Ocular torsion variation after superior oblique muscle weakening procedure: a case report

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Abstract

Purpose: To evaluate the torsional effect of superior oblique muscle tenectomy.

Design: Case report.

Methods: Case report of a patient with horizontal strabismus and bilateral superior oblique muscle overaction, submitted to bilateral superior oblique tenectomy. Objective access of ocular torsion was performed using retinography and a computer software (Autocad 2009®).

Results: The preoperative angle was 7.57° in the right eye and 0.66° in the left eye. Postoperative angle of torsion was 4.22° in the right eye and -1.50° in the left eye.

Conclusion: The presented case report suggests that superior oblique tenectomy has an extorsion effect, decreasing the intorsion detected in case of superior oblique overaction.

Introduction

Several types of strabismus may be associated with oblique muscles dysfunctions. The superior oblique muscle (SO) acts primarily as an intorter of the eye and secondarily as depressor and abductor. Superior oblique overaction is a recognized major factor in the genesis of A-pattern and also in the intorsion observed by fundus photography.1,2 Superior oblique tenectomy is one of the muscle weakening procedures available to treat SO muscle overaction and associated A-pattern.1 There are few studies assessing the torsional effect of the SO tenectomy.

Methods

This is a retrospective study of one of the patients studied in the previous free paper “Measurement of the Ocular Torsion Variation After Superior Oblique Tenectomy”, presented at the 29th Pan-American Congress of Ophthalmology and awarded with the Troutman Véronneau Prize in 2011.

This study included a patient from the Strabismus Service, Department of Ophthalmology of Santa Casa de...
Miseriônda Hospital, São Paulo, Brasil. This patient was submitted to ophthalmological examination, including visual acuity (Snellen), cycloplegic refractionometry, slit lamp and fundus examination. Measurement of the deviation was performed with the alternate prism and cover test with prisms for distance vision in the primary, superior and inferior positions, and for near vision in the primary position of the gaze. The same examiner, who was masked to the diagnosis and to the surgical procedure, performed all measurements. The patient presented best corrected visual acuity of 20/20 in both eyes and no changes were seen at the slit lamp and fundus examination. Ocular motility showed an esotropia of 25° plus an A pattern of 25° and bilateral SO overaction (3+ in a range of 1+ to 4+). The patient underwent bilateral SO tenectomy (Figure 1), that includes the intorter fibers among others. Rectus muscles surgery was performed to correct the horizontal deviation.

Objective evaluation of the torsion was performed by retinography with a retinographer (Topcon®), one week before and one month after surgery. Mydriasis was achieved with instillation of one drop of 1% tropicamide (Mydriacyl®) in each eye. The head of the patient was stabilized in the chin and forehead rest and eye height was regulated according to the markings in the instrument in order to avoid head tilt during the examination. Patient was asked to stare at the internal target. The image captured was used to measure the angle of torsion, through a software commonly used in architecture, the Autocad 2009® (Autodesk Inc.®).

Pre and postoperative results were compared. The examiner responsible for the performance of the measurements was not aware of the diagnosis nor of the previous surgical procedure.

The research project of this study was approved by the Committee on Ethical Research of the Irmandade da Santa Casa de Miseriônda Hospital of São Paulo (protocol #044/10).

Results

In the preoperative period, eye intorsion was observed, with torsion angles of 7.57° in the right eye and 0.66° in the left eye (Figures 2A-B), both of them above the horizontal line that crosses the center of the optic disc. After surgery, there was a decrease of the torsion angles: in the right eye the angle became 4.22° and in the left eye, -1.50° (Figures 2C-D); these angles were located above the horizontal line that crosses the geometric center of the optic disc, which is a sign of intorsion, according to the study by Bixeman and Von Noorden. These authors also established the normal position of the fovea, located at 1/3 of disc diameter below the horizontal line that crosses the optic disc center, creating a mean angle of 7.25° with that line.

In the described case report, the angle of torsion was 7.57° in the right eye and 0.66° in the left eye before surgery. These angles were located above the horizontal line that crosses the geometric center of the optic disc, which is a sign of intorsion, according to the study by Bixeman and Von Noorden. These authors also established the normal position of the fovea, located at 1/3 of disc diameter below the horizontal line that crosses the optic disc center, creating a mean angle of 7.25° with that line.

Among the SO weakening techniques, those performed medially to the superior rectus provide greater effect, when compared to the lateral approach technique, and may cause complications such as SO palsy. Scleral disinsertion and tenectomy accomplished laterally to the superior rectus are the preferred techniques for small and medium overactions of SO. The patient had bilateral SO overaction of +3 and the technique used was tenectomy carried out laterally to the superior rectus (Figure 1) in both eyes, which acts both on anterior and on posterior fibers, thus reducing the intorsion.

Result presented in this case report, showed that SO full tenectomy acted as an extorsional surgery, as there was a difference between the angles before and after surgery. Similarly, Roizen et al found that anterior fibers tenectomy corrected 5.2° of intorsion. Sharma et al, in turn, showed that the posterior tenectomy technique was ineffective to change eye torsion, with non-statistically significant postoperative results (p=0.81 in the right eye and p=0.09 in the left eye), and concluded, therefore, that selective weakening of posterior fibers of the SO muscle only affects the functions of downgaze and abduction of the eye.

In this case, SO tenectomy caused extorsion in both eyes, thus reducing the incycloduction found in the case of this muscle’s overaction.