



Belting Suture for Optic Zone Combined with Stitched Sutures for Paracentral Corneal Injury: Case Report

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Abstract

The study focuses on the effectiveness of a combination of stitched suture and belting suture, along with wearing a soft contact lens during the early post-op period, for corneal wound adaptation without optical zone damage caused by needle trace-opacifications and fast spherical reshaping of the corneal scar. A 26-year-old male was injured by a pebble and had a visual acuity of 20/200, pH 20/100, and IOP T-1 (palpatory). The wound repair surgery involved a routine stitched-suturing technique for all edges of the wound, except for the one adjacent to the optical zone, which required a tension force directed to the center of the cornea and the one belting suture was placed for that direction. A gas-permeable soft contact lens was then attached to the patient's eye to reduce postoperative pain and improve visual acuity. Over several months, the scar formation progressed to a geometrically nearly spherical shape of the cornea, and the optical zone remained clear due to the belting suture. In April 2023, the VA=20/40 reached a week after suture removal. The combination of stitched-suturing and belting suturing techniques for corneal wound repair, combined with wearing a soft gas-permeable contact lens, allows for corneal spherical shape restoration with less opacification within the optical axis, promoting good patient rehabilitation after deforming penetrating cornea injuries.

Introduction

Penetrating injuries of the eyeball, especially of the central zone of the cornea require an accurate suturing of the wound to regain spherical shape and transparency of the cornea with achieving hermetic wound closure. Historically all surgeons must design an own plan with existed only two types of sutures as a tool: 1) a simply stitched (single, X-shaped double or continuous for linear wounds) and 2) a concentric purse-string sutures. Both are making problems as close as they placed to the optical axis of the cornea due to needle-passings' opacifications and deformation of the spherical shape of cornea.

Presented clinical case proves benefits of the belting suture technique to achieving a best anatomical and functional rehabilitation of the cornea. The using of such sutures allowed to seal optic zone wounds of cornea without trace-opacifications and irregular astigmatism formation due to needle passings. The study

aims to present the efficacy of combining stitched suture with belting suture and wearing a soft contact lens during the early post-op period for corneal wound adaptation without optical zone iatrogenous damage and fast spherical reshaping of the corneal scar.

Case Study

A 26 y.o. male asked in 22.06.2022 for medical help to MEH several hours after right eye injury caused by a pebble flying off from a lawn mower.

VA was 20/200 pH 20/100, IOP T-1 (palpatory). An oblique deforming penetrating wound revealed in the inferior-temporal paracentral zone of the right eye cornea. There was no active bleeding in the eye, pupillary shape was normal. There was an aqueous humor leakage in time of blinking. The lens and the vitreous were clear. There was a mild contusion macular edema.

The wound repair surgery performed: a routine stitched-suturing technique was used for all edges of the wound with the exception of the one adjacent to the optical zone which required the tension force directed to the center of the cornea. The one belting suture was placed for that direction, and finally a gas-permeable soft contact lens attached to the patient's eye to reduce postoperative pain and some improvement of VA.

The eye was injured by flying a pebble in the time of grass mowing.



Fig 1

VA WAS 0.1 (20/200) PH 0.2 (20/100), IOP T-1. An oblique deforming penetrating wound revealed in the inferior temporal paracentral zone of the right eye cornea.



