Tarsorrhaphy is used for the treatment of severe ocular surface disorders and cases of ocular exposure. Temporary tarsorrhaphy has been shown to aid in the healing of corneal epithelial defects. A variety of temporary techniques have been suggested that allow closure for epithelial healing but also allow access to the eye. The drawstring temporary tarsorrhaphy uses rubber bolsters and 6-0 prolene sutures passed through the eyelid margin. This modification of the temporary tarsorrhaphy allows for complete closure of the eyelids while providing easy opening and closing. In addition, this technique is easy to perform in almost any setting.

Tarsorrhaphy is used to close the eyelids to facilitate the healing of various corneal epithelial disorders or to prevent corneal exposure and its inherent complications. A temporary form of tarsorrhaphy is used when closure of the eyelids is needed for shorter periods. With any tarsorrhaphy technique, one must allow for future and sometimes frequent examination of the eye and for administration of topical medication.

A variety of temporary techniques have been proposed. These include the use of pressure patching, cyanoacrylate, botulinum toxin to the levator muscle, and a variety of suture techniques. Each of these techniques comes with advantages and disadvantages. Techniques (Table), such as gluing the eyelid shut and lateral tarsorrhaphy, are easy to perform and allow for excellent healing but make examination difficult. Injection of botulinum toxin into the levator muscle is technically more difficult and more expensive but allows for easy examination of the eye. Our proposed drawstring technique allows for complete closure between examinations, yet permits easy opening of the eyelids for examination or application of medicine. Like most temporary tarsorrhaphy techniques, the drawstring technique can be performed in any setting.

METHODS

The central pretarsal area of both the upper and lower eyelids is anesthetized with lidocaine (1% epinephrine; 1:100000) using a 3-mL syringe and a 30-gauge needle. The area is then prepared with povidone iodine and sterile drapes are applied. Sterile bolster material is created by cutting a Foley catheter into 2 semicircular strips. One of these strips is then cut into two 2-cm sections and one 1-cm section. The bolsters help prevent the suture from damaging eyelid tissue. These pieces also aid in evertting the eyelid to prevent trichiasis. The 1-cm bolster acts to close the drawstring when placed against the 2-cm bolster of the lower eyelid (Figure 1 and Figure 2).

A double-armed 6-0 prolene suture on a cutting needle (P-3) is first passed completely through one of the 2-cm bolsters about 2 mm from the end. The same needle arm is then passed 3 to 4 mm from the upper eyelid margin into the tarsus, exiting the eyelid margin at the gray line (through the arcus marginalis). The needle should then enter the gray line of the lower eyelid in the same position relative to the medial palpebral fissure, exiting the lower eyelid 2 to 3 mm inferior to the eyelid margin. The other needle arm of the 6-0 prolene suture is then passed through the 1-cm bolster and 2-cm bolster of the lower eyelid. The remaining end of the suture is then tied to the 1-cm bolster to complete the drawstring closure.
suture should then be placed through the upper-eyelid bolster in a similar fashion to the lower eyelids but displaced laterally. Both needles are then passed through the second 2-cm bolster, which is placed adjacent to the lower eyelid. Tightening of the suture at this point should allow complete closure of the eyelid.

The next step is to create the drawstring. The 2 suture arms are passed through the 1-cm bolster. The needles are then removed and the 2 ends of the suture are tied, leaving 2 to 3 cm of slack in the suture to allow the lower-eyelid bolsters to be loosened and the eyelid opened. The suture can now be pulled to bring the drawstring together and bring the 2 large bolsters down on the eyelids to accomplish closure. The smaller bolster locks down the drawstring to keep the eyelid in place. To open the drawstring, the smaller bolster is separated from the larger lower eyelid bolster, which allows the eyelid to be examined or to receive treatment. The suture can be cleaned with 2% povidone iodine.

**REPORT OF CASES**

**CASE 1**

A 30-year-old man was seen in the emergency department following severe head trauma and bilateral retrobulbar hemorrhages from a motor vehicle crash. Bilateral lateral canthotomies and cantholyses were performed. Neurosurgeons repositioned frontal fractures to provide increased orbital volume. Unfortunately, the patient had significant corneal exposure, eventually resulting in a corneal ulcer. The drawstring tarsorrhaphy was performed in the intensive care unit setting. The intensive care nurses were able to open the tarsorrhaphy to apply the necessary antibiotic drops. After 3 weeks, the tarsorrhaphy was replaced but was not associated with inflammation. After 4 weeks, the patient’s infiltrates resolved and the tarsorrhaphy was removed.

