

Anterior Stromal Micropuncture Technique For Corneal Tattooing: A Case Report

Dr Vinitkumar Mahajani¹, Dr Anas Khan², Optom Prathmesh Yadav³

¹Consultant and Pediatric Ophthalmologist, Shahu Maharaj Lions Pride Eye Hospital (CSMLP)
Ichalkaranji, Kolhapur

²MS (Shalakyta tantra), S.V.N.H.T's Ayurvedic Medical College and Hospital Rahurim Ahmednagar,
Maharashtra (India)

³BSc Clinical Optometry, Bharti Vidhyaapeeth College of Optometry (Sangli –Miraj Road), Miraj,
Maharashtra, India

ABSTRACT:

Background: Corneal tattooing is also called as keratopigmentation (KTP). It is used for centuries to make better the cosmetic look of corneal leucomatous opacity or scar. KTP is also helpful to manage visual symptoms link with corneal and iris malformations.

Aim: To investigate corneal tattooing with Indian ink dye as surgical substitute to ameliorate cosmetic appearance in visual impaired eyes.

Case History: A 26 yr old male patient came to our OPD with history of left eye loss of vision since 15 years. He had history of open globe injury in the left eye. On examination no visual potential found in that eye with leucomatous corneal opacity. Thick corneal epithelium debridement was done with crescent knife. Corneal staining by anterior stromal micropuncture with 30G and 26G was done followed by deep intrastromal micronized pigments dye placement till it dry. BCL applied over the cornea after the procedure.

Result: Patient was satisfied with less post operative pain, reduction in glare, burning sensation and complications associated with the surgery.

Conclusion: Corneal tattooing accomplishes a high quality cosmetic outcome which is associated with patient laugh, pleasure or satisfaction. KTP is alternative to other large scale, disfigure and mutilating corneal reconstructive surgery.

Keywords: cornea, cosmetic, dye, keratopigmentation, leucoma,opacity, surgery, tattooing .

INTRODUCTION:

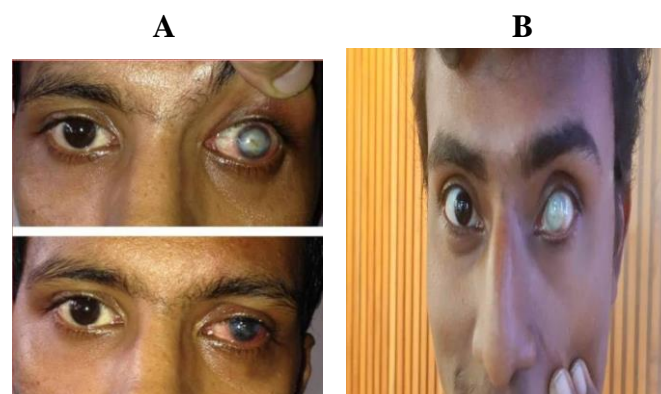
Corneal tattooing used for cosmetic purpose for corneal opacity as well as for optical reasons. A corneal scar after corneal infection or injury causes scattering of light and glare. Corneal tattooing not only blends the opacity to the normal eye color which is cosmetically acceptable in a blind eye but decrease the glare in a normal eye. It has been advocate to make better the ability to see of an eye in cases like keratoconus, corneal opacities, coloboma, aniridia, traumatic closed globe injury and albinism.^{1,2} In given condition tattooing decreases the glare associated with irregular pupil or scattering of light due to corneal opacity. Galen (131-210 A.D) is think about to be the first who dyed human cornea in a case of corneal opacity with the help of copper sulphate.³ Louis Von Wecker in 1869 used black India ink for

leucomatous corneal opacity. He used cocaine for corneal anesthesia. Then Indian ink pigment was inserted in to corneal stroma with grooved needle diagonally.⁴

