Clear lens exchange

Prof Dr : Abd El Hamid Elhoufi

Clear lens extraction :

- Clear lens extraction (CLE), also called refractive lens exchange (RLE), is the removal of a noncataractous natural lens of the eye with or without intraocular lens placement as a refractive procedure.

Myopia

- Myopia is not only a refractive error but it affects the whole eye .
- Myopia is associated with higher incidence of :
  - Nuclear and PSC cataract
  - POAG
  - Pigmentary glaucoma
  - posterior staphyloma.
  - degenerative changes of the vitreous.
  - cobblestone degeneration, retinal detachment,retinal pits, holes, or tears.
  - subretinal neovascularization, lattice degeneration,Fuchs spots and or lacquer cracks.

Clear lens extraction

Refractive

- Myopia
- Hyperopia
- Presbyopia

Non refractive

- CNAG

Myopia

Myopia

- 25 year old female with refraction
  - OD : -18.25 -0.75 @ 170
  - OS : -17.00 - 1.00 @ 180
- BCVA :
  - OD : 0.8
  - OS : 0.7
- Fundus : chorioretinal degeneration
- Otherwise : normal findings

Myopia

- Options :
  - Corneal refractive surgery
  - ICL or Iris clawed IOL
  - CLE

To determine the best refractive surgery for each patient we should discuss :

- Development of cataract
- Endothelial cell count
- state of accomodation
- Development of glaucoma
- Risk of retinal detachment
- Ant segment anatomy
- Cost
- Cosmesis

Development of cataract

Development of cataract

- Myopic patients have a higher incidence of Cataract even without any surgical intervention .

Clinical and Epidemiologic Research | December 2002

Myopia and Incident Cataract and Cataract Surgery: The Blue Mountains Eye Study

Development of cataract

Abstract

PURPOSE. To assess whether an association exists between myopia and incident cataract and cataract surgery in an older population-based cohort study.

METHODS. The Blue Mountains Eye Study examined 3654 participants aged 49 years or more during 1992 to 1994 and then 2334 (75.1%) of the survivors after 5 years. A history of using eyeglasses for clear distance vision was obtained. Objective refraction was performed with an autorefractor, followed by subjective refraction with a logarithm of minimum angle of resolution (logMAR) chart. Emmetropia was defined as a spherical equivalent refraction between +1 D and −1 D, hyperopia as more than +1 D, and myopia as less than −1 D. Slit lamp and retroillumination lens photographs were graded for presence of cortical, nuclear, or posterior subcapsular cataract, according to the Wisconsin Cataract Grading System. Generalized estimating equation models analyzed data by eye.

Development of cataract

RESULTS. There was a statistically significant association between high myopia (−6 D or less) and incident nuclear cataract (odds ratio [OR] 3.3, 95% confidence interval [CI] 1.5–7.4). Incident posterior subcapsular cataract was associated with any myopia (OR 2.1, 95% CI 1.0–4.8), moderate to high myopia (−3.5 D or less, OR 4.4, 95% CI 1.7–11.5), and use of distance glasses before age 20 (OR 3.0, 95% CI 1.0–9.3), after adjustment for multiple potential confounders, including severity of nuclear opacity. Incident cataract surgery was significantly associated with any myopia (OR 2.1, 95% CI 1.1–4.2) as well as moderate (−3.5 to more than −6D; OR 2.9, 1.2–7.3) and high myopia (OR 3.4, 95% CI 1.0–11.3).

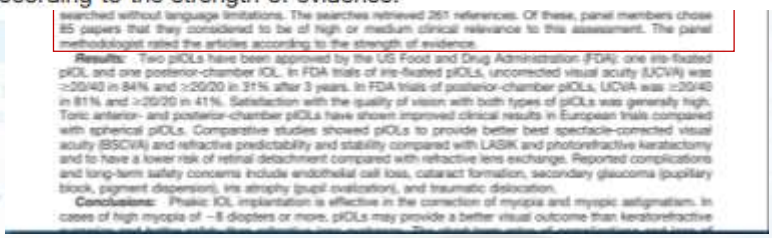
Development of cataract

Ophthalmic Technology Assessment

Phakic Intraocular Lens Implantation for

Objective: To review the published literature for evaluation of the safety and outcomes of phakic intraocular lens (pIOL) implantation for the correction of myopia and myopic astigmatism.