**CASE 2**

A 75-year-old man with adult-onset diabetes for 20 years developed a postoperative sterile corneal ulcer after
CATARACT EXTRACTION BY PHACOEMLUSIFICATION. CENTRAL THINNING WAS AS MUCH AS 80%. A DRAWSTRING TEMPORARY TARSORRHAPHY WAS PERFORMED IN THE CLINIC MINOR ROOM. THE PATIENT'S STERILE ULCERATION WAS AGGRESSIVELY TREATED WITH TOPICAL STEROIDS, ANTIMICROBIALS, AND BY DISCONTINUING TOPICAL NONSTEROIDAL MEDICATION. THE PATIENT'S WIFE WAS ABLE TO OPEN AND THEN CLOSE THE DRAWSTRING TO APPLY HIS FREQUENT MEDICATIONS. THE DRAWSTRING TARSORRHAPHY WAS CHANGED APPROXIMATELY EVERY 3 TO 4 WEEKS DURING THE COURSE OF THE FOLLOWING SEVERAL MONTHS. FORTUNATELY, THE PATIENT'S CORNEA STABILIZED TO THE POINT THAT ALLOWED PENETRATING KERATOPLASTY TO BE PERFORMED SEVERAL MONTHS LATER (FIGURES 3 AND 4).

CASE 3

A 70-YEAR-OLD MAN WAS SEEN IN THE CLINIC WITH A LONG-STANDING HISTORY OF A PERSISTENT CORNEAL EPITHELIAL DEFECT, PRIMARY OPEN-ANGLE GLAUCOMA, AND PROLIFERATIVE DIABETIC RETINOPATHY WITH NEOVASCULAR GLAUCOMA OF HIS RIGHT EYE. THE PATIENT UNDERWENT CRYOABLATION IN THE OPERATING ROOM TO TREAT HIS PROLIFERATIVE DIABETIC RETINOPATHY. WHILE IN THE OPERATING ROOM, A DRAWSTRING TARSORRHAPHY WAS PERFORMED. THE PATIENT'S WIFE WAS ABLE TO USE THE DRAWSTRING TO OPEN HIS EYE TO ADMINISTER MULTIPLE ESSENTIAL GLAUCOMA MEDICATIONS AND POSTOPERATIVE ANTI-INFLAMMATORY MEDICATIONS. THE DRAWSTRING ALSO ALLOWED FOR ADEQUATE POSTOPERATIVE EXAMINATIONS AND PROVIDED BETTER HEALING FOR THE EPITHELIAL DEFECT. HIS DEFECT IMPROVED MODESTLY WHILE THE TARSORRHAPHY WAS IN PLACE FOR 2 MONTHS.

COMMENT

TARSORRHAPHY IS USEFUL IN THE TREATMENT OF PERSISTENT CORNEAL EPITHELIAL DEFECTS. SEVERAL TECHNIQUES HAVE BEEN PROPOSED TO PROVIDE PROTECTION TO THE CORNEAL SURFACE. EACH HAS ITS OWN ADVANTAGES AND DISADVANTAGES.

PERMANENT TARSORRHAPHY IS EFFECTIVE BUT CAN HAVE A HIGH INCIDENCE OF DEHISCENCE AND MAY DEFORM THE EYELID MARGIN. THE PERMANENT TECHNIQUE (INCLUDING INTERMARGINAL TARSORRHAPHY) MAY LEAD TO DAMAGE TO THE EYELID MARGIN AND RESULTANT TRICHIASIS. PRESSURE PATCHING PROVIDES A NONINVASIVE OPTION BUT IS DEPENDENT ON PATIENT COOPERATION.
tient placement and compliance. A variety of temporary techniques have been proposed. Cyanoacrylate temporary tarsorrhaphy has an unpredictable time course. This technique lasts from 1 to 15 days (average of 6 days). It also does not allow for easy observation without the need for reaplication of the agent. Botulinum toxin injection can provide temporary eyelid closure, but it provides variable results; may cause hypotropia, and is expensive. A variety of other temporary techniques have been proposed that use sutures to close the eyelids. Several of these require additional measures to close the eyelids or fail to provide adequate access to the eye.

In summary, the drawstring temporary tarsorrhaphy is a useful tool in the treatment of persistent epithelial defects. It allows easy access to the eye for examination and for the administration of topical medications. Additionally, it can be performed easily in virtually any setting.

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REFERENCES


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