

Combining Magnifying Vitrectomy Contact Lens with Non-Contact Wide-Angle Viewing System During Macular Surgery: Surgical Technique

Maküler Cerrahide Büyütücü Vitrektomi Kontakt Lens ile Non-Kontakt Geniş Açılı Görüntüleme Sisteminin Birlikte Kullanılması

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ABSTRACT The aim of this study was to assess the combined use of a magnifying vitrectomy contact lens and non-contact wide angle viewing system during macular surgery. We used a 30° magnifying contact lens (ODVM, Ocular Instruments) in combination with the non-contact wide angle viewing system (Eibos 90 D, Möller-Wedel, Wedel, Germany) in fifteen cases of macular hole and epiretinal membrane. Combining the 30° magnifying contact lens with the wide angle viewing system coupled with 90 diopters macula lens provided a better and sustained clarity of the macular view compared to the wide-angle viewing system (EIBOS) alone. We suggest the combined use of a magnifying contact lens with a non-contact wide angle viewing system which allows easier and safer delicate maneuvers during macular surgery due to increased clarity and width of the macular view.

Key Words: Contact lenses; vitrectomy

ÖZET Bu çalışmada maküler cerrahide büyütücü vitrektomi kontakt lens ile non-kontakt geniş açılı görüntüleme sisteminin birlikte kullanılmasının sonuçları araştırılmıştır. Maküler delik ve epiretinal membran nedeniyle 15 olguya 30° büyütücü vitrektomi kontakt lens (ODVM, Ocular Instruments) ve non-kontakt geniş açılı görüntüleme sistemi (Eibos 90 D, Möller-Wedel, Wedel, Germany) birlikte kullanılarak 23 gauge vitrektomi uygulandı. 30° büyütücü vitrektomi kontakt lens ve non-kontakt geniş açılı görüntüleme sisteminin birlikte kullanılması geniş açılı görüntüleme sisteminin (EIBOS) tek başına kullanılmasına göre daha net bir görüntü sağladı. Bu nedenle, büyütücü kontakt lens ve geniş açılı görüntüleme sisteminin birlikte kullanılmasının, artmış netlik ve görüş açısına bağlı olarak maküler cerrahiler sırasında daha kolay ve hassas manevralar yapılmasına olanak sağlayabileceğini düşünmekteyiz.

Anahtar Kelimeler: Kontakt lensler; vitrektomi

For the video/videos of the article:



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The use of wide-angle viewing systems for vitreoretinal surgery has become popular among the surgeons because it allows surgery on a wide retinal area simultaneously. Although magnifying vitrectomy contact lenses provide a larger and a more detailed view during macular surgery such as internal limiting membrane (ILM) peeling, its area of observation is very narrow and tilting the globe can blur the fundus image, which is not the case for noncontact wide-angle viewing systems.¹ However, during vitrectomy surgery with a noncontact system, the corneal surface frequently dries with resultant blurred view, thus requiring irrigation

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despite the use of a viscoelastic material on its surface.² In addition the major limitation of the non-contact systems is limited depth of field during macular surgery. Therefore, we have used a combination of a high-reflective index magnifying vitrectomy contact lens and a noncontact wide-angle viewing system coupled with a 90 diopters macula lens to gain the advantages of both systems during epiretinal membrane (ERM) and/or ILM peeling for macular hole surgery.

We have used the combination of a 30° magnifying contact lens (refraction index, n: 1.49) (ODVM, Ocular Instruments) and a 90 diopter (D) noncontact wide-angle viewing system (Eibos 90 D, Möller-Wedel, Wedel, Germany) in fifteen cases of macular hole and ERM (Figure 1). After completion of triamcinolone assisted 23 G TSV vitrectomy and posterior hyaloid removal, ERM was peeled using a fine gripping retinal forceps. ILM was then stained with brilliant blue G (BBG) and peeled with an ILM forceps. During the surgical steps, a video recording was taken by each viewing system alone and also their combination. The width, magnification, and clarity of the fundus images with and without the magnifying vitrectomy contact lens were compared.

The 30° magnifying vitrectomy contact lens alone enabled the most magnified but the narrowest view of the macula with an adequate clarity (Figure 2A). On the other hand, the wide-angle viewing system with 90 diopters macula lens alone provided the widest but the least magnified view of the macula (Figure 2B). Combining the 30° magnifying vitrec-

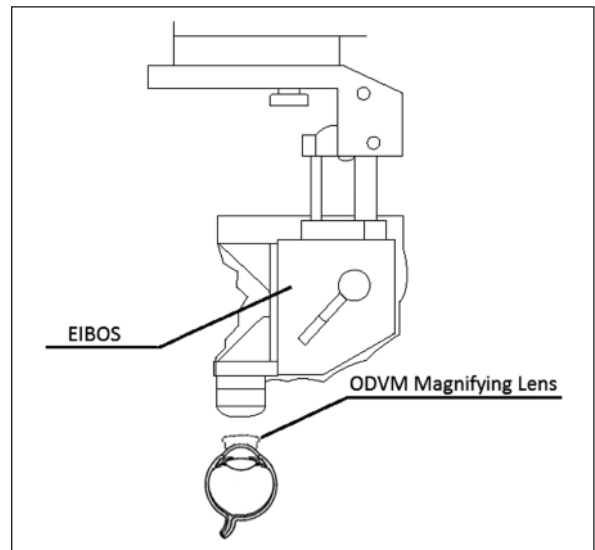


FIGURE 1: Schematic view of the setting of noncontact wide-angle viewing system and magnifying vitrectomy contact lens.