Methods: Literature searches of the PubMed and Cochrane Library databases were conducted on October 7, 2007, and July 14, 2008. The PubMed search was limited to the English language; the Cochrane Library was searched without language limitations. The searches retrieved 261 references. Of these, panel members chose 85 papers that they considered to be of high or medium clinical relevance to this assessment. The panel methodologist rated the articles according to the strength of evidence.



We performed a systematic literature review to determine the incidence of and predisposing factors for cataract after phakic intraocular lens (pIOL) implantation. Of the 6338 eyes reported, 4.35% were noted to have new-onset or preexisting progressive cataract. The incidence of cataract formation was 1.29%, 1.11%, and 9.60% with anterior chamber, iris-fixated, and posterior chamber (PC) pIOLs, respectively. In the PC pIOL group, early cataract formation was related to surgical trauma and late-onset cataract was related to IOL–crystalline lens contact. Analysis of cataract progression in eyes with preexisting cataract showed a progression rate of 29.5% after pIOL surgery. These results suggest that cataract formation is most likely to occur after PC pIOL implantation. Patients with preexisting progressive cataract should be informed about the possibility of cataract progression and possible need for cataract surgery after pIOL implantation. Cataract surgical intervention resulted in restoration of visual acuity.

Development of cataract

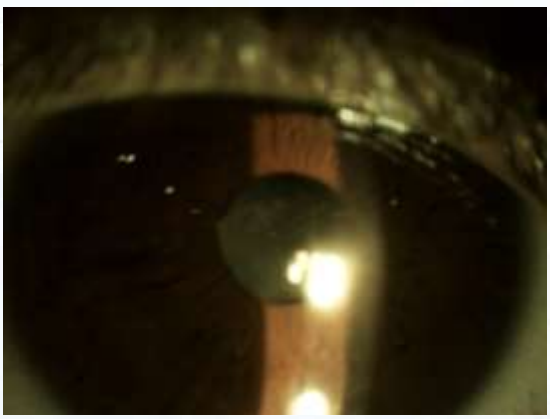
Ont Health Technol Assess Ser. 2009;9(14):1-124. Epub 2009 Oct 1.

Phakic intraocular lenses for the treatment of refractive errors: an evidence-based analysis.

Medical Advisory Secretariat.

SUMMARY OF FINDINGS: The search identified 1,131 citations published between January 1, 2003, and January 16, 2009. Including a health technology assessment (HTA) identified in the bibliography review, 30 studies met the inclusion criteria: two HTAs; one systematic review; 20 pre-post observational studies; and seven comparative studies (five pIOL vs. LASIK, one pIOL vs. PRK, and one pIOL vs. CLE). Both HTAs concluded that there was good evidence of the short-term efficacy and safety of pIOLs, however, their conclusions regarding long-term safety differed. The 2006 HTA found convincing evidence of long-term safety, while the 2009 HTA found no long-term evidence about the risks of complications including cataract development, corneal damage, and retinal detachment. The systematic review of adverse events found that cataract development (incidence rate of 9.6% of eyes) is a substantial risk following posterior chamber pIOL implantation, while chronic endothelial cell loss is a safety concern after iris-fixated pIOL implantation. Adverse event rates varied by lens type, but they were more common in eyes that received posterior chamber pIOLs. The evidence of pIOL effectiveness is based on pre-post case series. These

Development of cataract



Development of cataract

What is the problem??
When cataract developed remove ICL and do an ordinary cataract surgery .

Development of cataract

- Cataract surgery In cases of post ICL & iris claw lens :
- 1- Refractive surprise .
- 2- Two surgeries instead of one .

