

Fornix versus Limbal Incision for Strabismus Surgery at Dr M K Shah Medical College and Research Center

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Abstract:

Background and Aim: Over the past few decades, numerous minimally invasive procedures have been developed in the field of ophthalmology. These include phacoemulsification for cataracts, which utilises non-penetrating techniques and miniature drainage implants to treat glaucoma; vitreoretinal surgery employs transconjunctival approaches and minimal buckling; endoscopic techniques for the lacrimal system; and lids require small incisions. Strabismus surgeons' utilisation of limbal versus fornix incisions is the objective of the current study.

Material and Methods: A The current investigation was carried out over the course of three years on 50 patients at Dr. M.K.Shah Medical College & Research Centre, Chandkheda, Ahmedabad. One English questionnaire was specifically designed and distributed to 50 Patients WhatsApp groups via a general link to the Google survey questionnaire that we had developed. Questionnaire contained questions regarding demographics and Reasons for the preferred approach in different settings.

Results: The following 50 patients participated in our survey: In every setting, the limbal approach was favoured, including adult primary procedure. When questioned about the cause, the improvement in exposure across all contexts was cited. The participants who opted for the fornix approach stated that it caused them to experience reduced pain, distress and speedy recovery post-surgery.

Conclusion: Every surgical technique for strabismus possesses its own set of benefits and drawbacks. An individual ought to incorporate every style into their arsenal and select the most suitable one for every patient. Two-muscle strabismus surgery based on the fornix was less difficult to perform and caused patients to experience less postoperative irritation and pain than two-muscle strabismus surgery based on the limbus.

Keywords: Fornix Incision, Limbal Incision, Ophthalmology, Strabismus Surgery.

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Introduction

As minimally invasive techniques and the robotic revolution advance, the prevailing approach in strabismus surgery is to reduce the size of the incision. During strabismus surgery, the number of muscles that are operated on and the nature and positioning of the conjunctival incision will influence the patient's distress and postoperative redness. [1,2] The limbal incision is widely utilized due to its ability to enhance muscle visibility. It is the technique of choice for reoperations involving anatomical plane disruption and scarring, and it is

comparatively simple to instruct surgical assistants. Clear visualization enables direct striking of the muscles and provides superior visibility. Nevertheless, when comparing the fornix incision to this procedure, it is possible that the latter carries a greater risk of irritation due to the use of conjunctival sutures for closure, as well as visible conjunctival scarring, corneal dellen formation, and stem cell loss at the limbus. It is most effective on patients who are extremely geriatric, whose conjunctiva has significantly diminished in

elasticity. A superiorly positioned peritomy will be obstructed if the patient undergoes a subsequent trabeculectomy because scar tissue formation has occurred at the site of a prior limbal incision. [3] The fornix incision, conversely, is among the most frequently performed incisions globally in the context of strabismus surgery. [4,5]

Because the incision is made in the fornix, it is improbable that it will result in significant visible scarring; access to multiple muscles may be granted through a single incision; or, a limited number of sutures may be placed in the cul-de-sac, where discomfort at the site of conjunctival closure is minimal.

However, the primary drawback of the fornix incision is that it necessitates specific training, results in a less visible surgical field, is more difficult to instruct assistants, and is more difficult to execute on inelastic conjunctiva of the elderly due to the obstruction of conjunctival reflection over muscle insertion, which presents a challenge in the case of extremely elderly patients. [6]

Material and Methods

The current investigation was carried out over the course of one year on 50 patients at Dr. M.K.Shah Medical College & Research Centre, Chandkheda, Ahmedabad. Ethical approval was taken from the institutional ethical committee and written informed consent was taken from all the participants. Patients were selected by Random Sampling Method.

One English questionnaire was specifically designed and distributed to 50 Patients WhatsApp

groups via a general link to the Google survey questionnaire that we had developed. Questionnaire contained questions regarding demographics and Reasons for the preferred approach in different settings.

Statistical Analysis

Following the compilation and entry of the recorded data into a spread sheet application (Microsoft Excel 2007), the information was exported to the data editor tab of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). On the basis of their distribution, quantitative variables were described as means and standard deviations or median and interquartile range. The presentation of qualitative variables consisted of counts and percentages. The levels of significance and confidence were established at 5% and 95%, respectively, for every test.

Results

In aggregate, 50 individuals participated in the survey. The demographics of the participants are detailed in Table 1. 25 (or 50%) of the respondents received limbal approached surgery and remaining received Fornix approached surgery. In every setting, the fornix approach was favoured, including adult primary procedure. When questioned about the cause, the improvement in exposure across all contexts was cited. The participants who opted for the fornix approach stated that it caused them to experience reduced pain and distress [Table 2].

