# Artisan Aphakic Intraocular Lens Implantation in Cases of Subluxated Crystalline Lenses Due to Marfan Syndrome

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## ABSTRACT

**PURPOSE:** To assess implantation of an Artisan aphakic intraocular lens (IOL) in cases with subluxated lenses due to Marfan syndrome.

**METHODS:** Retrospective study of a small case series comprised of seven eyes (two children and three adults) with subluxated lenses due to Marfan syndrome that underwent lens extraction and Artisan aphakic IOL implantation. Best spectacle-corrected visual acuity and endothelial cell status were the key elements of follow-up examinations.

**RESULTS:** No complications occurred during surgery. Visual acuity was improved by ≥4 Snellen lines in all seven eyes. These results were maintained at the last follow-up. Endothelial cell status remained constant in all cases at 6-month follow-up.

**CONCLUSIONS:** In seven eyes with a subluxated crystalline lens due to Marfan syndrome, implantation of an Artisan aphakic IOL improved visual acuity while preserving anterior chamber status. [*J Refract Surg*. 2006;22:99-101.]


The ocular hallmark of Marfan syndrome, a heritable disorder of the connective tissue, is dislocation of the lens (ectopia lentis) in 60% to 80% of cases. Pars plana lensectomy and vitrectomy replaced intracapsular and extracapsular extraction of the lens in the surgeon's preferences, while the operated eye remained aphakic. Emmetropia was later achieved through the use of contact lenses or glasses. A recent alternative is implantation of an Artisan intraocular lens (IOL) (Ophtec, Groningen, The Netherlands).

This study describes our experience in seven cases of ectopia lentis due to Marfan syndrome and compares our findings with two reports in the literature, regarding the use of the Artisan IOL in lens dislocation.

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## PATIENTS AND METHODS

Five patients (two children and three adults) (seven eyes) with subluxated crystalline lenses due to Marfan syndrome were referred to the University Eye Clinic of Ioannina between 2002 and 2004 (Fig). The main symptom was poor or variable visual acuity. In one adult case, episodes of acute glaucoma occurred due to papillary block caused by the subluxated lens. All patients were diagnosed with Marfan syndrome prior to this study.

A full eye examination was performed in all cases, including visual acuity assessment (Snellen chart), endothelial cell count (Table), slit-lamp evaluation of the anterior chamber and the lens subluxation, Goldmann tonometry, and posterior segment evaluation.

All eyes underwent implantation of Artisan aphakic IOLs with a 5.4-mm optic (model 205). Surgery was performed using general anesthesia in four pediatric cases and topical anesthesia in three adult cases. Three standard pars plana vitrectomy ports were performed. The vitrectomy probe was passed into the capsular bag through a small incision to the side of the lens capsule. Aspiration alone was sufficient to remove the lens in all four cases. The capsular bag was removed and anterior vitrectomy performed. A standard 6.0-mm sclerocorneal tunnel was prepared at the 12 o'clock position. Two paracenteses were placed at 10 and 2 o'clock. The anterior chamber was filled with sodium hyaluronate 2.3%. Acetylcholine was injected into the anterior chamber to constrict the pupil. An iris-fixated Artisan aphakic IOL was inserted in the anterior chamber with a forceps and fixated to the iris with enclavation needles. A peripheral iridectomy was performed at the 12 o'clock position. The corneoscleral wound was sutured and the viscoelastic material was manually aspirated. Gentamicin 20 mg with betamethasone 3 mg were subconjunctively injected in the operated eye and chloramphenicol ointment was applied. In one adult case, IOL insertion was performed the following day because the iris did not respond to acetylcholine and remained dilated.