*IOL calculation carries risk of inaccurcy
*Lens induced astigmatism can not be calculated
*Cataract formation is a matter of time .
*2 surgeries carry more cost , anxiety , risk of complications

To determine the best refrctive surgery for each patient we should discuss :

- Development of cataract
- Endothelial cell count
- state of accomodation
- Development of glaucoma
- Risk of retinal detachment
- Ant segment anatomy
- Cost
- Cosmesis

Endothelial cell count

Endothelial cell count

ICL

Abstract

This study is a meta-analysis comparing the efficacy, predictability, and safety of correcting myopia via implantation of two types of phakic intraocular lens (PIOLs): the implantable collamer lens (ICL) and iris-fixed PIOL. The Cochrane library, Pubmed, and EMBASE were searched. Study selection, data exclusion, and quality assessment were performed by two independent observers. The pooled relative risk (RR), pooled standardized mean difference (SMD), and their 95% confidence intervals (CIs) were used to compare lenses. Seven studies involving 511 eyes were included. The pooled SMD in postoperative uncorrected distance visual acuity (UDVA) comparing ICLs to iris-fixed PIOLs was −0.22 (95% CI, −0.58 to 0.13; P=.22). The pooled RR values of UDVA of 20/20 or better and of 20/40 or better comparing ICLs to iris-fixed PIOLs were 1.15 (95% CI, 0.89 to 1.47; P=.29) and 1.01 (95% CI, 0.95 to 1.08; P=.75), respectively. The pooled RR of loss of best spectacle-corrected visual acuity (BSCVA) and gain in BSCVA comparing ICLs to iris-fixed PIOLs were 1.20 (95% CI, 0.24 to 6.00; P=.82) and 1.14 (95% CI, 0.89 to 1.48; P=.31), respectively. The pooled RR comparing ICLs to iris-fixed PIOLs was 0.78 (95% CI, 0.29 to 2.12; P=.63) for all reported complications and 2.80 (95% CI, 1.04 to 7.52; P=.04) for severe complications. The pooled RR of achieving a result within ±0.5 D (diopter) of the intended target comparing ICLs to iris-fixed PIOLs was 1.35 (95% CI, 1.04 to 1.77; P=.03). Overall, there is no significant difference in efficacy between the two types of PIOLs or in safety, except that the ICL is associated with a greater incidence of severe complications, especially anterior subcapsular cataract, primarily in the Version 2 and Version 3 groups. However, ICL has better predictability.

PMCID: PMC4130551
PMID: 25115906

ular Lens

Endothelial cell count

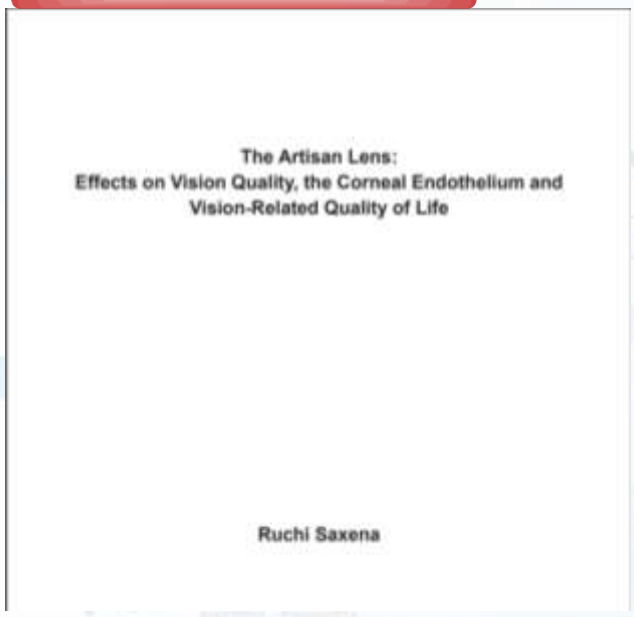
PLoS One

Next, we examined whether the severe complications adversely affected the patients. We defined the severe complications as follows: 1) complications that needed long-term clinical intervention or surgery, such as lens opacities; cataracts; high intraocular pressure (IOP) that could not be controlled by short-term drugs; glaucoma; retinal detachment; obvious loss of corneal endothelial cells that led to corneal edema or other clinical symptoms; and severe uveitis that had anterior chamber cells, flare, pain, ciliary hyperemia, keratic precipitates, or other signs of uveitis; and 2) any reasons that led to IOL exchange or removal.

