

Corneal Laceration Repair!

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Abstract

Ocular trauma is an emergency which should be addressed immediately. Injury to cornea is a preventable cause of blindness. A meticulous corneal tear repair is essential for optimal visual outcome. This photo essay aims to brief postgraduate residents with an insight on principles of full thickness corneal tear repair. Two cases of severe penetrating corneal injury are presented here who were operated with satisfactory restoration of ocular integrity

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Photo-essay

Ocular trauma is an emergency which should be addressed immediately. Injury to cornea is a preventable cause of blindness. A meticulous corneal tear repair is essential for optimal outcome. Two cases of penetrating corneal injury are presented here who were operated with satisfactory restoration of ocular integrity. This photo essay aims to brief postgraduate residents with an insight on principles of full thickness corneal tear repair.

The first case involves a five year-old school-going girl. Her left eye was injured by goat's horn while playing one day prior. On examination, a limbus-to-limbus full thickness corneal tear with 2mm extension into sclera (Figure 1) on either side was noted along with iris incarceration. Anterior chamber (AC) was shallow. Pupil was irregular, sluggishly reacting to light (No RAPD). Presence of posterior synechiae and traumatic cataract without vitreous herniation was

noted. Self-sealed corneal wound by iris incarceration was noted. Visual acuity examination showed accurate Perception of light (PL) and projection of rays (PR) in all quadrants.

The second case involves a 27 year-old male whose left eye was injured by a sharp iron particle while working 2 days back. On examination, a limbus-to-limbus full-thickness corneal tear without iris incarceration was observed but with flat AC. (Figure 2) Traumatic mydriasis, sphincter tear and traumatic cataract were noted. Visual acuity was HMCF with accurate PL, PR in all quadrants.

Orbital CT scan did not reveal any intraocular foreign body in either case. The mainstay of treatment involved assessment of wound extent followed by primary repair along with tackling traumatic cataract either in same sitting (in first case) or as staged procedure (in second case) under suitable anaesthesia. Post-op B-scan in the first case revealed vitreous haemorrhage with no retinal detachment while it was unremarkable in the second case.

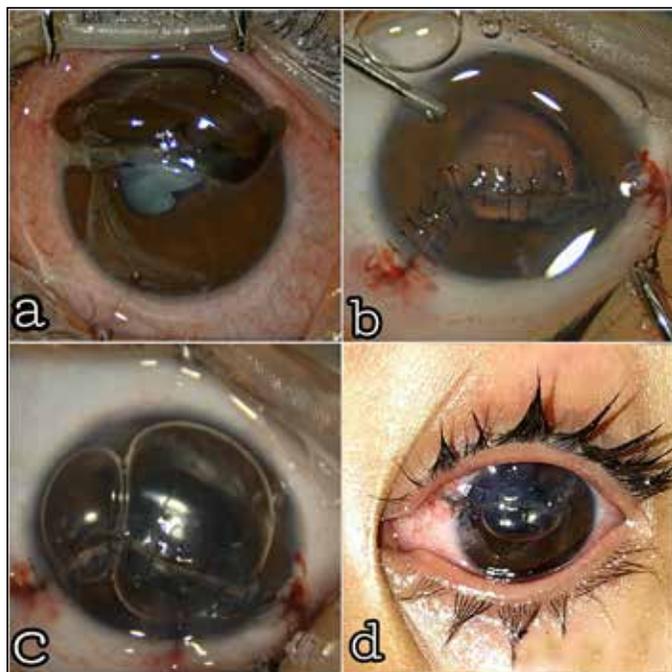


Figure 1 : (1a) Pre-Op image of Case 1 - Limbus-to-limbus full thickness corneal tear with scleral extension, iris incarceration and traumatic cataract; (b) Intra-Op image showing multiple interrupted 10-0 nylon corneal sutures after abscission of incarcerated iris tissue. Red pupillary reflex and intact posterior capsule visible after traumatic cataract extraction. (c) Intra-Op image showing optimally sutured corneal wound with buried suture knots (d) POD1 image showing well formed AC with air bubble

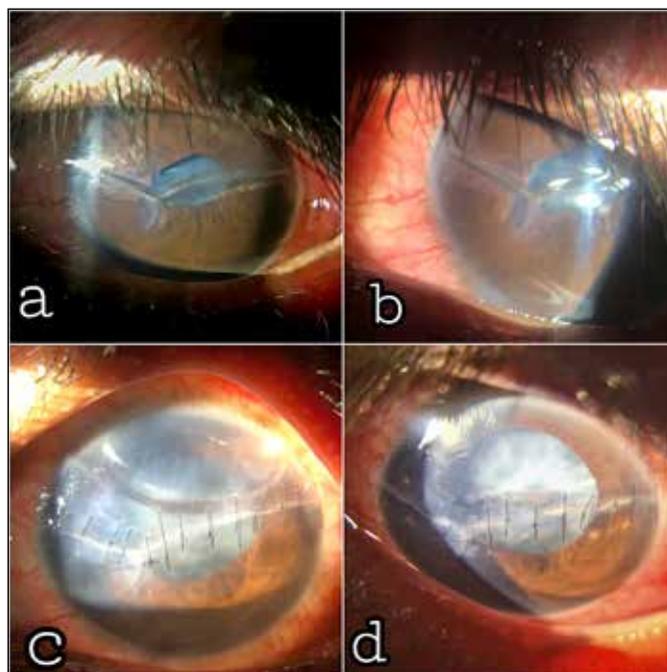


Figure 2 : (a) Pre-Op image of Case 2 showing limbus-to-limbus full thickness corneal tear with flat AC and traumatic cataract; (b) Magnified view showing stellate shaped wound edges; (c) POD1 image showing properly placed sutures with layer-to-layer apposition of wound edges, dilated pupil revealing traumatic cataract; (d) POD7 image showing healthy and intact sutures with buried knots.

