The +10 Diopter Lens Occluder

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**Background:** It would be useful to be able to visualize the eye under cover during the cover test. Used as an occluder, a +10 diopter (D) lens will permit such visualization. It is important to know if a +10D lens creates dissociation that is qualitatively similar to an opaque occluder.

**Methods:** The angle of strabismus was measured in 33 patients with esotropia. Seventeen had intermittent exotropia, and 15 had dissociated vertical divergence with both an opaque occluder and a +10D lens used as an occluder. The findings were then compared.

**Results:** In 64 of the 65 patients participating in this study, the measurements obtained with the 2 occluders agreed within 3 prism diopters on repeated testing. In the remaining patient, the measurements differed by 5 prism diopters. In all patients, the dissociated eye could be clearly visualized through the +10D lens.

**Conclusion:** A +10D lens permits excellent visualization of the dissociated eye and provides measurements that are qualitatively similar to those obtained with a standard occluder.


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The gold standard method for measuring strabismus in cooperative patients is the alternate prism cover test.\(^1\) This test is performed utilizing an opaque black occluder to cover 1 eye at a time. It is sometimes useful, however, to observe the alignment or motion of the eye behind the occluder. For example, some patterns of nystagmus may change in an eye when it is occluded.\(^2\) Also, the 3 components of dissociated vertical divergence (elevation, excyclotorsion, and abduction)\(^3\) may only be evident under cover. Finally, latent ocular misalignments can be documented for the purposes of publication or oral presentation if the occluded eye is visible. Spielmann\(^4\) has described the benefits of using a translucent occluder, which permits a view of the eye under cover with a modest degree of clarity. In theory, a high plus powered lens used in the place of an occluder might provide sufficient dissociation to bring out a latent deviation, yet permit the examiner to view or photograph the eye with clarity and magnification. The purpose of this study is to investigate the use of a +10 diopter (D) lens as an occluder during the strabismus examination.

This study sample included 17 patients with intermittent exotropia; in 11 of whom the same measurements were obtained with each occluder. Of the remaining 6 patients, 5 had larger angles with the +10D lens occluder. On repeated testing with the opaque occluder, however, this same larger measurement was obtained in all 5. The remaining patient had 5 PD less exotropia at 1/3 m with the +10D lens occluder. This measurement persisted on repeat testing with the opaque occluder.

This study also included 33 patients with partly accommodative esotropia. Thirty of these patients had the same measurements using the 2 different occluders. One measured 5 PD less with the +10D lens occluder and had the same smaller deviation on repeated testing with the opaque occluder. In 2 patients the angle was larger by 5 PD at 1/3 m with the +10D lens occluder; however, the same larger deviation was found when testing was repeated with the opaque occluder. There were 15 patients with dissociated vertical divergence in this study. Fourteen had the same measurements with the 2 occluders. One patient measured 5 PD less with the +10D lens occluder; how-
ever, on repeated testing with the opaque occluder, the initial larger measurement was replicated. This person was the only patient in the entire study in whom the measurements with the 2 different occluders differed by more than 3 PD on repeated testing.

For all patients tested in this study, the eye behind the +10D lens occluder could be visualized well enough to permit qualitative assessment of its position and movement characteristics. This was clinically useful in differentiating certain clinical disorders. For example, both dissociated vertical divergence and inferior oblique overaction may be associated with elevation of the eyes in adduction. However, in the former case, the abducting eye may also elevate if occluded, and the abducting eye takes up fixation. With inferior oblique overaction, the abducting eye would be hypotropic (Figure).
Alternate prism cover testing, and prism under cover testing utilizing the +10D occluder, yielded results comparable with the standard opaque occluder and also permitted good visualization of the occluded eye. Of the 10 patients who initially had a difference in measurements with the 2 occluders, 7 had an increased angle of misalignment when tested with the +10D occluder. However, they showed the same larger measurement when retested with the opaque occluder. This suggests that the difference in the measurements was a function of the deviation changing due to repeated dissociation, rather than there being a difference in the degree of dissociation created by the 2 types of occluders used. Two patients had smaller measurements when tested with the +10D occluder, but the same smaller measurement was obtained on retesting with the opaque occluder. Only 1 of 65 patients in the entire study had measurements that differed by greater than 3 PD on repeat testing with the opaque and +10D occluders. We consider a difference in measurements of greater than 3 PD to be clinically important because it would alter the amount of surgery that we would perform.

We found that the +10D occluder provides the best means we know of for visualizing an eye in the dissociated state. In addition, the magnification it affords enhances the ability to study subtle movements of the deviating eye. Also, the +10D lens occluder provides sufficient magnification and clarity to permit photographic documentation of the dissociated eye. Because of the limited number of patients included in this study and the lack of rigorous statistical analysis, we are not recommending that measurements obtained with the +10D lens occluder be used for quantifying surgery. We feel that doing so is unnecessary; measurements obtained with the standard opaque occluder can be used for that purpose. We do feel, however, that the data indicate that the +10D lens occluder is an excellent tool for observing and photographing the eye in the dissociated state. It provides measurements that are at least qualitatively similar to standard occlusion.

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REFERENCES


100 Years Ago in the ARCHIVES

A look at the past . . .

Notwithstanding the rather extravagant claims which have recently been put forth as to the success obtained in the treatment of detachment of the retina by operative procedures more or less novel, it may still be held, I think, that complete recoveries from this very grave condition, especially recoveries occurring in highly myopic eyes, are sufficiently rare to justify one in reporting even a single case of this character.

Reference: Theobald S. A case of extensive detachment of the retina in a myopic eye in which complete recovery followed rest in bed and the administration of pilocarpine. Arch Ophthalmol. 1900;29:35.