tomy contact lens with the wide angle viewing system coupled with 90° diopters macula lens provided almost an equally wide and magnified view of the macula compared to the wide-angle viewing system alone. However, the combination of both systems provided a better and sustained clarity of the macular view compared to the wide-angle viewing system alone (Figure 2C) (Supplementary video).

The magnifying vitrectomy contact lens (ODVM, Ocular Instruments) has been used for detailed examination of the macula and delicate removal of epiretinal membranes and ILM during vitreoretinal surgery. The lens has (polycast polyethylmetacrilat (PMMA) optics with a silicone flange for its stabilization on the cornea.

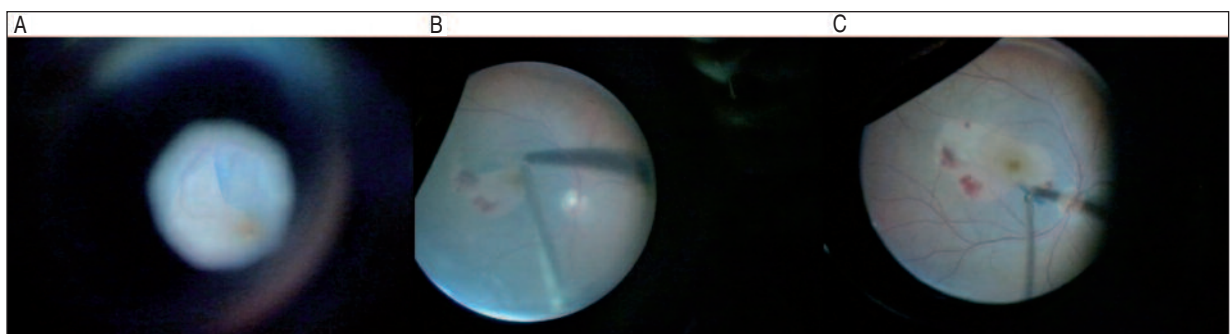


FIGURE 2: The fundus view with **A)** the magnifying vitrectomy contact lens alone **B)** the wide-angle viewing system with 90 diopters macula lens alone **C)** the combination of the magnifying vitrectomy contact lens and the wide-angle viewing system.

(See color figure at <http://www.turkiyeklinikleri.com/journal/oftalmoloji-dergisi/1300-0365/>)

Many vitreoretinal surgeons use a wide-angle viewing system like EIBOS both to remove vitreous and for delicate maneuvers performed at the macula, such as peeling of the internal limiting membrane. Ohji et al.³ used a combination of the Peyman Wessels Landers 132 D Upright Vitrectomy Lens (PWL lens; Ocular Instruments, Bellevue, WA) and a magnifying vitrectomy contact lens (HHV; Hoya Corporation, Tokyo, Japan) held with a lens ring to remove the vitreous. After removing the vitreous, they removed the PWL lens to see the macular details and peel the epiretinal membrane or the internal limiting membrane through the magnifying lens. However, the magnifying vitrectomy contact lens enabled a more magnified but a very narrow observational area of the macula. It is possible to get the same amount of view by only noncontact wide-angle viewing system coupled with a 90 diopters macula lens with zooming. However, we observed zooming results a significant decrease in the clarity of the macular view. In the present study, we have combined ODVM lens with EIBOS coupled with a 90 D lens, to allow us a wider intraoperative macular view with the same clarity.

The combination of a magnifying vitrectomy contact lens and a wide-angle viewing system of-

fers two main advantages. First, there is no need for an assistant to irrigate the corneal surface, since corneal surface covered by a magnifying vitrectomy contact lens can be kept wet to maintain clear vision during surgery. Second, quality of the fundus view may be better when the contact lens and the wide-angle viewing system are used together because of the decreased aberrations caused from the cornea, intraocular and crystalline lenses.^{4,5} Third, the stereopsis which is very important during membrane peeling. Magnifying vitrectomy contact lenses provide excellent stereopsis during surgery; on the other hand the major limitation of the non-contact systems is the limited depth of field during macular surgery. The combined system allows a very favorable stereopsis when performing ERM or ILM peeling.

To our observation the combined use of a 30° magnifying vitrectomy contact lens with a wide-angle viewing system allows easier and safer delicate maneuvers during macular surgery due to increased clarity and width of the macular view. However, further studies should compare this combination with conventional methods or using contact and non- contact lenses separately in terms of success rate, complications, peripheral vitrectomy.

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