The observation of safety and predictability of implanting autologous lenticule obtained by SMILE for Anisometropia

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Femtosecond laser assisted corneal small incision allogenic intrastromal lenticule implantation in monkeys: a pilot study

Purpose. To investigate the feasibility and morphological effects of femtosecond laser assisted corneal small incision allogenic intrastromal lenticule implantation (AILI) in monkeys
Results

Cornea tissue edema gradually relieved and regained clear at 1 month.

Nerve fibers regeneration can be detected in the lenticule layer on 6 months. Overall $3.27 \pm 1.2$D corneal power was increased at 6 months. Corneal stromal were $69 \pm 11 \mu m$ thicker than preoperative ones and were roughly equal with maximum thickness of implanted lenticules.

No significant complications were observed in the follow-up period.
Conclusions

• Femtosecond laser assisted corneal small incision allogenic intrastromal lenticule implantation (AILI) is a feasible and safe technique for increasing corneal stromal thickness and change corneal refractive power, which may provide a novel method for keratoectasia, presbyopia, and hyperopia in the future.

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Femtosecond laser lenticule transplantation in rabbit cornea: experimental study
methods

Figure 1. Surgical procedure. R-1) Femtosecond laser ablation, with the bottom layer completed, and the upper layer still under operation. R-2) Dissection of the upper layer. R-3) Dissection of the bottom layer. R-4) Extraction of the stromal lenticule. L-1) Femtosecond laser ablation. L-2) Dissection of the pocket. L-3) Insertion of the lenticule (arrow). L-4) Adjustment of the lenticule (arrow) position. L-5) Flattening of the flap and lenticule. L-6) Successfully transplanted state. R = right eye, L = left eye
Results

conclusions

lenticule obtained by SMILE for reuse in rabbit is safe, effective and stable

The lenticule Could be used for Anisometropia

One eye be Myopic and the other hyperopic

The two eyes have unequal refractive power

high myopia with a high degree of hyperopia
anisometropia patients wearing contact lenses
is one of the best option

If the patient don’t accept contact lens and glasses……
The observation of safety and predictability of implanting autologous lenticule obtained by SMILE for hyperopia

Purpose: To evaluate the safety, efficacy, stability and predictability of implanting autologous lenticule obtained from small-incision lenticule extraction (SMILE) for the treatment of hyperopia
Methods

Five patients (10 eyes) one eye myopic the other eye hyperopic
The enrolled patients had a mean age of $24.6 \pm 5.3$ years (range 19 to 31 years, Table 1); male: female = 3:2

The eye with myopia was treated with SMILE. The lenticule extracted from the myopic eye was subsequently implanted to the hyperopic eye

Follow up: 1d, 1m, 3 m, 6 m, 9 m and 1y post operatively ophthalmologic examination: UCVA BCVA AS-OCT corneal topography

<table>
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Limitation

1) the suitable cases were limited, and the small sample size might affect the statistical efficiency

2) All the lenticules’ diameter were 6.5mm patients with large dark pupil might feel glare which might affect the visual quality

3) This technique was only for hyperopic correction using the lenticule extracted from myopic eye
To using this technique for myopic correction to implant a lenticule extracted from hyperopic eye into myopic eye with thin cornea
Conclusions

Implanting an autologous lenticule obtained by SMILE for hyperopia might be safe, effective and stable; while its predictability should be improved in the future

(Published .JRS July 2015)
Further study: Epi-Lenticule Epi transplantation after SMILE
Further study:

Biomechanics after SMILE

There was no significant change in AT1, AT2, DA, or IOP after lenticule creation (P>0.05), a significant change in these parameters following subsequent corneal lenticule extraction (P<0.01)
The Corvis ST demonstrated the intralamellar small gas bubbles formed from the vaporisation of tissue after lenticule creation and a gray zone was observed between the cap and the residual stromal bed after lenticule extraction.
Conclusions

SMILE lenticule could be reused for refractive error correction

SMILE lenticule could be used for treating corneal disease
Thanks!

😊

The Future