There was a greater incidence of severe complications in the ICL group versus the iris-fixed PIOL group (RR=2.80; 95% CI, 1.04 to 7.52; P=.04; I^2=0.0%) (Figure 9). Similarly, we omitted Menezo's study [34] to do the sensitivity analysis. The V2, V3, and V4 ICLs that were all implanted in this study, increasing the incidence of postoperative lens opacity, even cataract because of the small vault of V2, V3 ICLs. V3 ICLs were associated with a 9.2% incidence of cataract versus 0.8% for V4 ICLs (P<.001), according to the FDA clinical trial [39], we found no significant difference in severe complications between the groups (RR =2.06; 95% CI, 0.65 to 6.52; P=.22; I^2=0.0%). Overall, there was no evidence of publication bias (Begg's test, P=.09; Egger's test, P=.05).

Endothelial cell count

Iris claw lens



The Artisan Lens:
Effects on Vision Quality, the Corneal Endothelium and Vision-Related Quality of Life

Ruchi Saxena

Proefschrift

Ruchi Saxena

Endothelial cell count

Iris claw lens

Participants

Three hundred eighteen eyes of 173 myopic patients treated with the Artisan iris-fixated phakic intraocular lens (IOL).

Conclusion

After 3 years, a significant ECD loss was revealed. This ECD loss was significantly negatively correlated to the ACD. We therefore suggest that eyes just meeting the minimum ECD requirement have greater ACDs to compensate for possible greater endothelial cell loss and that patients with shallow anterior chambers have higher ECDs. Artisan phakic lens implantation in young eyes narrowly meeting the minimum criteria of endothelial cell density (2000 cells/mm^2) and ACD (2.6 mm) should perhaps be reevaluated, due to longer exposure to higher rates of endothelial cell loss.

To determine the best refrctive surgery for each patient we should discuss :

- Development of cataract
- Endothelial cell count
- state of accomodation
- Development of glaucoma
- Risk of retinal detachment
- Ant segment anatomy
- Cost
- Cosmesis

State of accomodation

State of accomodation

- Age :
  Should be considered ≥ 40 years old or approaching .
- Occupational needs
- Cultural needs: in our country

State of accomodation

- Can we help them ??

1. Multifocal IOL
2. Trifocal IOL
3. Monovision

We performed a metaanlysis of peer-reviewed studies involving implantation of a multifocal intraocular lens (IOL) in presbyopic patients with cataract or having refractive lens exchange (RLE). Previous reviews have considered the use of multifocal IOLs after cataract surgery but not after RLE, whereas greater insight might be gained from examining the full range of studies. Selected studies were examined to collate outcomes with monocular and binocular uncorrected distance, intermediate, and near visual acuity; spectacle independence; contrast sensitivity; visual symptoms; adverse events; and patient satisfaction. In 8797 eyes, the mean postoperative monocular uncorrected distance visual acuity (UDVA) was 0.05 logMAR ± 0.006 (SD) (Snellen equivalent $20/20^{-3}$). In 6334 patients, the mean binocular UDVA was

publications

Emanuel Rosen MD, Jorge L. Alió MD, PhD, H. Burkhard Dick MD, PhD, Steven Dell MD, Stephen Slade MD

Results :

patient satisfaction. In 8797 eyes, the mean postoperative monocular uncorrected distance visual acuity (UDVA) was 0.05 logMAR ± 0.006 (SD) (Snellen equivalent $20/20^{-3}$). In 6334 patients, the mean binocular UDVA was 0.04 ± 0.00 logMAR (Snellen equivalent $20/20^{-2}$), with a mean spectacle independence of 80.1%. Monocular mean UDVA did not differ significantly between those who had a cataract procedure and those who had an RLE procedure. Neural adaptation to multifocality may vary among patients.

