

Presbiyopi Düzeltici Göz İçi Lenslerin Tarihçesi: Geçmişten Günümüze

Elif Ceren YEŞİLKAYA¹

Giriş

Tüm dünyada yaygın bir halk sağlığı problemi olan katarakt için mevcut tedavi temelde kristalin opak lensin cerrahi olarak çıkarılması ve bir göz içi lens (GİL) yerleştirilmesi olsa da modern katarakt cerrahisi, bunun ötesine geçerek, görmeyi geri kazandıran refraktif bir prosedür haline gelmiştir. Modern mikrocerrahi teknikleri, yeni GİL teknolojileri, gelişmiş biyometri ve GİL gücü hesaplama yöntemleri, çoğu katarakt hastasının yüksek kaliteli görmeyi yeniden kazanmasını sağlamaktadır.

Son yıllarda presbiyopi düzeltici GİL'lerin süregelen dramatik değişimine ve gelişimine tanık oluyoruz. Günlük pratiğimizde presbiyopi düzeltici GİL kullanımı daha yaygın hale gelirken teknolojik yeniliklere paralel yeni tasarımlar bu lenslerin sürekli iyileştirilmesiyle sonuçlanmaktadır. Bu bölümde presbiyopi düzeltici GİL'lerin tarihsel gelişimi (Şekil 1) ayrıntılarıyla ele alınacaktır.

¹ Göz Hastalıkları Uzmanı, Şişli Hamidiye Etfal Eğitim ve Araştırma Hastanesi, yesilkayaceren@gmail.com

KAYNAKÇA

1. Keates RH, Pearce JL, Schneider RT. Clinical results of the multifocal lens. *J Cataract Refract Surg* 1987; 13:557–60.
2. Hoffer, K. J, Savini, G. (2019). Multifocal intraocular lenses: historical perspective. In *Multifocal Intraocular Lenses* (pp. 9-30). Springer, Cham.
3. Percival SP, Setty SS. Prospectively randomized trial comparing the pseudoaccommodation of the AMO ARRAY multifocal lens and a monofocal lens. *J. Cataract. Refract. Surg.* 19(1), 26–31 (1993).
4. Davison JA, Simpson MJ. History and development of the apodized diffractive intraocular lens. *J Cataract Refract Surg* 2006; 32:849–58.
5. Chiam, P. J., Chan, J. H., Haider, S. I. et al. (2007). Functional vision with bilateral ReZoom and ReSTOR intraocular lenses 6 months after cataract surgery. *Journal of Cataract & Refractive Surgery*, 33(12), 2057-2061.
6. Packer, M., Hoffman, R. S., Fine, I. H., et al. (2006). Refractive lens exchange. *International ophthalmology clinics*, 46(3), 63-82.
7. Cillino, S., Casuccio, A., Di Pace, F. et al. (2008). One-year outcomes with new-generation multifocal intraocular lenses. *Ophthalmology*, 115(9), 1508-1516.
8. Alfonso JF, Fernandez-Vega L, Senaris A, et al. Prospective study of the Acri.LISA bifocal intraocular lens. *J Cataract Refract Surg* 2007; 33:1930–5.
9. Gatinel, D., Pagnoulle, C., Houbrechts, Y., et al. (2011). Design and qualification of a diffractive trifocal optical profile for intraocular lenses. *Journal of Cataract & Refractive Surgery*, 37(11), 2060-2067.
10. Doane JF. Accommodating intraocular lenses. *Curr Opin Ophthalmol* 2004; 15:16–21.
11. Alio JL, Plaza-Puche AB, Fernández-Buenaga R, et al. Multifocal intraocular lenses: an overview. *Surv Ophthalmol.* 2017; 62:611e634.
12. Alio JL, Pinero DP, Plaza-Puche AB. Visual outcomes and optical performance with a monofocal intraocular lens and a new-generation single-optic accommodating intraocular lens. *J. Cataract. Refract. Surg.* 36(10), 1656–1664 (2010).
13. Pepose, J. S., Qazi, M. A., Davies, J. et al. (2007). Visual performance of patients with bilateral vs combination Crystalens, ReZoom, and ReSTOR intraocular lens implants. *American journal of ophthalmology*, 144(3), 347-357.
14. Cazal J, Lavin-Dapena C, Marin J, et al. Accommodative intraocular lens tilting. *Am. J. Ophthalmol.* 140(2), 341–344 (2005).
15. Lichtinger A, Rootman DS. Intraocular lenses for presbyopia correction: past, present, and future. *Curr. Opin.Ophthalmol.* 23(1), 40–46 (2012).
16. Mastropasqua L, Toto L, Falconio G, et al. Longterm results of 1 CU accommodative intraocular lens implantation: 2-year follow-up study. *Acta Ophthalmol Scand.* 2007; 85:409–14.
17. McLeod SD, Vargas LG, Portney V, et al. Synchrony dual-optic accommodating intraocular lens. Part 1: optical and biomechanical principles and design considerations. *J Cataract Refract Surg.* 2007; 33:37–46.

