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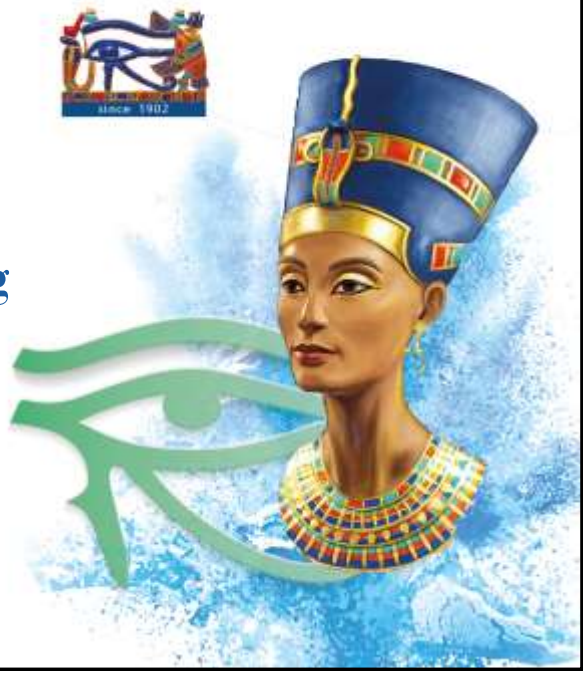

Different lenticular sizes affecting SMILE myopic astigmatism correction

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MD, FRCS ESC,CAIRO .

NO FINANCIAL INTERSTS

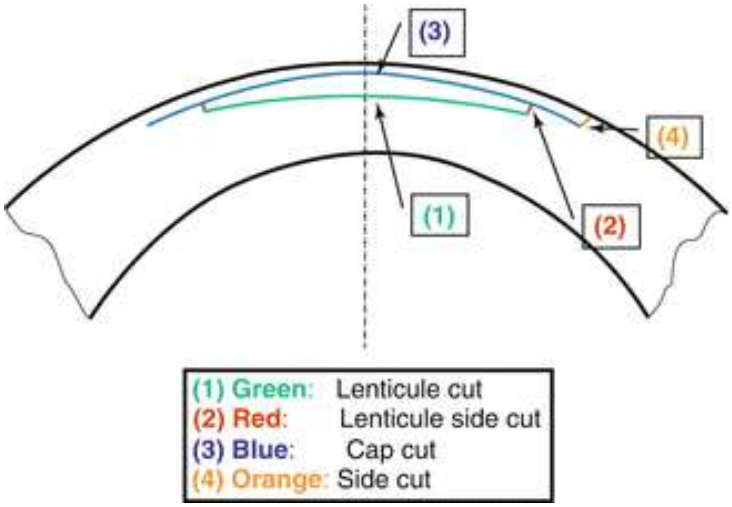
ReLEx SMILE:

- **ReLEx**

(refractive lenticule extraction)

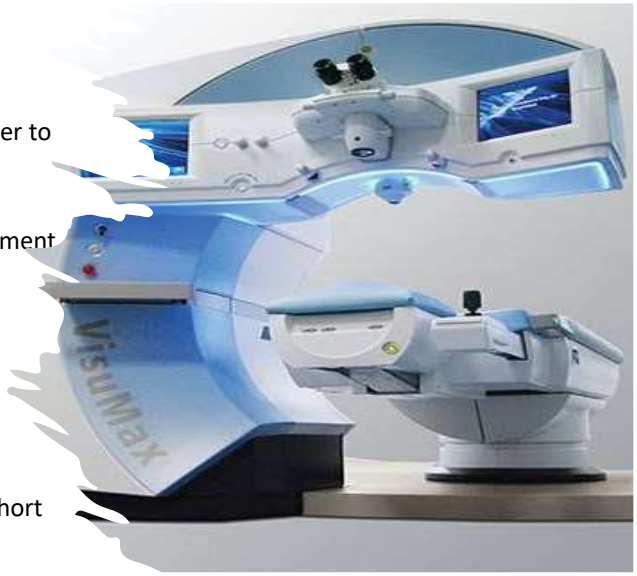
- **SMILE**

(small incision lenticule extraction)



Machine:

- It utilizes the high-precision femtosecond laser to create a lenticule inside the cornea.
- One or more access incision in a single treatment step.
- Its cutting precision, speed makes it an ideal platform for advanced corneal surgery .
- Incisions are made through microscopic-photodisruptions of tissue, created by ultrashort pulses.