State of accomodation

- Monovision :
  - Dominant eye for far and non dominant eye for near
  - We can use bioptics to refine minimal error and astigmatism even under Monovision strategy

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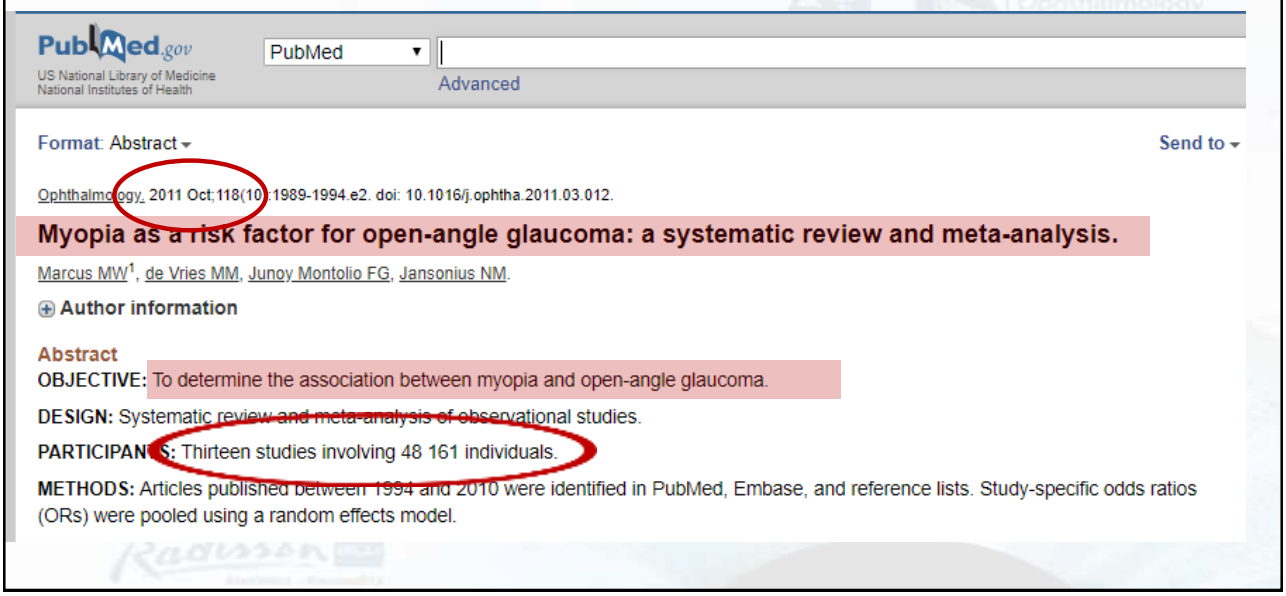
Development of glaucoma

Development of glaucoma



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Ophthalmology. 2011 Oct;118(10):1989-1994.e2. doi: 10.1016/j.ophtha.2011.03.012.

Myopia as a risk factor for open-angle glaucoma: a systematic review and meta-analysis.

Marcus MW[1], de Vries MM, Junoy Montolio FG, Jansonius NM.

Author information

Abstract

OBJECTIVE: To determine the association between myopia and open-angle glaucoma.

DESIGN: Systematic review and meta-analysis of observational studies.

PARTICIPANTS: Thirteen studies involving 48 161 individuals.

METHODS: Articles published between 1994 and 2010 were identified in PubMed, Embase, and reference lists. Study-specific odds ratios (ORs) were pooled using a random effects model.

Development of glaucoma

MAIN OUTCOME MEASURES: Odds ratios with 95% confidence intervals (CIs) of myopia as a risk factor for open-angle glaucoma.

RESULTS: Data from 11 population-based cross-sectional studies were included in the main analyses. The pooled OR of the association between myopia and glaucoma based on 11 risk estimates was 1.92 (95% CI, 1.54-2.38). On the basis of 7 risk estimates, the pooled ORs of the associations between low myopia (myopia up to -3 D) and glaucoma and between high myopia (≤-3 D myopic) and glaucoma were 1.65 (1.26-2.17) and 2.46 (1.93-3.15), respectively. There was considerable heterogeneity among studies that reported an association between any myopia and glaucoma (I(2)=53%) and low myopia and glaucoma (I(2)=29%), but not for high myopia and glaucoma (I(2)=0%). After omitting studies that contributed significantly to the heterogeneity, the pooled ORs were 1.88 (1.60-2.20) for any myopia and glaucoma and 1.77 (1.41-2.23) for low myopia and glaucoma.

