Piggy-back contact lens fitting using intra-limbal RGP lens in a Chinese patient with rapid keratoconic progression: a case report

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Purpose
To report a successful contact lens management case of a patient with rapid keratoconic progression using intra-limbal RGP lenses on a Piggy-back system.

Case report
A 33-year-old female, LKS, presented to our Optometry clinic for contact lens fitting. The patient complained about blurry distant vision and high astigmatism in both eyes. She denied any remarkable ocular and general health history. She did not have any contact lens wear experience. After a comprehensive eye examination, the patient was diagnosed to have advanced keratoconus in both eyes (see Fig 1 and Fig. 2).

Muti-curved RGP lens with different parameters and piggyback back system were fitted to the patient. However, optimal visual acuity (V.A.) and lens fitting could not be obtained due to her irregular and inferiorly steepened cornea. The trial fittings with different lens parameters were summarized as follows:

OD: E&E/ E-Couns /Φ8.7mm / BC 7.3mm
Impression: Poor centration with heavy bearing (OU), discomfort (OU)

OD: E&E/ E-Couns /Φ8.7mm / BC 7.4mm
Impression: Poor centration with heavy bearing (OU), discomfort (OU)

OD: Rose K /Φ8.7mm / BC 7.0mm
OS: Rose K /Φ8.7mm / BC 7.1mm
Impression: Poor centration with heavy bearing (OS>OD), discomfort (OU)

OD: Rose K /Φ8.7mm / BC 7.1mm
OS: Rose K /Φ8.7mm / BC 7.0mm
Impression: Poor centration with heavy bearing (OU), discomfort (OU)

OD: E&E/ E-Couns /Φ8.7mm / BC 7.1mm
OS: E&E/ E-Couns /Φ8.7mm / BC 7.2mm
Impression: Poor centration with heavy bearing (OU), discomfort (OU)

OD: Lens Dynamics/ DynaZ Intra-limbal /Φ11.2mm / BC 7.34mm
OS: Lens Dynamics/ DynaZ Intra-limbal /Φ11.2mm / BC 7.18mm
Impression: Borderline centration (OU), Inferior lens elevated, moderate discomfort (OU)

Eventually, a pair of soft keratoconic contact lenses have been successfully fitted to the patient

OD: Softflex/ Softk /Φ14.2mm / BC 7.6mm / -5.50 D V.A.: 0.9
OS: Softflex/ Softk /Φ14.2mm / BC 7.6mm / -5.50 D V.A.: 0.4

Impression: Acceptable lens fit and good comfort (OU)

LKS returned to our clinic two years later. During the visit, significant progression of keratoconus (about 40µm and 50µm thinner than baseline for OD and OS respectively) was noted (Fig 3 and Fig 4).

As optimal V.A. cannot be achieved using soft contact lenses with modified parameters. She was then refitted with a piggyback system using high plus silicone hydrogel contact lenses and intra-limbal RGP lenses in order to improve the centration and V.A.

Finally, LKS was successfully fitted with this Piggy-back lens system (J & J Acuvue Oasys and Lens Dynamics DynaZ Intra-limbal RGP lens). Corneal health, lens fitting, and subjective feeling were optimal in both eyes during the subsequent aftercare consultations (Fig. 5).

Discussion and Conclusion
Centration, comfort, and vision are the main concerns for contact lens fitting in advance keratoconus patients. Piggy-back system with small diameter RGP lenses or specially designed soft lenses may not be able to provide acceptable vision and fitting. In contrast, high plus soft lenses in piggyback system can create central steepened anterior corneal surface that can smooth out the irregularities of the cornea. When using together with an intra-limbal RGP lenses, the piggyback system can significantly improve the lens fitting and vision, especially for those patients with severe inferiorly steepened cornea.

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Reference
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