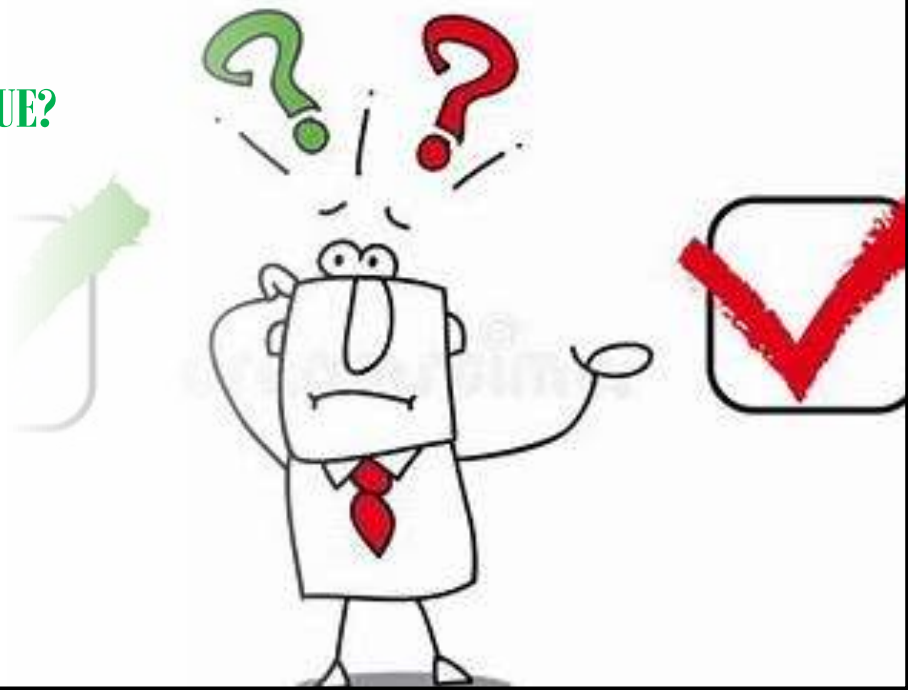


FDA APPROVAL :

- Sep.2016.
- -1.00 to -10.00 myopic D.
- -0.75 cylinder D.
- Expanded 2018 to include astigmatism till -3.00 .

- Chow SSW, Chow LLW, Lee CZ, Chan TCY, Astigmatism Correction Using SMILE. Asia-Pacific journal of ophthalmology (Philadelphia, Pa.). 2019 Sep-Oct; [PubMed PMID: 31490198]

IS IT REALLY TRUE?



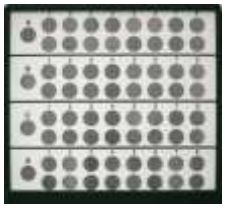
Aim of work :

- SMILE showed high efficacy and safety , but there has been under correction tendency when treating astigmatism.
- reported 11-16% under correction depending on the amount of astigmatic correction.
- some studies tried to evaluate the visual and refractive outcome of the SMILE procedure in the correction of astigmatism -1.0 D and higher.
- our study focused on answering another question about the efficacy of correcting the different amounts of astigmatism in the SMILE procedure while using different lenticule diameters - contrast sensitivity results and epithelial changes .

METHODS:

- Hospital-based, comparative, randomized, prospective, interventional contralateral eye study including 40 patients was conducted in the Eye Subspecialty Center, Cairo, Egypt.
- All patients underwent SMILE using the 6.5 mm lenticular diameter in the right eye and 7.0 mm in the left eye.
- The study included patients aged 18 to 50 years having myopia with up to -10.00 D spherical equivalent (SE) and astigmatism of -0.75 D to -5 D with corrected distance visual acuity (CDVA) of 0.7 or better (decimal). The eyes were divided into low astigmatism (<-1.5 D), moderate astigmatism (-1.5 to -3 D), and high astigmatism (> -3 D) groups.

Pre-operative evaluation :