CONCLUSIONS: Individuals with myopia have an increased risk of developing open-angle glaucoma.

Development of glaucoma

- We have surgical strategies to deal with cases of phakic and pseudophakic eyes with glaucoma . But we don't have in cases of ICL and Iris claw IOL.

Development of glaucoma

Methods

From Jan 8, 2009, to Dec 28, 2011, we enrolled patients from 30 hospital eye services in five countries. Randomisation was done by a web-based application. Patients were assigned to undergo clear-lens extraction or receive standard care with laser peripheral iridotomy and topical medical treatment. Eligible patients were aged 50 years or older, did not have cataracts, and had newly diagnosed primary angle closure with intraocular pressure 30 mm Hg

(EAGLE): a randomised controlled trial

Prof Augusto Azuara-Blanco PhD [a], Jennifer Burr MD [b], Prof Craig Ramsay PhD [c], David Cooper PhD [c], Prof Paul J Foster PhD [f], Prof David S Friedman PhD [g], Graham Scotland PhD [c, d], Mehdi Javanbakht PhD [d], Claire Cochrane MSc [c], Prof John Norrie PhD [c, e], EAGLE study group

Results :

Findings

Of 419 participants enrolled, 155 had primary angle closure and 263 primary angle-closure glaucoma. 208 were assigned to clear-lens extraction and 211 to standard care, of whom 351 (84%) had complete data on health status and 366 (87%) on intraocular pressure. The mean health status score (0·87 [SD 0·12]), assessed with the European Quality of Life-5 Dimensions questionnaire, was 0·052 higher (95% CI 0·015–0·088, p=0·005) and mean intraocular pressure (16·6 [SD 3·5] mm Hg) 1·18 mm Hg lower (95% CI –1·99 to –0·38, p=0·004) after clear-lens extraction than after standard care. The incremental cost-effectiveness ratio was £14 284 for initial lens extraction versus standard care. Irreversible loss of vision occurred in one participant who underwent clear-lens extraction and three who received standard care. No patients had serious adverse events.

To determine the best refrctive surgery for each patient we should discuss :

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Risk of retinal detachment

Risk of retinal detachment

➢ In … etinal de…

1 … ence of RD

CONCLUSION Go to:

Myopic refraction ranging from 3,5 to 7,49 dsph can be considered as "critical" for the occurrence of retinal breaks, and then of the retinal detachment as well.

In order to prevent the retinal detachment in the eye with myopia, we suggest a detailed examination of patients with draws refractions. Diagnosed retinal breaks can be adequately surgically treated as prevention.

Risk of retinal detachment

- How to decrease risk of RD in CLE :

1. Avoid CLE in mild to moderate myopia .
2. Detailed examination of the patient especially retina .
3. Any tear should be treated and lasered preoperatively.
4. Surgical technique .
5. Post operative care .

Risk of retinal detachment

4.Surgical technique

- 5.5 mm CCC is ideal
- Good hydrodissection
- keep the AC formed
- Don't hesitate to use OVD when needed
- Care must be taken to keep Post. Capsule intact
- Hydrophobic IOL is better to decrease need of Yag capsulotomy
- Don't use double way cannula

Risk of retinal detachment

5. post operative care

- Examine the retina in schedual manner
- Examine the retinal periphery carefully before Yag
- Try to avoid / delay Yag as possible
- During Yag capsulotomy use the lowest energy and do the smallest size

To determine the best refractive surgery for each patient we should discuss :