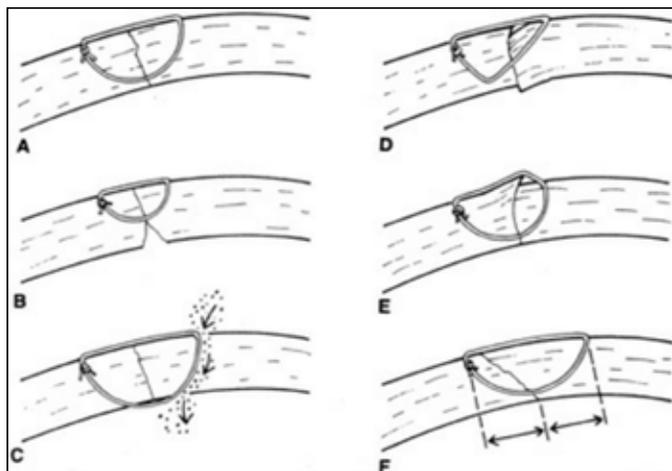


Figure 3 : Effects of suture placement for corneal lacerations.

- (a) For sharp perpendicular wounds, deep suture placement equidistant from the wound margins gives excellent wound approximation.
- (b) Shallow sutures create internal wound gape.
- (c) Full-thickness sutures may create a conduit for microbial invasion.
- (d) Sutures of unequal depth create wound override.
- (e) Sutures of unequal length create wound override.

(f) For shelved lacerations, sutures should be placed equidistant with respect to the internal aspect of the wound to achieve good wound apposition.

(Acknowledgement: Hersh P S et al. Surgical Management of Anterior Segment Trauma. In Duane's Clinical Ophthalmology 2006. Vol6 Chapter39).

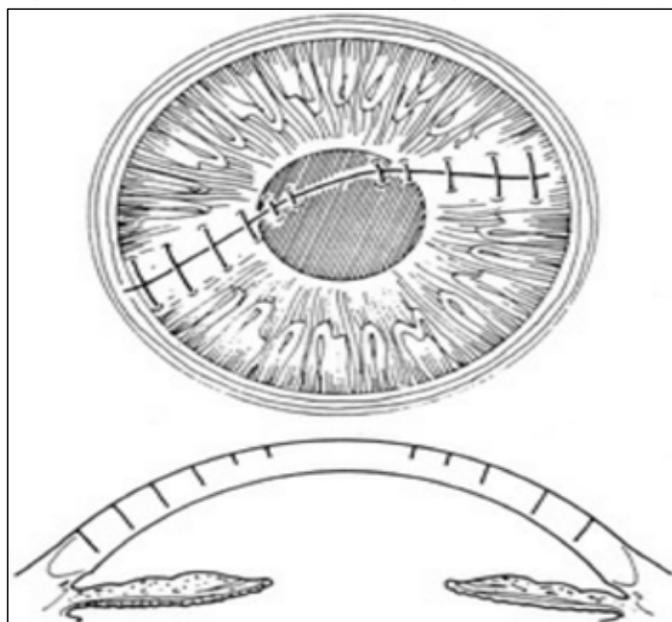


Figure 4: Long, deep, and relatively tight peripheral sutures and shorter, shallower, appositional sutures near the central cornea may restore the normal corneal dome. (Acknowledgement: Hersh P S et al. Surgical Management of Anterior Segment Trauma. In Duane's Clinical Ophthalmology 2006. Vol6 Chapter39).

Cornea forms the major refracting surface; any change in corneal contour, clarity, thickness can result in significant visual disturbance. [1] Studies found that corneal injuries were more in most active period of life (15-50 years) and 15% of them were among children. This has a considerable socioeconomic impact since people of this age group form the bulwark of workforce. Literature search revealed full thickness corneal laceration as most important cause of corneal blindness followed by infectious keratitis.^{2,3}

Principles of corneal tear repair^{4,5}

1. Place the first suture at limbus when it is involved. It provides anatomic stability to wound edges.
2. Place suture perpendicular and equidistant to the cut edge at 85-90% depth to ensure optimum tension for layer-to-layer approximation. Equal amount of tissue should be incorporated on each side of the wound. (Figure 3A)
3. In shelved/oblique lacerations, sutures to be placed equidistant with respect to the internal aspect of the wound (Figure 3F).
4. Apply long tight compressive suture at the periphery. Central sutures should be minimally compressive and short. This results in peripheral flattening and central steepening of the cornea. (Figure 4)
5. Bury suture knots in corneal stroma to lessen post-op inflammation and infection.
6. Revise any loose or too tight sutures to achieve regular corneal contour. Cornea flattens adjacent to tight sutures and steepens adjacent to loose sutures, hence affecting astigmatism significantly.

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