1901 Nieden used electric needle for corneal tattooing. Similarly Armaignac used China ink for tattooing using three small points over cornea.^{5,6} Arif O Khan and David Meyer introduced chemical method for corneal stain using the Gold chloride, platinum chloride, silver nitrate reduced by hydrazine hydrate to a black pigment.⁷ Coloring technique uses direct introduction of colored agent in to corneal stroma with the help of multiple anterior stromal micropunctures.⁸ Different colored dyes like Indian Ink, organic colors, animal uveal pigment, Chinese ink and soot has been used. Recent technique consist use of excimer laser (193 nm) to prepare corneal lamella for tattooing.⁹ Lamellar keratectomy gives good outcome n term of uniform application of colour.¹⁰ But for many conditions this is impossible because of thinning, irregular cornea, anterior staphyloma or band shape keratopathy (BSK). Penetrating keratoplasty has risk of graft rejection and infection. Its use for cosmetic purpose is not acceptable due to shortage corneal donors. Mechanized keratopigmentation¹¹ is other option for corneal tattooing. Substitute techniques to upgrade the aesthetic look of disfigured eyes are colored cosmetic contact lenses, use of ocular prosthesis and keratoplasty.¹² Narrow mindedness commonly develops after prolonged use of contact lenses.¹³ Use of ocular prosthesis in a corneal scar causes infection, inflammation, erosion and prosthesis misplacement. Hence tattooing of cornea has a role for cosmetic improvement of ugly corneal scars. Our study aimed to improve the cosmetic correction of disfigured cornea.

CASE REPORT:

A 26 yr old male patient came to our OPD with past history of open globe injury in left eye. Ophthalmic examination was performed including USG B scan to rule out posterior segment pathology. The corneal thickness, depth, vascularization was carefully examined by slit lamp bio microscopy. After explaining to the patient and their relatives consent was taken. Preoperative photograph and informed consent was obtained. Corneal tattooing was done under retrobulbar anesthesia with nil visual prognoses explained. Corneal epithelium removed using crescent blade. Cornea was washed with normal saline. Bleeding corneal vessels were cauterized at limbus. After drying the cornea, 2% Gold Chloride solution was applied over the corneal stroma till it dry, and then 2% hydrazine hydrate solution was applied over corneal stroma. Deep stromal staining of this black color by multiple micro puncture with 30G and 26G needle was done and BCL was applied. Atropine (1%) eye drops with tobramycin eye ointment and pressure patch applied for two days. Post operative oral NSAID's given. Antibiotic and cycloplegic eye drop prescribed for 10 days.



Colored photograph A and B shows left eye leucomatous corneal opacity, lipid keratopathy associated with vascularization. Photograph A shows left eye pre and post operative picture.

DISCUSSION:

Various techniques for corneal tattooing include staining method where direct application of Indian ink to cornea which is fast method with uniform dye application. But side effect of this method includes early decrease in intensity of the dye.¹⁴ Pigment is directly inserted in to corneal stroma by needle micropuncture which is called as Impregnation method. The limitation of this method is irregular dye deposit results in light scatter.¹⁴ Panda et al compared a series of patients who undergone impregnation tattooing versus lamellar keratectomy technique. An noted greater pigment density and no signs of erosion with lamellar keratectomy technique.¹⁵

Femto second laser is used to make a corneal pocket in to which tattoo ink is injected called as FACT (femto assisted corneal tattooing).¹⁶ Alio et al in a case series of corneal tattooing used micronized mineral pigment was performed in 234 eyes of 204 patients and percentage of complications was 12.82 % of which the 49% show light sensitivity, 19% has color fading and 7% shows neovascularization.¹⁷ In our study no such complication like corneal infection, pain, Bowman membrane rupture and globe penetration was happened. It is essential that Bowman membrane was not damaged during the procedure as its integrity is important for retaining strong epithelial lining of cornea. Injury to Bowman membrane results in recurrent corneal erosion which is painful condition.¹⁸

Holth et al in 1926 explained a use of sterilized drawing ink in corneal tattooing.¹⁹ Sekundo et al recently supported this use of ink are superior to ancient China ink, which is well known to cause inflammation.¹⁸

CONCLUSION:

Tattooing of cornea by any technique is efficient, simple, less expensive surgical procedure. Our technique gives better cosmetic, esthetic and satisfactory outcome.