In the three cases in which topical anesthesia was used, a standard 6.0-mm sclerocorneal tunnel was prepared at the 12 o'clock position. Two paracenteses were placed at the 10 and 2 o'clock positions. The anterior chamber was then filled with sodium hyaluronate 2.3%. A small incision was performed in the capsular bag through which the vitrectomy probe of the Series 2000 Legacy phacoemulsifier (Alcon, Ft Worth, Tex)

TABLE

**Pre- and Postoperative Examination Data of Seven Eyes That Underwent Implantation of an Artisan Aphakic IOL for Subluxated Crystalline Lenses Due to Marfan Syndrome**

| | | BSCVA | | | Endothelial Cell Density (mean cells/$m^2$±SD) | | |
|---|---|---|---|---|---|---|---|
| Eye | Patient Age (y) | Preop | 2 Months Postop | 6 Months Postop | Preop | 2 Months Postop | 6 Months Postop |
| 1 | 11 | 2/20 | 12/20 | 8/20 | 2850±30 | 2842±38 | 2848±41 |
| 2 | 11 | 4/20 | 14/20 | 14/20 | 2510±45 | 2500±24 | 2485±32 |
| 3 | 26 | 6/20 | 14/20 | 14/20 | 2940±38 | 2930±45 | 2930±39 |
| 4 | 26 | 2/20 | 10/20 | 12/20 | 3220±62 | 3225±19 | 3212±24 |
| 5 | 8 | 4/20 | 12/20 | 12/20 | 3150±29 | 3148±12 | 3140±27 |
| 6 | 31 | 4/20 | 14/20 | 14/20 | 2995±51 | 2995±65 | 2992±38 |
| 7 | 35 | 4/20 | 12/20 | 12/20 | 3250±34 | 3245±27 | 3244±32 |

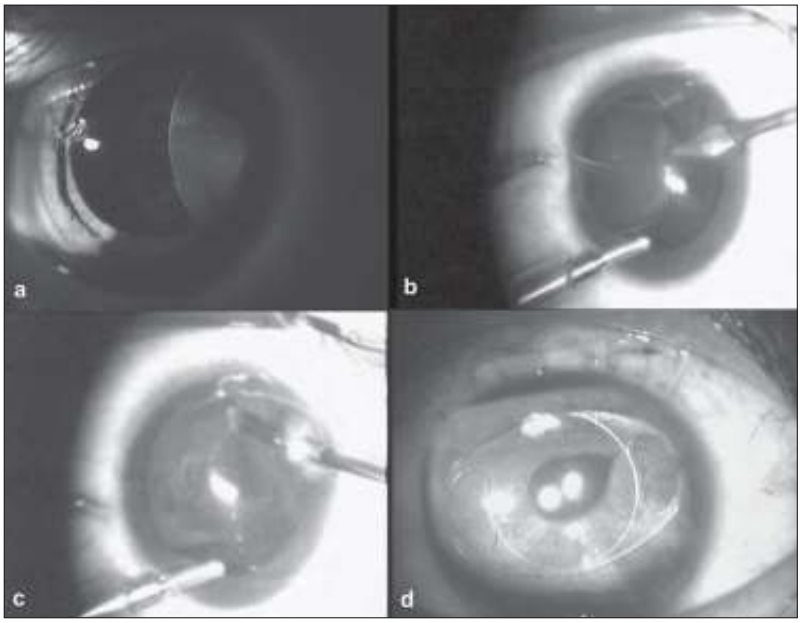


**Figure. A)** Dislocated lens due to Marfan syndrome. **B)** Sclerotomy using a Ziegler knife. **C)** Lens aspiration with the vitrectomy probe of the Legacy 2000. **D)** Eye of a patient with Marfan syndrome after Artisan lens implantation.

aspirated the lens material. The complete capsular bag was then removed using the cutting mode of the vitrectomy probe, and anterior vitrectomy was performed in all cases. An Artisan IOL was implanted with the same procedure described in the cases where general anesthesia was administered.