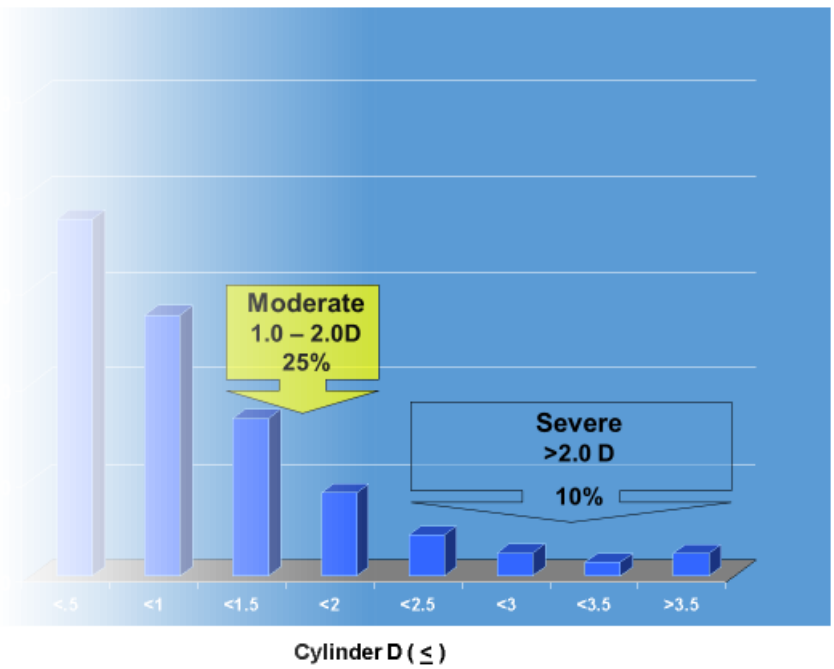


- **Anterior , posterior seg. examination.**
- **VA , cyclo ref.**
- **Pentacam.**
- **Ant.OCT.**
- **CS.**

Astigmatism and SMILE don't mix ☺

- **Visumax lacks :**

- Eye tracker.
- Iris registration.
- Topography guided profile.
- Cyclotorsion?????????????



Cyclo-torsion :

- Preoperative examinations are conducted while patient is seated.
- refractive procedures are conducted while patient is supine.
- Cyclotorsion due to postural change is called "posture-related ocular cyclotorsion"
- Axial misalignment of 10 degrees in refractive surgery theoretically causes a 30% or greater loss in astigmatic correction.

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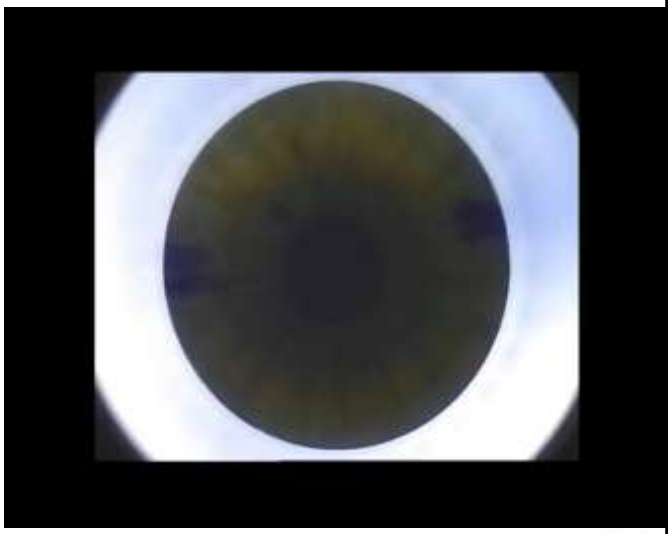
Manual compensation :

- Horizontal Limbal marking using laser visible ink is performed at 0-180 degrees in upright position.
- The patient eye is docked to contact glass of the treatment pack followed by application of suction.
- the extent of cyclotorsion is determined using the reticule in the eye piece.
- The cone is rotated very gently to align the marks on the eye to the 0-180 axis of the reticule .

Surgical parameters :

- cap thickness 120 µm.
- cap diameter 7.5 mm for lenticule diameter 6.5 mm (right eye) or 8.0 mm for lenticule diameter 7.0 mm (left eye), cap side cut angle 70°.
- 3 mm incision positioned at 120° angled 45°.
- transition zone of 0.1 mm and clearance of 0.5 mm, lenticule side cut angle of 90° , edge lenticule thickness of 15 µm.



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Post-operative evaluation :

- Follow-up 1 day, 1 week, 3 months, and 6 months .
- Data were collected for analysis(UDVA, refraction, CDVA, Pentacam , CS, and anterior segment OCT.
- For each treatment case, the safety index was calculated in decimal units, as postoperative CDVA/ preoperative CDVA and the efficacy index as postoperative UDVA/ preoperative CDVA .