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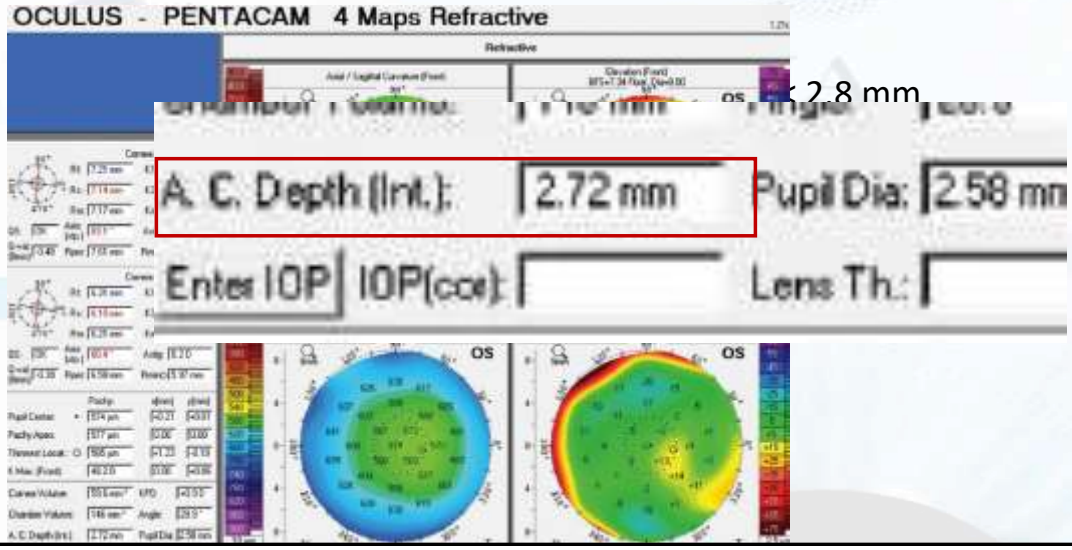
Ant segment anatomy

Ant segment anatomy



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Cost

Cost

Clin Ophthalmol. 2010; 4: 447–454.
Published online 2010 May 14.
PMCID: PMC2874272
PMID: 20505837

Comparison of clear lens extraction and collamer lens implantation in high myopia

Ahmed M Emarah, Mostafa A El-Helw, and Hazem M Yassin

Conclusion:

Clear lens extraction presents less of a financial load up front, and less likelihood of the need for a secondary intervention in the future. Clear lens extraction is a more viable solution in developing countries with limited financial resources.

To determine the best refractive surgery for each patient we should discuss :

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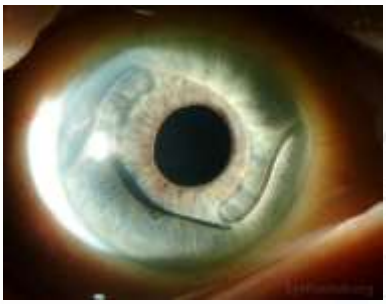
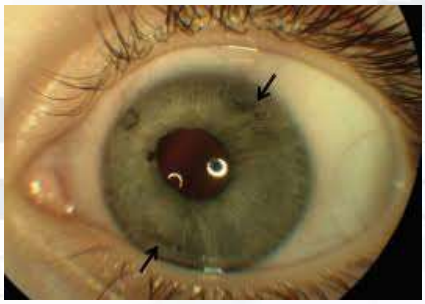
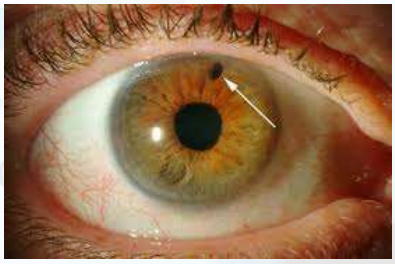
Cosmesis

Cosmesis

Back to our case

Myopia

- 25 year old female with refraction
  - OD : -18.25 -0.75 @ 170
  - OS : -17.00 - 1.00 @ 180
- BCVA :
  - OD : 0.8
  - OS : 0.7
- Fundus : chorioretinal degeneration
- Otherwise : normal findings

Myopia

- Best option :
  - Corneal refractive surgery
  - ICL or Iris clawed IOL
  - CLE

So..

- CLE is an effective and safe procedure as a refractive procedure .
- Recent advances in cataract surgery and IOLs made CLE more efficient than early reports .
- CLE may be a better choice among other corneal and lens refractive surgeries.
- CLE may be the best available solution in particular cases eg. CNAG .

Thank you