Fig 2

The OCT data of the 8:00 Meridian of Cornea

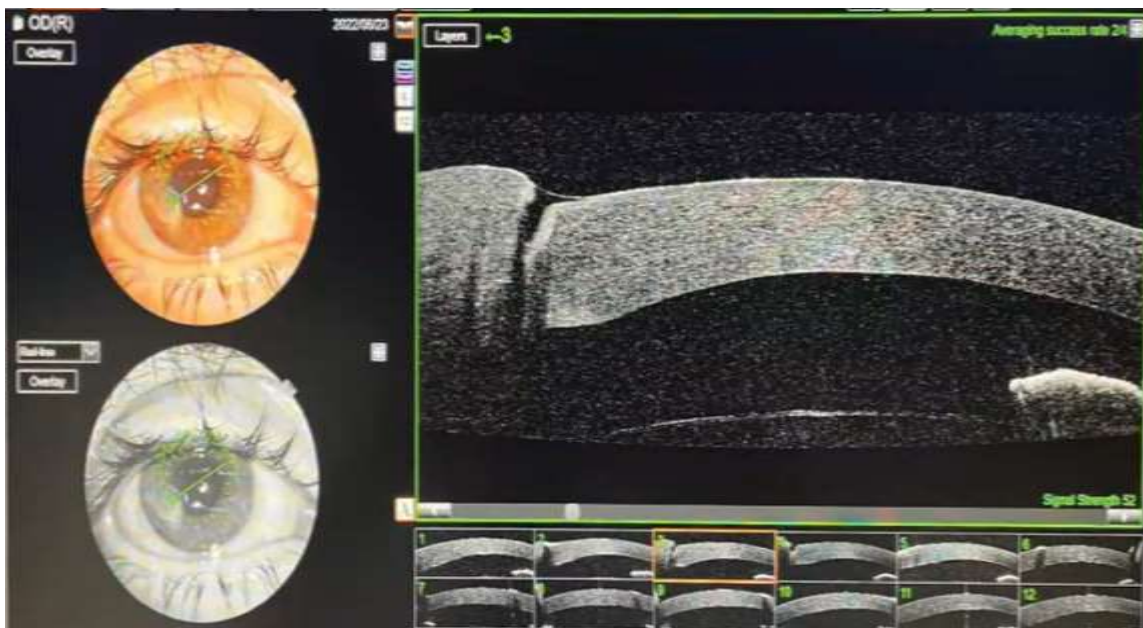


Fig 3

The traditional suturing plan for repairing wound.

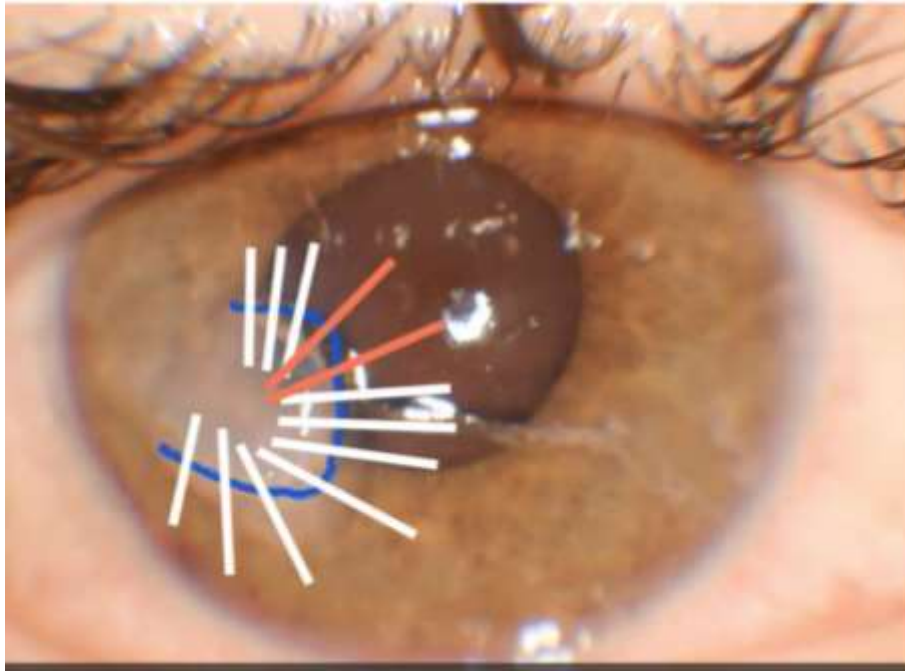


Fig 4

Harmful to optic zone 2 stitched sutures marked in red were replaced with the one belting suture.