Postoperatively, combination drops of dexamethasone and neomycin were used qid. The drops were tapered over 4 weeks. Patients were followed at the outpatient department of our clinic. Visual acuity measurements were taken using the Snellen optotype, and slit-lamp examination of the anterior and posterior chamber, Goldmann tonometry, and endothelial cell count were also performed (Table). Postoperative complications were recorded.

## RESULTS

Seven eyes (five patients) with ectopia lentis underwent implantation of an Artisan IOL. Patient age at the time of surgery ranged from 8 to 35 years. All five pa-

tients presented with ectopia lentis due to Marfan syndrome, causing monocular diplopia in two eyes (one child and one adult), best spectacle-corrected visual acuity (BSCVA) ≤4/20 in six eyes (two children and two adults), and 6/20 in one eye (adult). Postoperatively, the spherical equivalent refraction was within ±1.00 D in all seven eyes. No significant iritis, intraocular pressure elevation, IOL decentration, or irregular pupil was observed postoperatively. One adult eye presented with postoperative corneal decompensation that resolved in 10 days.

During the postoperative examination, BSCVA in all operated eyes was ≥10/20—10/20 in one case (adult), 12/20 in three cases (children), and 14/20 in three cases (two adults and one child). Six eyes sustained postoperative visual acuity for a follow-up period of 6 months. One eye (child) presented with retinal detachment 3 months after implantation of the Artisan lens. The patient was operated on and visual acuity improved at each follow-up examination, reaching 8/20 after 6 months.

No reduction in the number of endothelial cells was observed after surgery or at 6-month follow-up in all seven cases (Table).

## DISCUSSION

Refractive surgery made the Artisan IOL the topic of many reports, as an alternative to correcting ametropia. Exceptional postoperative results led surgeons to consider using it in aphakic eyes after intracapsular cataract extraction, where no posterior capsular support was present.

This report describes the use of the Artisan IOL in cases of subluxated lenses due to Marfan syndrome, where the posterior capsule is removed. Gabor[1] was the first to report the use of the Artisan IOL in adults with subluxated lenses, followed by Stefaniotou et al.[2] Guell and Manero[3] used Artiflex, a foldable iris-claw lens in cases of aphakia after penetrating ocular injury. van der Pol and Worst[4] described the use of Artisan aphakic IOLs in children with congenital, traumatic, or developmental cataract, with results similar to reports in which posterior chamber IOLs were used. Lifshitz et al[5] achieved excellent results implanting Artisan aphakic IOLs in children with subluxated crystalline lenses. The above reports are the only in the literature, proving the novelty of using the Artisan lens in ectopia lentis.

The most common complications reported were an irregular pupil (0.4% to 1.2%), transient corneal edema (0.8% to 1.4%), transient intraocular pressure elevation (1.4%), and IOL decentration (in up to 2%). Transient corneal edema in one adult eye was our only accordance with the above complications. Furthermore, one eye (child) presented with retinal detachment 2 months after implantation. This led to operation of the eye, where the presence of the Artisan lens proved, as described in the literature,[6] to be an advantage in surgery, providing better fundus visualization than a posterior IOL.

An important issue with the Artisan lens concerns endothelial cell loss. Budo et al,[7] reporting data from 518 eyes enrolled in a European multicenter study of the Artisan phakic IOL, showed maximal mean endothelial cell loss rates of 4.8% at 6 months postoperatively. Basti et al[8] reported an endothelial cell loss of approximately 6% in children 6 to 8 months after extracapsular cataract extraction and posterior chamber IOL implantation. The above studies determined the time we performed endothelial cell count postoperatively; however, we did not observe significant change in our measurements prior to and after surgery.

Implantation of the Artisan aphakic IOL is a good surgical option in managing subluxated lenses in children and adults with Marfan syndrome. Minimal complications, corneal endothelium safety, and easy implantation are advantages over scleral fixated IOLs, angle fixated IOLs, or aphakia treated with glasses or contact lenses. Further study with longer follow-up is necessary before definite conclusions can be drawn.

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