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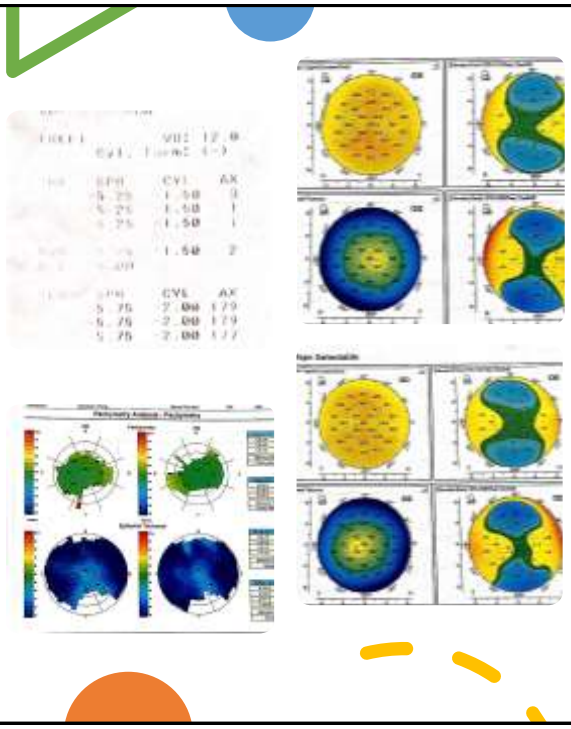
Case 1:

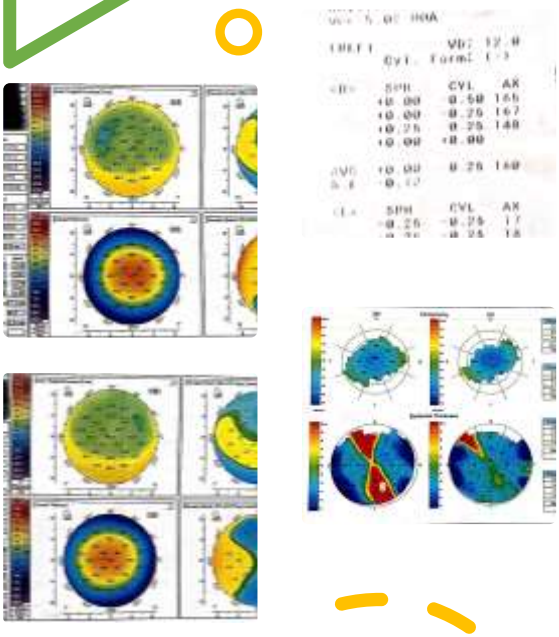
- Before SMILE :
- Female 26 yrs .
- REF
- RT :-5.5 -1.5*180
- LT:-6.00 -2.00*180

- BCVA 20/20 .



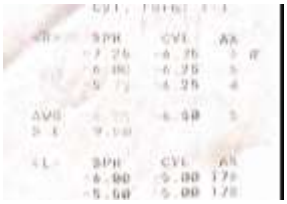
Post SMILE :

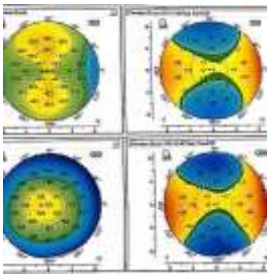
UAVA 20/20 .

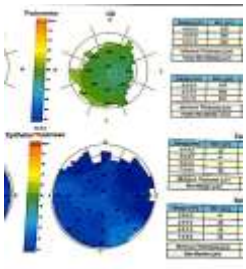


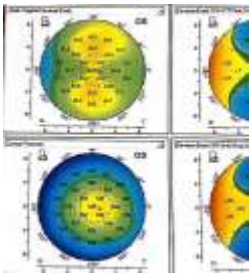
Case 2:

- Male 23 yrs .
- BCVA 20/30 with glasses .
- Ref :
- RT eye : -7.5 -5.00*180
- LT eye : -7.00 -5.00*175



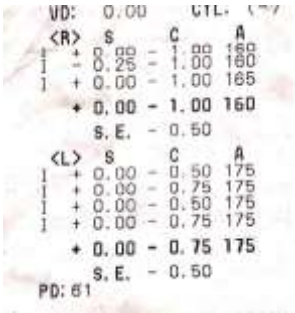


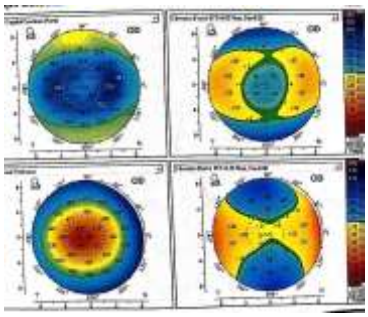


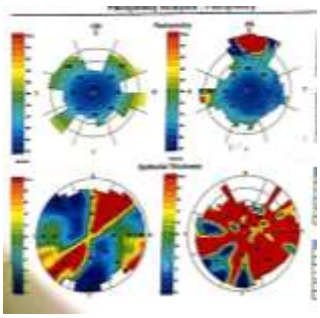


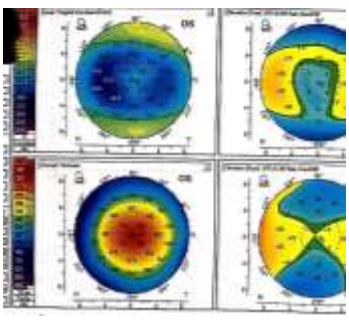
Post SMILE:

UAVA 20/25.