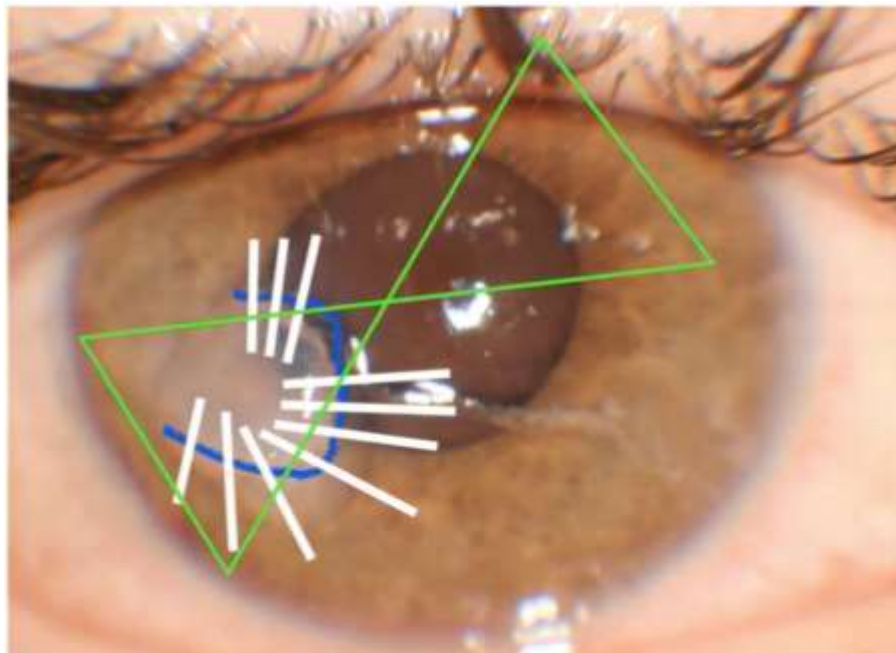


Fig 5

Tangential forces of suture make a pressing effect in the stroma.

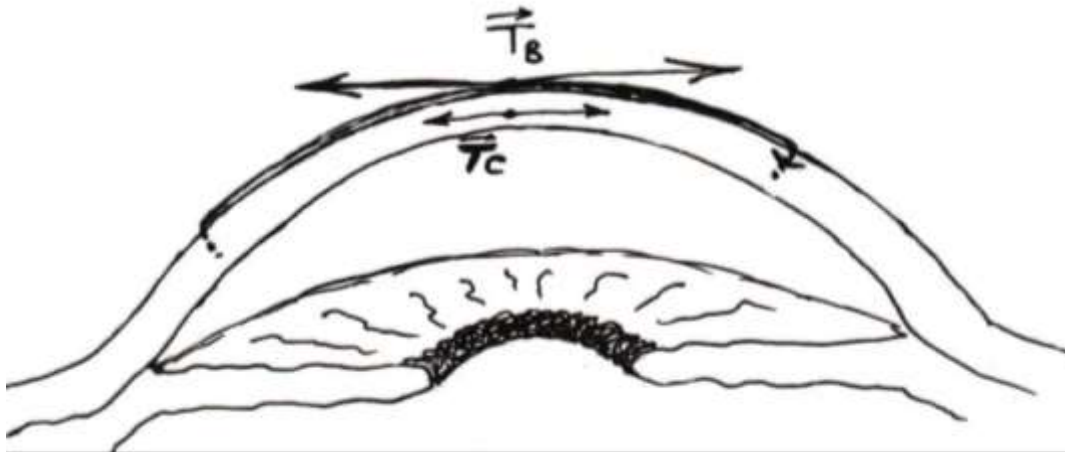


Fig 6

Results

In several months the scar formation was going with geometrically nearly spherical shape of cornea, and moreover, the optical zone was remaining clear thanks to the belting suture which allowed to keep optical zone of the cornea free of trace opacifications caused by suturing needle. Finally, in April 2023 the VA=20/40 reached a week after suture removal.

