In vitro comparison of minimal size injections of acrylic hydrophobic intraocular lenses

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Financial disclosure:

P. Rozot: Consultant Alcon, Carl Zeiss Meditec, Thea; Y. Guldenfels: Carl Zeiss Meditec, Hoya; C. Chong & L. Saidi are employees of Acrylian Ltd; P. Rozot & Y. Guldenfels have no interest int the matter subject of this poster

Purpose

- To assess the injectability and unfolding of various acrylic hydrophobic intraocular lenses (IOLs) in standardized conditions of injection through mini and micro incisions and to analyse the time of unfolding of these IOLs.

Material & methods

- Under a room temperature of 19° and after hydration of both IOLs and cartridges during 15 seconds, IOLs were manually placed in cartridges (MEDICEL Accuject 2.1 mm, 1.8 mm and 1.6 then ViscoJect Bio 1.5mm) by an operator working under a microscope; after waiting 2 minutes an electromechanical piston (with constant speed and monitoring of the strength used - kg) injected the IOLs in a Petri box filled with water heated at 34°.

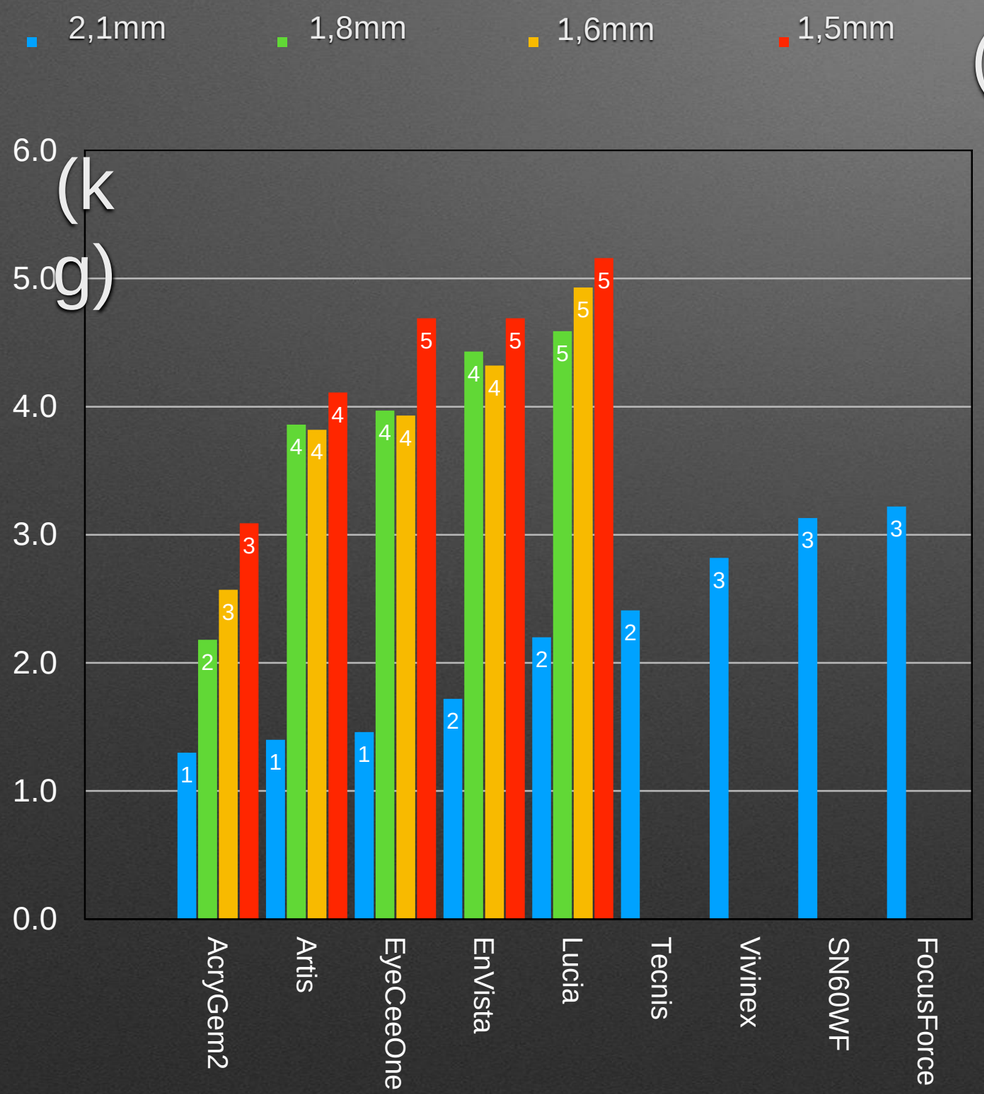
- 2 IOLs of 9 firms were used; 3 if one was blocked; if 2 successfully passed, a smaller incision was assessed with 2 new IOLs.

