

Refractive Surgery.....RETHINKING

The progress in laser refractive surgery has entered an interesting state of recommendations and practices. Reference to my editorial views in volume 22 number 4, October 2006 issue of P.J.O. about correction of the most prevalent refractive error "presbyopia", it still remains the most difficult and enigmatic refractive error to be corrected by all the measures known so far including presbylasik monovision, scleral expanding procedures, conductive keratoplasty, LTK, refractive IOL's etc. while correction of hyperopia more than +4D with laser refractive surgery is still not being recommended.

Over the years laser refractive surgery in myopia and myopic astigmatism has been gradually evolving to achieve safer outcomes aiming at better visual results and meeting the expectations of the patients also.

In the beginning P.R.K. (Photo Refractive Keratectomy) with excimer laser was the widely practiced procedure, but soon there were objections to pain, haze, slow visual recovery, regression etc, hence the development and significantly rapid transition to Lasik (Laser in situ keratomileusis) where a superficial flap of 120-180 micron is raised with a mechanical keratome and laser is applied in the stromal bed, then flap is replaced giving pain free rapid visual rehabilitation without significant haze and regression.

One group of refractive surgeons are still strongly advocating P.R.K. because by performing surface ablation we could safely remove at times more of corneal tissue, though with immediate complications of pain and delayed visual recovery but avoiding the flap related complications, the most important being the development of ectasia due to disturbed biomechanics of cornea which is an awful complication when it happens though it is rather rare in lasik.

The Lasik procedure at present remains very popular with patient preference due to no pain, rapid visual recovery and lesser wound healing complications by the preservation of the vital layers of Bowman's membrane along with underlying tough corneal stromal layers and by making a thinner flap of

about 120 microns to be able to save enough residual stroma (about 300 micron or more) to overcome the danger of ectasia.

To achieve this much thin flap with mechanical keratome is now possible with new keratomes like X.P without any significant chances of button-holing and other flap related complications. This much thin flap of 120 microns or even thinner can be safely achieved with femtosecond intralase laser, where flap thickness is also uniform compared to mechanical keratomes created flaps which are thicker in the periphery and thinner centrally hence more prone to complications.

While there are efforts to develop a mechanical keratome which can safely create a further thinner and uniform flap, there are other developments like Lasek and Epilasik where only epithelial flap is raised to perform ablation, saving sufficient stroma to avoid the later complication of ectasia but these epithelial flaps are not easy to make and tend to develop flap related problems.

During this period customized treatments with or without wavefront guidance gained popularity with a promise of bionic vision that is better than 6/4 etc. But soon there were some disappointments as we did not understand the corneal biomechanics precisely as yet and were also over sold by the trade and manufactures hence this tendency faded out for some time but eventually has reemerged with better understanding of corneal biomechanics coupled with enhanced precision of technology and now is being incorporated in both P.R.K and Lasik.with safer and excellent results.

At present there are two distinct groups of refractive surgeons, the P.R.K adherents which are concerned with biomechanics of Lasik like flap related complications, ectasia, and the Lasik proponents concerned with problems of wound healing, haze, regression, pain and delayed visual recovery in surface ablation.

While there is serious rethinking going on in refractive surgery whether to revert back to P.R.K or continue Lasik as such with creation of a thin flap of

120 microns or so with mechanical keratome there is another important development taking place with the evolution of a new technique where a thin flap of 90 to 100 micron is created with femtosecond intralase laser again preserving the vital Bowman's membrane and important tough anterior stromal material underneath it eventually saving enough residual stroma (more than 300 microns). This procedure called SBK (Sub Bowman membrane Keratomileusis) is being favourably considered by both P.R.K. and Lasik proponents as it overcomes most of the objections of P.R.K and Lasik and achieving the best of both procedures. The only reservation is the cost effectiveness as it entails another femtosecond laser which is as costly as excimer laser and despite making flaps with femtosecond intralase laser a very thin flap about 80 micron or so is still not without flap related problems always. The SBK at times called superficial

Lasik by some (where flap thickness is about 80 microns) is gaining popularity and certain manufactures are thinking of developing a machine with both excimer and femtosecond facilities.

Refractive surgeons all over are keenly awaiting further clinical data and published studies of SBK and surface Lasik to be able to decide what is safer and better for our patients, while draining about the day they will be able to perform intralamellar ablations.

M Lateef Chaudhry
Editor in Chief
Pakistan Journal of Ophthalmology