Diagnosis and measurement of cyclodeviation

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SUMMARY A simple, convenient, and accurate method of detecting and measuring even the smallest degree of cyclodeviation with the help of two special major amblyoscope slides is described. Routine use of these slides in the investigation of all paralytic squints to detect and measure cyclodeviation is suggested. This will prove useful in the correct diagnosis and in the adequate management of a case of cyclovertical muscle palsy.

The importance of the detection and measurement of cyclodeviation in all cases of paralytic squint is being increasingly realised, but it has not yet been a routine practice with all orthoptists and strabismologists because of the absence of a handy and at the same time accurate method of testing. Of the various methods commonly employed to detect cyclodeviation the Maddox double prism test and the Bielschowsky apparatus cannot measure it. The Maddox wing measures cyclodeviation only for near vision. The Maddox rod placed in a trial frame is often used to measure the defect at different distances and in different gaze positions, but a slight tilt of the frame or a slight malpositioning of the rod in the frame affects the measurement. We have also found the trial frame limits the extent of excursion of the eyes from primary to other gaze positions and thereby limits the usefulness of the method in cases of mild paresis of a cyclovertical muscle. Moreover, in this method the extent of excursion of the eyes from the primary positions cannot be measured, and therefore identical testing condition cannot be provided in subsequent follow-ups, which is essential for comparing the findings in order to assess progress.

The after-image method as described by Sood and Sen (1970) is useful, but some patients find it difficult to appreciate the tilt of the after-image, especially when it is slight. This method is also less convenient for measuring the deviation in the 9 cardinal positions of gaze, as the after-image often does not last long enough and has to be produced several times. Since a major amblyoscope is used in most orthoptic centres to measure horizontal and vertical deviation, it is quite convenient to measure

the cyclodeviation also at the same time. A major amblyoscope also permits measurement of the extent of excursion of the eyes from the primary position. However, the SMP slides generally used for this purpose do not permit precise measurement, and therefore special slides are needed.

The purpose of this communication is to describe two special slides that we have been using with the Clement Clarke major amblyoscope for the last year to measure cyclodeviation routinely in all cases of cyclovertical muscle palsy. These slides permit more accurate measurement of the defect than those (Nos. A17 and 18) introduced by Clement Clarke some years ago. Another added advantage of our slides is that the patient reads off the measurement directly from the slides.

Description of slides

Slide 1. This is similar to slide A of the after-image method (Sood and Sen, 1970) with some modifications. It consists essentially of a black circle on a white background. The circumference is marked in degrees, and the markings are extended at 30° intervals towards the centre like the spokes of a wheel. Each small division represents 2°. There is a small circle in the centre which acts as a target (Fig. 1).

Slide 2. This consists of a thin black cross with a black dot in the intersection which also acts as a target (Fig. 2).

The slides have been so designed that when both the pictures are superimposed the black dot in the intersection of the cross coincides exactly with the small circle in the centre of the large circle, and the vertical and horizontal lines of the cross coincide with the 90° to 90° and 180° to 180° axes of the large circle respectively and extend a little distance

beyond the circumference of the circle in both the axes.

Method of testing

After the determination of the refractive error and investigation of the type of squint and binocular functions the patient is placed in front of the major amblyoscope. Slide 1 is placed upright before the

Fig. 1 Slide 1

Fig. 2 Slide 2

healthy eye and slide 2 is likewise placed before the affected eye. The arms of the major amblyoscope are so set that the black dot in the intersection of the cross coincides exactly with the small circle in the centre of the large circle. The patient is now asked to describe the position of the vertical line (or the horizontal line) in relation to the markings on the circumference of the large circle. If, for example, the vertical line points to 90° to 90° there is no cyclodeviation. If the upper end of the vertical line deviates nasally, exocyclodeviation is present, and if the upper end deviates temporally then incyclodeviation is present. The degree of deviation can be read off by the patient directly from the markings on the circumference of the large circle. The reading can also be cross-checked by rotating the slide 2 in order to bring the tilted line back to coincide 90° to 90° axis of slide 1; the required degree of rotation of the slide read off by the investigator from a scale provided in the major amblyoscope is the measurement of cyclodeviation. The cyclodeviation is measured in 9 cardinal positions of gaze, the excursion of the eye from the primary position being kept constant so that the readings obtained in all follow-up tests are comparable.

Discussion

Measurements of cyclodeviation are rarely included in orthoptic reports. In acquired paresis or paralysis of one of the vertically acting extraocular muscles, especially one of the obliques, some degree of torsional deviation is usually present. However, this form of deviation is usually slight and is often missed if testing is not carried out adequately in all positions of binocular gaze.

With the increasing incidence of automobile accidents involving the ocular muscles the number of cases of parietic cyclodeviation for which surgical interference is indicated is increasing. In recent times a number of direct and indirect surgical approaches have been described (Duke-Elder and Wybar, 1973) to correct this defect or to reduce it sufficiently so that it can be controlled by normal torsional fusional reserve. Since in the present state of our knowledge it is difficult to state exactly how much of a particular procedure is to be carried out to correct a definite degree of torsion, one has to be prepared to carry out the surgical treatment in stages. Therefore in modern strabismological practice it is essential to measure cyclodeviation in all cardinal positions of gaze repeatedly not only for proper surgical planning but also for correct evaluation of the effectiveness of a particular procedure.

The method described here has been found to be simple, accurate to detect even the smallest degree of cyclodeviation, and most convenient to perform in all the 9 cardinal positions of binocular gaze. These slides can also be used to measure horizontal and vertical deviations accurately. The disadvantage of the method is that it cannot be used in young children, in whom the objective method of noting

torsional deviation during examination of ocular motility may be the only method practicable.

References

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