Financial support: Nil

Conflict of interest: None

Manuscript Category: Case report

Manuscript presented in other meetings or conference – No

Informed consent: was taken from patient and relatives.

REFERENCES:

1. Reed JW. Corneal tattooing to reduce glare in case of traumatic iris loss. *Cornea*.1994;13:401-5
2. Vassileva, Snejina and Evgeniya Hristakieva. “ Medical Applications of Tattooing”. *Clinics in Dermatology* 2007.25: 367-74
3. Galen C. De compositione medicamento rumsecundum Iocos.In : Kuhn CG ed. *Claudii Galeni opera omnia* Hildesheim : Olms ; 1965;12:696-803
4. Duke –Elder and Leigh AG. Tattooing of the cornea. In Duke- Elder S ed. *System of Ophthalmology* volume 8. Part 2 London Herry Kimpton.1965: 645-8
5. Ropper Hall MJ. The conjunctiva, cornea and sclera. In *stellards eye surgery*. 7th edn. Kent: Butter worths 1989: 252-4
6. Sameera Irfan, Faiza Rashid, Irfan Shahzad. To assess the efficacy of chemical corneal tattooing for

- unsightly corneal scars. Pak J Ophthalmol 2014, vol 30: No.3 July- Sept. 2014. Page no. 151
7. Khan ,Arif O, Meyer D. “ Corneal tattooing for the treatment of debilitating glare in a child with traumatic iris loss. ‘Am J of Ophthalmology. 2005; 920-1
 8. Pitz S et al. ‘Corneal tattooing : an alternative treatment for disfiguring corneal scar’. Br J Ophthalmology. 2003; 86: 397-9
 9. Anastas CN, Mc Ghee CNJ, Webher SK, et al. Corneal tattooing revisited: excimer laser in the treatment of unsightly leucomate. Aust NZ J Ophthalmol. 1995; 23:227-30
 10. Panda A, Mohan M, Chawdhary S. Corneal tattooing experiences with “ lamellar pocket procedure”. Nd J Ophthalmol 1984: 32: 408-11
 11. Alio JL, Sinerol B, Walewska- Szafran A, Miranda M. Corneal tattooing (Keratopigmentation) with new mineral micronized pigments to restore cosmetic appearance in severely impaired eyes. Br J Ophthalmol. 2010; 94: 245-9
 12. Custer PL, Kennedy RH, Woog JJ et al. Orbital implants in enucleation surgery. A report by the American Academy of Ophthalmology. Ophthalmol 2003.110: 2054-61
 13. Snejjina V, Hristakieva E. “ Medical Applications of Tattooing”. Clinics in Dermatology. 2007; 25: 367-74
 14. Burris, T.E.Holmes- Higgin, D.K.& Silvestrinil T.A. Lamellar intrastromal corneal tattoo for treating ris defects (artificial iris) Cornea 17,169-173 (1998)
 15. Panda A, Mohan M & Chawdhari S. Corneal tattooing experiences with lamellar pocket procedure. Indian J Ophthalmol 32, 408-411 (1984)
 16. Kim, J-H Lee D,Hahn, T-W & Choi, S-K. New surgical strategy for corneal tattooing using femtosecond laser. Cornea 28, 80-84(2009). <https://www.aao.org/clinicalvideo/corneal-tattooing>.
 17. Alio J,L, Al-Shymal, O, Amesty M.A. and Rodriguez, A.E. Keratopigmentation with micronized mineral pigments: complications and outcomes in a series of 234 eyes, Br J Ophthalmol 102, 742-747 (2018)
 18. Sekundo W, Seifert P, Seitz B et al. long term ultrastructural changes in human cornea after tattooing with non metallic substances. Br. J Ophthalmol.1999;83:219-24
 19. Holth S.Die Technik der Hornhauttato wierung, speziell der mhrfabigan, Klin Monatsbl Augenheilka: 1926;77: 289-302.