

Biomechanics in DALK: Big bubble vs Manual lamellar dissection

Biomecânica no DALK: Grande bolha versus Dissecção manual lamelar

Akilesh Gokul¹, Lize Angelo¹, Hans Vellara¹, Mohammed Ziaei¹ 

1. Department of Ophthalmology, New Zealand National Eye Centre, Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand.

Dear Editor:

We read with interest the results of the study by Akdemir et al, which compared the biomechanical properties of eyes undergoing big bubble deep anterior lamellar keratoplasty (DALK) with those undergoing predescemetic or manual DALK⁽¹⁾. Although the results are of interest, several issues require clarification.

In predescemetic DALK, a residual layer of host posterior stroma is left intact, which allows for wound healing to occur at the deep lamellar interface as well as at the peripheral wound edge⁽²⁾. Thus, it is conceivable that a very thin residual stromal bed thickness after DALK could allow for biomechanical properties similar to that of a BB DALK and that a thicker residual stromal bed could provide additional biomechanical support. However, the authors do not look at this variable in their study when comparing the two groups but rather report on postoperative corneal thickness. In our recent study investigating the biomechanical properties of predescemetic DALK, we demonstrated a correlation between residual central host thickness and biomechanical properties of the cornea⁽³⁾.

In addition, the authors fail to report their postoperative steroid regimen and indicate whether there was

any disparity in steroid use between the two groups. This is important because steroid use has previously been reported to prolong the instability induced by corneal incisions⁽⁴⁾.

Finally, although the authors report the sutures were removed in all patients at least 3 months before their biomechanical evaluation, they do not present the mean time from suture removal, and it is possible that a disparity between the lengths of time that the sutures remained *in situ* could have altered the wound healing response of the graft-host junction.

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Corresponding author: Mohammed Ziaei.
E-mail: m.ziaei@auckland.ac.nz

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Reply: Biomechanics in DALK: Big bubble vs Manual lamellar dissection

Resposta: Biomecânica no DALK: Grande bolha versus Dissecção manual lamelar

Mehmet Orcun Akdemir¹, Banu Torun Acar², Suphi Acar²

1. Department of Ophthalmology, School of Medicine, Bulent Ecevit University, Zonguldak, Turkey.

2. Haydarpasa Numune Research and Education Hospital, Istanbul, Turkey.

The questions and comments from Ziaei et al. provide us an opportunity to discuss the unclear points of our manuscript regarding the comparison of biomechanics in deep anterior lamellar keratoplasty (DALK). As they pointed out in their recent study investigating the biomechanical properties of predescemet DALK, they concluded that neither penetrating keratoplasty (PKP) nor the DALK technique used in keratoconus completely restored the biomechanical properties of the cornea to the level of healthy corneas. However, as compared with DALK, PKP resulted in a greater number of parameters that were significantly different from healthy corneas⁽¹⁾. We also compared the two techniques in patients with keratoconus and found results similar to those of Ziaei et al., in that the PKP technique resulted in weaker corneal biomechanical properties. However, we found different results between corneas undergoing DALK surgery and normal corneas. In our study, DALK surgery resulted in similar corneal hysteresis results as those of healthy corneas⁽²⁾. These results are not consistent with the study by Ziaei et al. In light of our results, we did not include the residual thickness of the stroma when comparing the DALK techniques. Moreover, our aim was primarily to evaluate the results of DALK surgery in cases of clear Descemet's membrane and with a residual stromal bed.

Zeiei et al. also focused their attention on reporting the postoperative steroid regimen and whether any disparity existed between the two groups in steroid use. It is clear that the postoperative steroid regimen was different between the PKP and DALK surgeries. This is attributed to the difference in corneal wound healing, endothelial rejection rates, and so forth⁽³⁾. We did not

use different steroid treatment protocols between patients with clear Descemet's membrane and residual stromal bed in DALK surgery. In addition, we believe that residual stroma had no effect on steroid use in cases in which a big bubble cannot be created, because adequate steroid treatment was administered in both groups. We have applied the same postoperative steroid regimen since 2008, and we have not seen the need to change this protocol in patients with DALK since then.

The advantages of DALK surgery over PKP are obvious and include the fact that topical corticosteroids can usually be discontinued earlier after DALK, DALK may have superior resistance to rupture of the globe after blunt trauma, and sutures can be removed earlier with DALK⁽³⁾. In their clinical and confocal study, Abdelkader and Kaufman found that progressive reduction of keratocyte brightness and reflectivity occurred in patients undergoing DALK surgery. In the predescemet group, keratocyte morphology and reflectivity returned to normal by 10 to 12 weeks, whereas this normalization process took 4 to 6 weeks in the descemet group⁽⁴⁾. In light of this study, the initial healing of the eye should have been completed by 3 months postgraft. Therefore, we prefer to set the minimum suture removal time as 3 months.

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Corresponding author: Mehmet Orcun Akdemir.

E-mail: doktorcun@yahoo.com

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