plates. Sixteen wells 3 mm in diameter and 1·5 mm apart are cut in a row, and a trough 3 mm wide is cut parallel to the wells 3 mm from their cathodal side. Heat inactivated sera (8 μl) are added to the wells, and a tissue extract containing soluble antigens (150 μl) is placed in the trough. We use human spleen extract or rabbit thymus extract at a final protein concentration of 5 mg/ml. Electrophoresis is carried out at 12 mA/slide for 1 hour in barbital buffer, after which the slides are washed in saline and stained in 0·1% Coomassie blue. Precipitins are identified by the formation of lines of identity with reference sera in adjacent wells (Fig. 1).

CIE carried out in this way permits the detection and immunological identification of precipitating antibodies by a single technique. Staining the plates enhances the appearance of weaker precipitin lines and provides a permanent record. CIE is more sensitive than Ouchterlony immunodiffusion and far more economical in the use of reference sera and antigen extract. Furthermore the need to perform enzyme digestion of the antigens is largely eliminated because of the greater separation and sharpness of precipitin lines produced by CIE. The virtue of the method is its simplicity, making it suitable for the identification of antibodies to acidic antigens in most laboratories.

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References

**Use of visual analogue scales**

_Sir_, We have previously studied the reproducibility and errors involved in the use of vertical visual analogue scales (VAS) and showed that reproducibility varies along the length of the scale. We have now extended this study both to horizontal scales and to the serial use of visual analogue scales, which better mimics the clinical situation.

Reference VASs were prepared by drawing out 13 10-cm scales and crossing them at 0·5, 1·0, 2·0, 3·0, 3·8, 4·0, 5·0, 6·0, 6·2, 7·0, 8·0, 9·0, and 9·5 cm respectively. 3·8 and 6·2 cm were included, as these distances correspond to the golden section, which we have previously shown to be important.

The 13 vertical reference scales were presented in a random order to 30 normal volunteers, and immediately after viewing a given scale the volunteer attempted to reproduce the line on a separate blank 10 cm vertical

![](image)

**Fig. 1** Variation in reproducibility along the length of (a) horizontal and (b) vertical VAS (n=30).
scales. The procedure was repeated on the same volunteers using 13 corresponding 10 cm horizontal reference scales. In every case the distance of the estimated cross from the bottom of the vertical scales, and from the left-hand side of the horizontal scales, was measured (±0.5 mm) and compared with the actual position of the cross on the reference lines. Eight of the above volunteers went on to repeat the exercise at weekly intervals for a total of 8 weeks.

The 30 normal volunteers (14 male, 16 female; mean age 33 years, SD 12 years, range 13–51 years) each attempting to duplicate 13 vertical reference lines gave a total of 390 measurements and a further 390 measurements for the horizontal scales. The overall distribution of estimates about a mean was fairly normal except near the apices, the distribution was skewed. However, there was a tendency to estimate towards the left of the reference distance on the horizontal VAS with 193 estimates falling to the left of their reference distances and 156 falling to the right. The remaining 41 estimates were correct.

The standard deviation for the 30 estimates for each of the 13 reference values varied and this is illustrated in Fig. 1. For both vertical and horizontal scales the most consistent or accurate estimates were those near the apices and the least consistent were near the golden section. The difference between the estimate and the actual distance for each of the 13 vertical and 13 horizontal reference points were summed for each volunteer in turn. A range of 33.0 to 93.5 mm total difference was observed, thus indicating wide variation in people's ability to accurately reproduce the reference scales. Considerable variation was also shown in the weekly estimates by 8 of the volunteers for both vertical and horizontal scales. None of the individual volunteers demonstrated any notable improvement or deterioration in their ability to reproduce a given value over 8 weeks.

The results show that reproducibility along a 10 cm VAS varies along the length of the scale from one person to another, from week to week for the same person, and between vertical and horizontal scales. The fact that 29 of the 30 volunteers were right-handed may explain a tendency for this group of subjects to estimate towards the left.

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**Book review**


This volume contains 29 formal presentations and 38 abstracts of additional papers presented at the seminar held recently in Israel. The formal presentations are grouped into 6 sections: (1) basic problems in rheumatology; (2) Sjögren's syndrome; (3) drug therapy; (4) orthopaedic surgery; (5) alternative therapeutic approaches; (6) epidemiology. Section 2 is undoubtedly the best but hardly justifies the publication of the whole proceedings, since there is little in this volume that is not readily available elsewhere. No doubt the participants themselves enjoyed the seminar and will find the book a pleasant memento of the occasion, but there are many better literary possibilities for spending the purchase price.

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Use of visual analogue scales.

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*Ann Rheum Dis* 1982 41: 555-556
doi: 10.1136/ard.41.5.555

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