18. Ossma, I. L., Galvis, A., Vargas, L. et al. (2007). Synchrony dual-optic accommodating intraocular lens: Part 2: Pilot clinical evaluation. *Journal of Cataract & Refractive Surgery*, 33(1), 47-52.
19. Nakazawa, M., Ohtsuki, K. (1984). Apparent accommodation in pseudophakic eyes after implantation of posterior chamber intraocular lenses: optical analysis. *Investigative Ophthalmology & visual science*, 25(12), 1458-1460.)
20. Rocha, K. M. (2017). Extended depth of focus IOLs: the next chapter in refractive technology? *Journal of Refractive Surgery*, 33(3), 146-149.)
21. Pedrotti E, Bruni E, Bonacci E, et al. Comparative Analysis of the Clinical Outcomes With a Monofocal and an Extended Range of Vision Intraocular Lens. *J Refract Surg*. 2016 Jul 1; 32(7):436-42.
22. Fernández EJ, Schwarz C, Prieto PM, et al. Impact on stereo-acuity of two presbyopia correction approaches: monovision and small aperture inlay. *Biomed Opt Express*. 2013; 4:822-830.
23. Cochener, B., Boutillier, G., Lamard, M. et al. (2018). A comparative evaluation of a new generation of diffractive trifocal and extended depth of focus intraocular lenses. *Journal of Refractive Surgery*, 34(8), 507-514.
24. Ferrer-Blasco T, Montes-Mico R, Peixoto-de-Matos SC, et al. Prevalence of corneal astigmatism before cataract surgery. *J Cataract Refract Surg* 2009; 35:70-75
25. Hoffmann PC, Héutz WW. Analysis of biometry and prevalence data for corneal astigmatism in 23,239 eyes. *J Cataract Refract Surg* 2010; 36:1479-1485
26. Lundström M, Dickman M, Henry Y, et al. Risk factors for refractive error after cataract surgery: analysis of 282 811 cataract extractions reported to the European registry of quality outcomes for cataract and refractive surgery. *J Cataract Refract Surg*. 2018;44(4):45-447. doi: 10.1016/j.jcrs.2018.01.031
27. Melles RB, Holladay JT, Chang WJ. Accuracy of intraocular lens calculation formulas. *Ophthalmology*. 2018;125(2):169-178. doi: 10.1016/j.ophtha.2017.08.027
28. Shimizu K, Misawa A, Suzuki Y. Toric intraocular lenses: correcting astigmatism while controlling axis shift. *J Cataract Refract Surg* 1994; 20:523-526
29. Grabow HB. Early results with foldable toric IOL implantation. *Eur J Implant Refract Surg* 1994; 6:177-178
30. Sanders DR, Grabow HB, Shepherd J. The toric IOL. In: Gills JP, Martin RG, Sanders DR, eds, *Sutureless Cataract Surgery; an Evolution Toward Minimally Invasive Technique*. Thorofare, NJ, Slack, 1992; 183-197
31. Ruhswurm I, Scholz U, Zehetmayer M, et al. Astigmatism correction with a foldable toric intraocular lens in cataract patients. *J Cataract Refract Surg* 2000; 26:1022- 1027
32. Chang DF. Early rotational stability of the longer Staar toric intraocular lens: fifty consecutive cases. *J. Cataract. Refract. Surg*. 29(5), 935-940 (2003).
33. Holland E, Lane S, Horn JD, et al. The AcrySof Toric intraocular lens in subjects with cataracts and corneal astigmatism: a randomized, subject-masked, parallel-group, 1-year study. *Ophthalmology* 117(11), 2104-2111 (2010).

34. Teus MA, Arruabarrena C, Hernández-Verdejo JL, et al. Correlation between keratometric and refractive astigmatism in pseudophakic eyes. *J Cataract Refract Surg.* 2010;36(10):1671–1675. doi: 10.1016/j.jcrs.2010.05.010
35. Swampillai AJ, Khanan Kaabneh A, Habib NE, et al. Efficacy of toric intraocular lens implantation with high corneal astigmatism within the United Kingdom's National Health Service. *Eye.* 2019. doi:10.1038/s41433-019-0744-0
36. Braga-Mele, R., Chang, D., Dewey, S., et al. (2014). Multifocal intraocular lenses: relative indications and contraindications for implantation. *Journal of Cataract & Refractive Surgery*, 40(2), 313-322.