- Video registered both injection and unfolding of the studied IOLs.

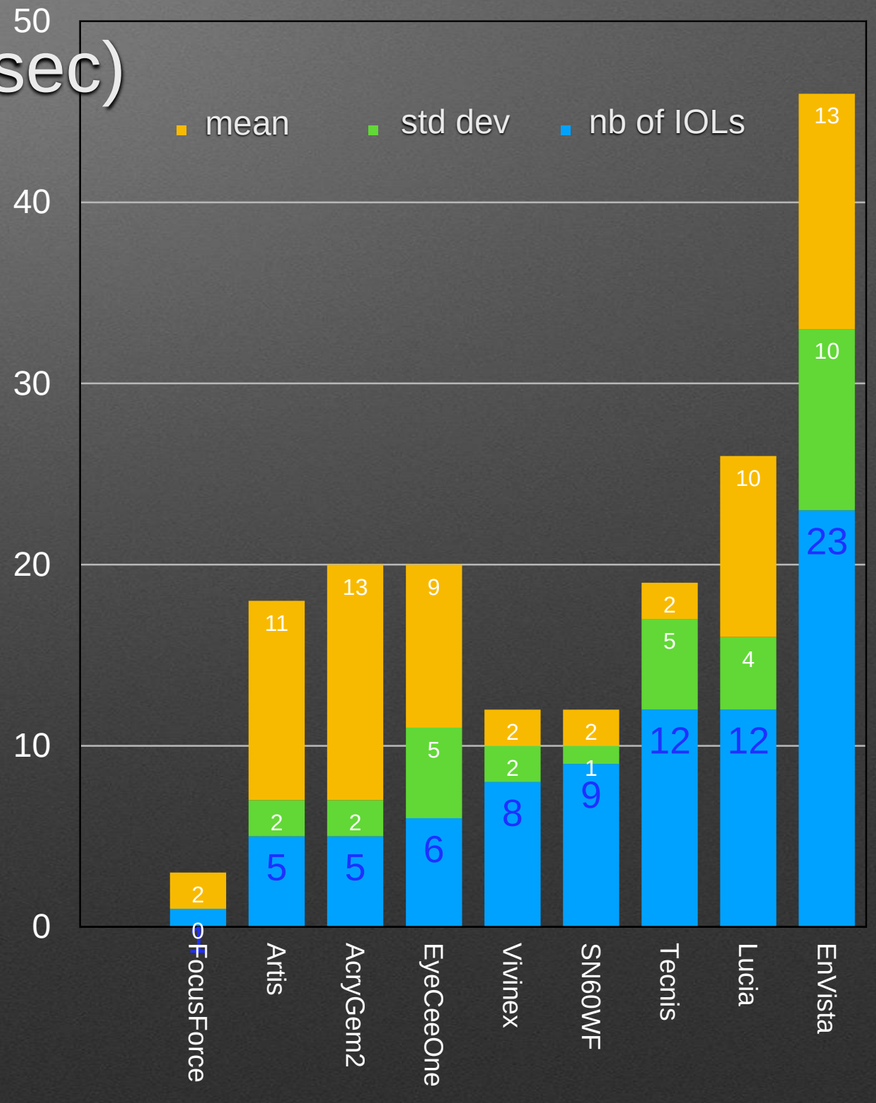
- Studied IOLS: AcryGem (Acrylian); Artis (Cristalens); EyeCee One (B&L); EnVista (B&L); Lucia (Zeiss Meditec); SN60WF (Alcon); Tecnis (J&J); Vivinex (Hoya) and FocusForce (B&L)

Results

Injectability force (kg)



Unfolding time (sec)



Conclusions

- SN60WF, FocusForce, Tecnis & Vivinex were only injectable with an injector with an external diameter of 2,1mm
- Artis, AcryGem2, EnVista, EyeCee One and Lucia were injectable with smaller cartridges but only Artis and AcryGem2 required forces less than 4 kg, which, for us, represents the limit force to inject without altering the structure of the device
- Concerning the unfolding speed, IOLs can separated in 3 groups:
  - very quick (and difficult to control): FocusForce
  - quick and controllable: Artis, AcryGem2, EyeCee One, Vivinex, Tecnis and SN60WF
  - slow: EnVista, Tecnis, Lucia

1 - Allen D, Habib M, Steel D. Final incision size after implantation of a hydrophobic acrylic aspheric intraocular lens: New motorized injector versus standard manual injector J Cataract Refract Surg 2012; 38:249–255

2- Auffarth GU, Merz PR, Choi CY, Giers BC . Comparative Analysis of Implantation Behavior of Different Hydrophobic Intraocular Lenses with Preloaded and Conventional IOL delivery systems . ASCRS 2016

3 - Kohnen T, Klaproth OK. Incision sizes before and after implantation of SN60WF intraocular lenses using the Monarch injector system with C and D cartridges.