

Silicone Band in the Surgical Treatment of Manifest Exotropia

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ABSTRACT

Purpose: A silicone band was sutured anteriorly to the edge of the lateral rectus muscle neotendon during recession surgery in order to reduce and delay the reoccurrence after exotropia surgery. **Methods:** Collected data of 12 patients (8 males and 4 females), aged 7 - 54 years with diagnosis of constant manifest exotropia and mean angle deviation in primary position of 15,04° (sd 1,18) for near and of 13,23° (sd 0,71) for distance. All patients underwent surgical treatment consisting of lateral rectus recession and silicone band apposition in correspondence to the anterior edge of the lateral rectus muscle neotendon. **Results:** A substantial reduction of the mean angle deviation was observed in all patients after surgery. No adverse band-related effects were detected. **Conclusion:** The silicone band in the surgical treatment of manifest exotropia could be a valuable aid in delaying the relapse thanks to its physical and structural features and to its biocompatibility.

Keywords: Silicone Band; Exotropia; Recession; Lateral Rectus Neotendon

1. Introduction

Surgery represents the gold standard treatment in eyes exodeviations. Several processes are implicated in the exodeviation genesis but neurological lesions [1] are the most frequent. Surgical technique is planned according to deviation grade, sensory status and age of the patients [2,3] and it includes bilateral lateral rectus recession and/or unilateral medial rectus resection (which is strictly related with the primary deviation degree [4-6]). The use of adjustable sutures might represent an effective aid in the surgical management [7] as well as dominant or non-dominant eye surgery might produce different functional outcomes [8,9].

Early post surgery complication is represented by surgical hypocorrection [10] but the most important long term complication is the long term deviation relapse [11].

Different factors are involved in the genesis of the reoccurrence. Besides the clinical features of the primary deviation and the abnormal wide neotendon regrowth in correspondence of the new insertion (microscopic evidence of Schwann cell degeneration both with an increase of the neurofilaments density, axonal vacuoles and hydric swelling [12,13]), level variation of some proteins [14] such as fibronectin, proteoglycans, aggrecans and laminin [15] seem to play a basic role in the resected muscles.

The relapse management consist in surgery [16] in-

volving lateral rectus or medial rectus (unless previously treated) [17,18].

According to several studies, relapse occurs in about 33% of cases and it might happen even following redo surgery (although with a lower probability compared with the first surgery [6,19,20]).

Most of the extreme eyes deviation (30° - 45° or 60^Δ - 90^Δ Δ= prismatic diopter) evolve to secondary strabismus forms due to recession/resection surgical protocol, extreme anisometropia or surgical trauma [21].

Some surgeons suggested a protocol consisting of a free mucosal transplantation [21] to treat secondary deviations (over 45° equivalent to 90^Δ).

However, exodeviation surgical correction is still representing a difficult challenge due to the several and different clinical features which make difficult the surgical approach and apparently aleatory outcomes.

2. Materials and Methods

The goal of our study was to estimate the effect of a silicone band sutured anteriorly to the lateral rectus neotendon insertion during recession surgery in order to reduce and delay the relapse in the surgical treatment of exotropia.

The study was carried out at the S. Salvatore Hospital of L'Aquila, in the Ophthalmology Unit, from June 2006 to December 2009. Data of 12 patients (8 males and 4

females) aged between 7 - 54 years with well-known diagnosis of manifest constant exotropia were collected; maximum follow-up at 42 months.

The pre surgical evaluation consisted in anamnesis (in order to evaluate present complaint and previous ocular history); complete ophthalmological assessment; cycloplegic retinoscopy (using tropicamide 1% and cyclopeantolate 1%); best corrected and uncorrected visual acuity check; orthoptic examination (cover-uncover test at both near and distance fixation; ocular motility examination; Worth Lights Test and microWorth test; Titmus Stereo Test and Lang Stereo Test).

The presurgical orthoptic assessment revealed exotropia in all patients; the mean deviation angle at near was 15.4° (sd 1.18) and at distance was 13.23° (sd 0.71).

The Titmus Test showed absent stereopsis in 50% of patients (6/12) and a complete perception of circles, with average retinal image disparity of 100 arcs in the remaining 50% of cases.

Ten over twelve patients (84%) suppressed one eye with the Worth Lights Test and the remaining 16% of patients (2 over 12) was able to fuse with a proper prismatic correction.

All the procedures were performed by the same experienced surgeon and consisted in 360° limbal conjunctival peritomy, medial rectus muscles isolation, lateral rectus recession and silicone band apposition (Novolene 5.0 suture) just anteriorly to the neotendon insertion, layer suture.

3. Results

Patients underwent follow up assessment every 6 month; final assessment performed at 42 showed the following results: 8 over 12 patients (66%) presented exotropy (mean angle deviation of 3.43° sd 0.87) at near fixation; in the remaining 34% of cases (4 over 12) exoforia was detected (mean angle deviation: 4° sd 0.73). Orthophoria for distance was obtained in 25% of cases (3 patients over 12) and exoforia was still present in 3 over 12 patients (25%) (mean angle deviation of 3.42° sd 0.58). In 6 over 12 patients residual small angle exotropia ($<1.5^\circ$ of deviation). With regards of the sensory evaluation, in 50% of cases (6 over 12 cases) a modified stereoscopic vision consisting in perception of the fly, animals and circles was detected, but with a retinal image disparity of 80 arcs. Sensory status check demonstrated suppression in one eye during the test in 10 over 12 cases (84%), while in the remaining 16% of patients (2/12) fusion was obtained using an appropriate prismatic correction.

4. Discussion

According to several studies, resection/recession surgery produces good outcomes in about 60% - 80% of patients

[22] and an early hypercorrection (4^Δ - 6^Δ) [23] seems to represent the only positive predictive factor in the long term success.

Some surgeons proposed to measure intraoperatively the deviated lateral rectus neotendon width in order to estimate the possible functional outcome [24]. A retrospective study involving 350 patients surgically treated for exotropia demonstrated that a good long term outcome (outbreak relapse mean time = 48 months [25] and 64 months [11]) could be achieved performing a postsurgical hypercorrection higher than 10^Δ of isotropia [25].

Hypercorrections higher than 17^Δ are often related with consequent secondary isotropia; in these cases, the greatest risk factor [26] is mainly represented by lateral incomitance. A recent study in 2005 showed that hypercorrections higher than 20^Δ need a subsequent surgical treatment due to a consequent isotropia in 5%, 9% of the patients [27].

Recently, a 20-year retrospective study involving patients who underwent exotropia surgery before age 10 suggested that stable eye alignment obtained in 11 year old patients tends to be the same until age 30 [28].

The analysis of the results obtained in our study demonstrated a substantial reduction of the mean angle deviation at 42 months after surgery associated with a significant improvement in terms of motor fusion and no presence of flogistic reactions related to silicone band. Stereoscopic sense remained unmodified and the sensory status examination continued to show suppression in one eye. Finally, ocular motility examination didn't suggest any duction disability.

In conclusion, the silicone band in the surgical treatment of manifest exotropia could be a valuable aid in delaying the relapse thanks to its physical and structural features and to its biocompatibility.

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