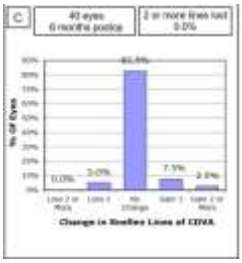


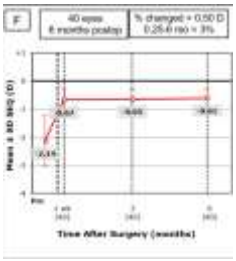


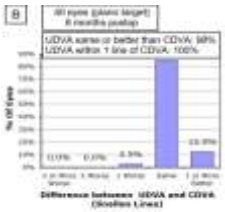


Results :

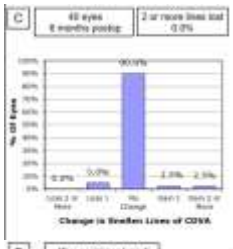
Rt eye 6.5mm

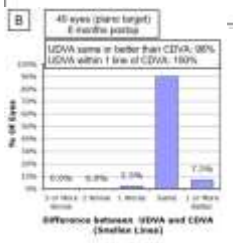


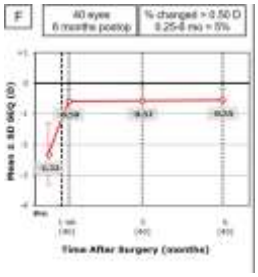




LT eye 7.00mm







Safety and efficacy index:

- At 6 months, both eyes showed good safety and efficacy indices, with no statistically significant differences between them in spherical or astigmatic correction. The only clinically significant difference is that the 7.00 mm lenticule eyes stabilized earlier.
- After 6 months, the only difference noted regarding postoperative corneas was also that the 7.00 mm was still thinner in both OCT CCT and Pentacam TCT but The difference in visual outcome was then non-significant.

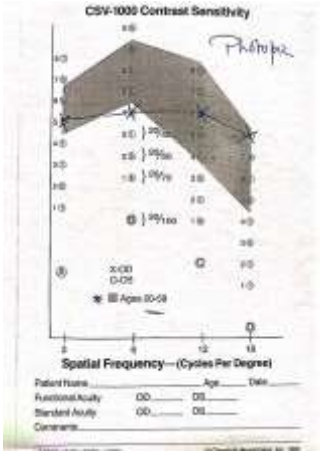
Contrast sensitivity results :

Rt eye lenticule 6.5mm

- The contrast sensitivity improved in photopic 3 cpd at 3m and remained so at 6m.

Lt eye lenticule 7.00mm

- The contrast sensitivity improved in photopic 3 cpd at one week and remained so at 6 m.



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Epithelial changes with anterior OCT:

- Preoperatively:

- there were no differences between both 6.5mm and 7.00mm regarding the central epithelial thickness, epithelial thickness regularity (SD), and asymmetry (superior minus inferior), P= 0.524, 0.674 and 0.589, respectively.

- At one week, three months, and 6 months postoperatively, there were no differences between 6.5 mm and 7.00 mm .

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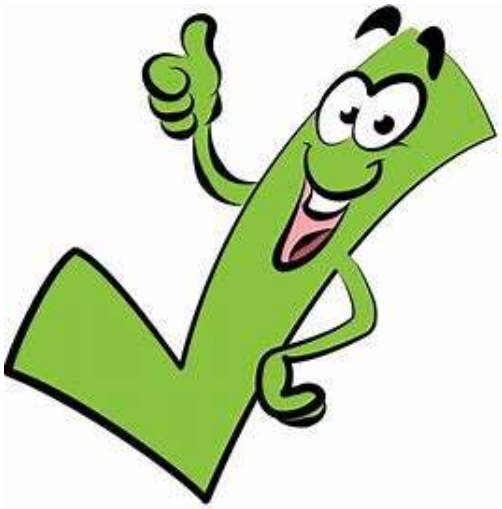
Take home massage :

- Evidenced based medicine is the way to confirm or disconfirm info.
- Manual compensation and preoperative marking can improve your results using SMILE myopic astigmatic correction .
- UAVA only is not enough for refractive solutions .
- Long term predictably and stability indices shows that SMILE is both effective and safe for high myopic astigmatism correction .



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Thank you