20 days after the trauma, note that the patient was with soft contact lens

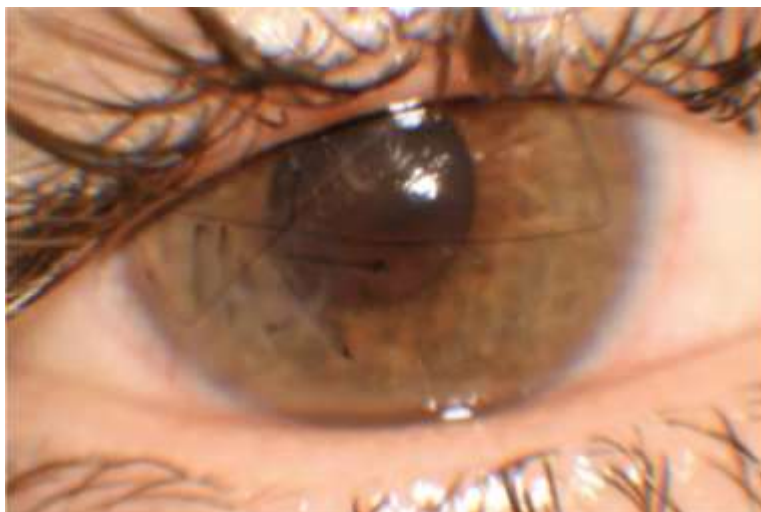


Fig 7

20 days after the trauma OCT data with the soft contact lens

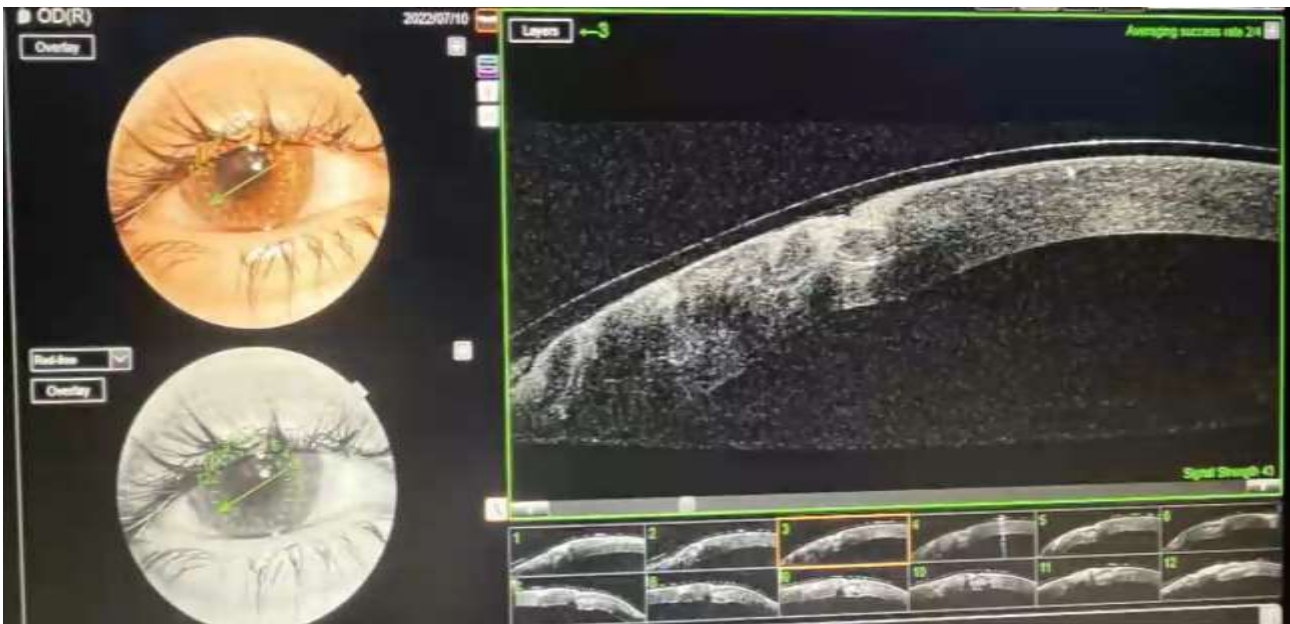


Fig 8

2 Months after the trauma, the photo was taken without the soft contact lens.

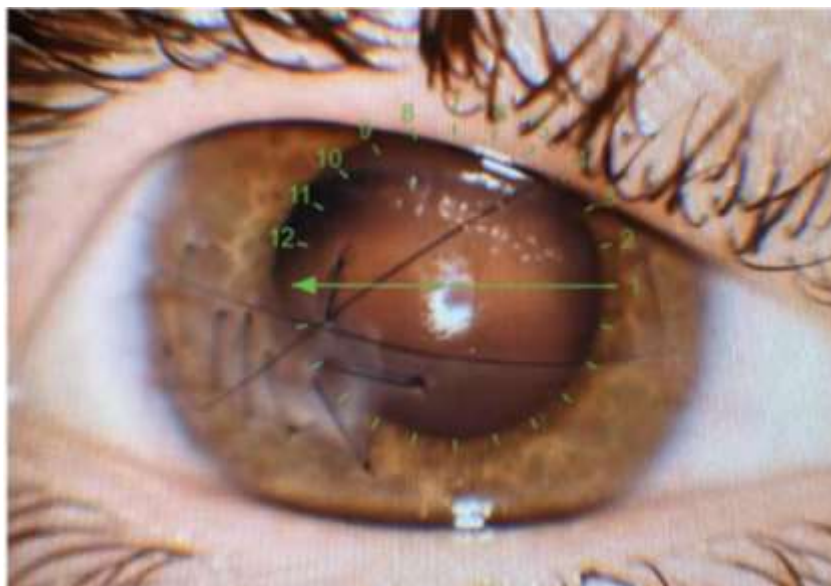


Fig 9

10 Months after trauma (sutures removed 2 months earlier), final OCT Data Note that the VA=0.5 (20/40)

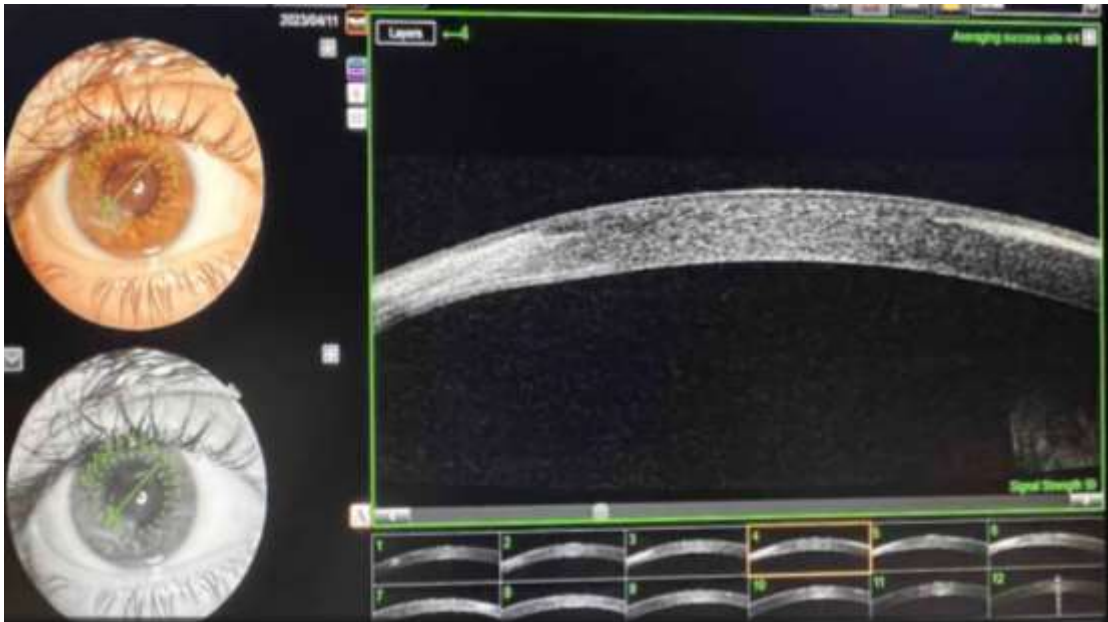


Fig 10

And finally, now (about 15 months after trauma) patient visited local optician and declares that he can see the seventh row (i.e. VA=0.7 (20/30))!!

Conclusion

The using of the combination of routine stitched-suturing technique with the belting suturing technique for optical zone in corneal wound repair with final wearing of soft gas-permeable contact lens help surgeons to reach the cornea's spherical shape restoration with less opacification within the optical axis, and finally good patient rehabilitation after deforming penetrating injuries of cornea, there is no need for special instruments.

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