Reduced vibration perception in right hands of normal subjects: an acquired abnormality?

P G Wiles, S M Pearce, P J S Rice, J M O Mitchell

We have measured the vibration perception threshold (VPT) in a large number of normal subjects with the aim of producing accurate age related percentile charts to allow simple, quantitative assessment of neuropathy at the bedside. During this study we noticed that the VPT for right thumbs was often greater than for the left suggesting that in the general population right hands may be less sensitive to vibration than left hands.

Recently, differences between VPT measurements from different sides of the body in the same subject have been highlighted and, in early studies, a tendency for right hands to be less sensitive than left hands was noted. No conclusions were drawn from these observations, however. We have, therefore, analysed our data in an attempt to assess the influence of age and occupation on left-right differences in vibration sense in normal volunteers.

Subjects, methods, and results

Vibration perception threshold was measured using a

[Graph showing data for male metal factory workers, all men, and all women with differences between right and left hands noted.]
hand held biothesiometer (Bio-medical Instruments Co, Newbury, Ohio, USA) in 1388 volunteers at their normal place of work or meeting place. Twenty three subjects were excluded because of illness or medications which might affect vibration perception, leaving 681 women, median age 38 (range 10–91), and 684 men, mean age 35 (range 8–90). Vibration perception threshold was measured at the thumb pulps, great toe pulps, and over the medial malleoli. The lowest of three readings was recorded at each site, together with details of age, sex, height, and illnesses and medications. Significance was assessed using Student’s t test for paired samples on log transformed data.

There were small but significant differences in VPT scores between right and left thumbs in men (mean (SE) 4.60 (0.11) vs 4.45 (0.11), p < 0.001) and women (5.16 (0.17) vs 5.01 (0.17), p < 0.001). Among the men, however, this difference was almost entirely accounted for by a group of 168 factory workers (making metal fittings), mean age 40 (range 16–64) (thumb VPT, right 4.21 (0.26) v left 3.83 (0.16), p < 0.001). In this group 63 (38%) had greater VPT scores in the right thumb, 17 (10%) in the left thumb, and 88 (52%) had no difference (p < 0.001) (figure).

Population curves of VPT scores against age show the VPT to be consistently lower in the left thumb when compared with the right. In women the difference was fairly constant at all ages, but in men the proportion with reduced vibration sensation on the right increased steadily with age, being 6% in the first decade and reaching 46% by the seventh decade (ages 60–69). Almost certainly this is related to right-handedness but, being an anonymous study, we are unable to return and assess this variable specifically. None of these differences was seen in toes or ankles.

**Comment**

We have confirmed the previously noted tendency for vibration sense to be reduced in right compared with left hands, and we have further shown that, at least in men, this is likely to be an acquired defect. The cause of the right-left difference is unknown but, rather than implying nerve damage, it is most likely to reflect skin thickening or some adaption to repeated mild trauma that may be related to occupation or activity that concerns the right hand more than the left. The possibility of such an adaption was illustrated by one metal worker who commented that on Monday mornings fittings recently turned felt uncomfortably hot to the fingertips whereas later in the week this discomfort was no longer apparent.

The relative simplicity and quantification of vibration sensation will ensure its continued use as a measure of nerve function. When using the biothesiometer to measure progression of disease in longitudinal studies, however, our results highlight the importance of making repeated measurements of VPT at identical sites on the same side. Furthermore, when comparing patient groups, our findings confirm the need to measure VPT bilaterally, thereby reducing error due to right-left differences.

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