinics and one of the major pieces of armament in the battle against neuropathy and its consequences.

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References


GRADING IMPAIRMENT IN LEPROSY

Editor,

With interest we read the article ‘Grading impairment in leprosy’ by Van Brakel et al. in *Leprosy Review* 70, no. 2. It would be an advantage for the management of leprosy control programmes if there was a simple accurate indicator to measure changes in impairment. This indicator could help to monitor how well a programme is able to prevent impairments. Reporting on Prevention-Of-Impairment-and-Disability (POID) activities would encourage the health workers to take this part of the work seriously.

In leprosy, the major impairments are caused by nerve damage: loss of sensation, loss of muscle power in hands, feet and eyes. Secondary impairments (e.g. wounds) can develop in addition to these primary impairments. These impairments can be measured and scored. The presently used WHO impairment grading system has the advantage that it is relatively simple. Eyes, hands and feet are examined for impairment caused by nerve damage. Disability grade 0 means no anaesthesia and no visible impairments or damage, disability grade 1 means that there is anaesthesia but no visible deformities or damage and grade 2 means that visible deformities or damage is present. The WHO impairment score is the maximum score found in any eye, hand or foot (range 0–2).

This WHO impairment grading system has serious limitations. The basic problem is that this grading system combines in one figure three basically different impairments. This does no justice to the three different components.

1. The impairment grade is not a good measurement for the severity of the impairment. Visible deformities are graded to be more severe than invisible ones. However, a person with loss of sensation in both hands and feet (grade 1) is more at risk of becoming severely disabled than a person with only paralysis of one small finger (grade 2). Grade 2 shows a different impairment than grade 1 (or a combination of impairments).
2. There is a wide range of severity of impairment in each category, e.g. disability grade 2 can mean paralysis of a little finger or loss of all fingers.
3. Voluntary muscle testing and sensation testing used for impairment grading are not always easy to score. In many patients, nerve damage causing the impairments is not complete. These slight changes in sensation and muscle power are often difficult to interpret, especially for general health workers with limited experience. The impairment may change over time with increasing and decreasing immune response.
4. The impairment grade can alter by small changes in impairment. On the other hand, large changes in impairment do not always alter the impairment grade. Improvement from grade 2 to 1 and vice versa may only be a wound appearing or healing. On the other hand, the disability in a hand may have improved very much without this showing in the disability grade (e.g. due to permanent loss of a finger).
5. The grading system depends on the accuracy of the sensation testing and the voluntary muscle