Table 1: Patients Demographics

Variable	Number	Percentage (%)
Number of cases performed during study duration		
10-30	30	60
31-50	18	36
51-70	2	4
Approach during study duration		
Limbal	25	50
Fornix	25	50

Table 2: Reasons for the preferred approach in different settings

Variable	Better exposure, n (%)	Less inflammation, n (%)	Less pain/discomfort, n (%)	Rapid healing, n (%)	Total (n)
Adult/primary					
Fornix	2	5	16	2	25
Limbal	17	1	2	0	25

Discussion

The importance of minimally invasive surgery is growing in virtually every aspect of surgery, including ocular surgery. Optical advancements,

instrument miniaturization, and endoillumination have altered and will continue to affect surgical procedures. Our results indicate that the fornix approach is the most preferred among all primary adult patients. The primary rationale behind the

selection of the Fornix approach was its superior post-operative recovery. Mikhail et al., who surveyed members of the American Association of Paediatric Ophthalmology and Strabismus discovered that participants favoured the fornix approach in primary operations on both pediatrics and adults at a rate of 58.1% and 53.5%, respectively. However, in reoperations, the limbal approach was preferred in 58.1% and 63.4% for pediatrics and adults, respectively. [6]

The limbal approach is renowned for its numerous benefits; in the 1960s, Von Noorden popularised this incision. He stated in his initial publication that it facilitates reoperations, heals swiftly, and produces a "perfect" cosmetic result due to the fact that the relationship between Tenon's capsule and conjunctiva is unaffected and complications are minimal, if any. [3] However, suturing the conjunctival laceration at the limbus may result in the development of a dellen. In order to circumvent this complication, a number of authors have investigated the use of fibrin adhesive for conjunctival incision closure. [7-9] It was discovered that the off-label use of fibrin adhesive reduced postoperative inflammation and shortened the duration of the operation. It significantly increases the number of wound spaces that necessitate subsequent suturing and is considerably more expensive than sutures. [9]

By positioning the conjunctival opening at a suitable distance from the cornea, it is possible to reduce the occurrence of corneal dellen formation, prevent Tenon's capsule prolapse, and mitigate postoperative discomfort. Furthermore, mounting evidence suggests that non-limbal strabismus surgery may protect high-risk patients from anterior segment ischemia by affecting the perilimbal blood supply less significantly. However, due to the uncommon occurrence of these complications, only larger studies with greater statistical power can provide evidence regarding whether the new technique will result in a reduction in the frequency of such complications.

The fornix approach offers several benefits, including a reduced incision size concealed by the eyelid, the capability to access multiple muscles through a single incision, conjunctival preservation for potential glaucoma surgery, and reduced pain and irritation due to the absence of sutures. One potential drawback is the comparatively higher learning curve and the need for an elastic conjunctiva, which may pose difficulties for older individuals. With improved instrumentation and gentler manipulation,

however, it is possible to execute at nearly any age. [10,11] Better exposure was cited by the majority of surgeons who favored the limbal approach for reoperation in both our survey and the survey by

Mikhail et al. [6] Intriguingly, Parks stated in his initial paper describing the technique that it is repeatable and that reoperations are possible via the incision from the initial operation. [4]

Mojon has recently implemented MISS (minimal incision strabismus surgery). [2] Two small incisions are created parallel to the upper and lower margins of the muscle, one millimeter shorter than the amount of recession or resection desired. When compared to the limbal approach, MISS results in negligible lid edoema, minimal cicatrization that increases the likelihood of reoperation, and no discernible impact on end acuity or alignment. One could theoretically attain the same advantages of MISS by means of a fornix incision. It has not yet been compared to Park's fornix incision; however, the absence of an assistant is an evident advantage of the MISS technique over the fornix approach. Increasing evidence indicates that the limbal-based approach is associated with a higher incidence of anterior segment ischemia (ASI). [12] The perilimbal episcleral vessels were compromised as a result of the limbal-based incision. Conversely, it is maintained through the utilisation of fornix-based incisions and the more recent MISS. [2] As a consequence, certain authors have deduced that the fornix incision is the most effective method for averting ASI. [13]

When it comes to adjustable sutures, the fornix approach is favored by the majority of surgeons because it provides easier access to the sutures for adjustment and allows for delayed adjustment. [6,14] Modifications can be achieved by employing a limbal approach. [15] A majority of the surgeons surveyed here favored the limbal technique.

As evidenced by the fact that no single technique is applicable to all patients, smaller incisions facilitate a quicker recovery.

Conclusion

Surgeons should adopt every possible technique that makes the surgery smoother and minimizes inflammation, discomfort, and visible scarring. Each method of strabismus surgery has its advantages and disadvantages.

There is no one technique proven to be superior to the other in terms of outcomes. One should add all styles to his armory and choose the appropriate one for each patient.

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