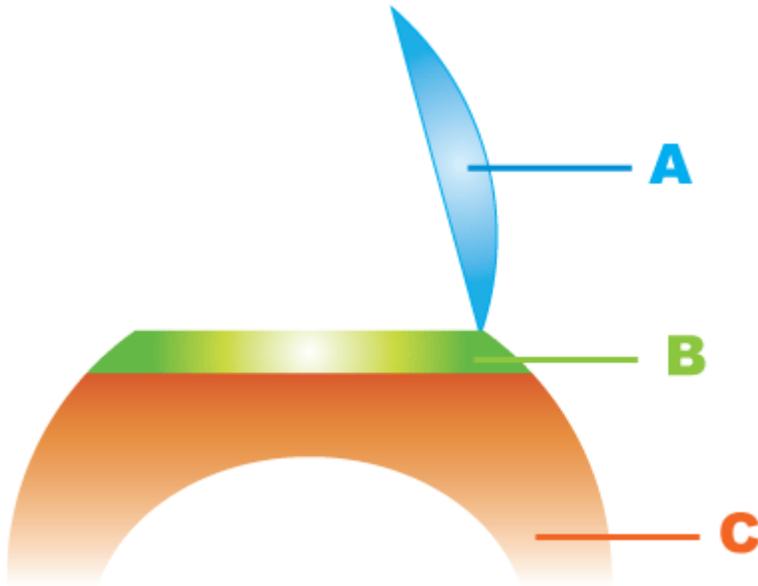


Lasik is by far the commonest refractive surgical correction for short-sightedness, long-sightedness and astigmatism. Lasik involves the creation of a flap over the corneal of an eye (identical to the windscreen of a car) before the application of laser energy (known as excimer laser) to remove the required amount of corneal tissue needed. The corneal thickness is unique and constant in one's eye throughout the life. Normal corneal thickness spans between 500 – 600 um for most. The amount of tissue to remove is according to the initial power of the said individual.

Flap created by different motor flap creators known as microkeratomes are between 110 – 180 um. It can also be created by laser flap creator (known as intralase) and can be set at any thickness you desire. Once the flap is created, laser is applied to “carve away” the necessary thickness depending on:-

1. Power of the eye - The higher the power the more tissue is needed to take away.
2. Desired area – The wider the area, the more tissue is needed to take away.
It is imperial the area of treatment exceeds or equal to the pupil size (again according to individual) to avoid starburst particularly in dim light when pupil is maximal.



- A** Flap thickness – 110 – 180 um.
B According to power and desired area of treatment across the corneal.
C Residual tissue – This must be at least 250um and probably 270 um if possible so as to leave room for enhancement laser should regression take place.

The two factors in order to retain as much residual tissue in order to avoid over treating and left with less than 250um are:

1. Flap thickness – depending on which motor you pick
2. Which excimer laser and the programme you pick

Flap thickness – By mechanical method

There are almost a dozen available flap creators (known as microkeratome) in the market. With different brand names and adaptors, pre set calibration varies between 110um to 180um. Ideally, the thinner the flap thickness, the more tissue will be left available for removal by the excimer laser. Generally, flap thickness should be minimally thin, around 120um but not any thinner as it will be too thin to have any control while lifting over. Any thinner flap would be difficult to control, quite like flipping over a clean film with a chopstick.

During surgery, a mechanical microkeratome is applied using high suction pressure over the corneal. When sufficient pressure is reached, a mechanical blade is pass over the corneal to create a flap. A good microkeratome should have little or no variation with its flap thickness cases after cases. In other words, the same level of precision in flap thickness must remain constant. The Bausch and Lomb XP microkeratome is very precise and accurate among most microkeratomes.

Flap thickness by Intralase Femtosecond Keratome

The creation of laser flap involves an interface devise that flattens the cornea into a flat shape under a glassplate. Laser beam is applied to the inner deeper layer to create a cleavage, hence forming a flap. Once again this is pre-calibrated to the desired flap thickness. Such creation of laser flaps is not a magical ‘no touch’ approach. Such an approach has proven to give much more variation in the precision of flap thickness. Hence the actual thickness of left over tissue may vary quite significantly, yielding less accuracy than mechanical microkeratomes. Moreover, more suction time and surgery time are required by flap created by laser delivery system. Less time means less potential for unanticipated intraoperative events that could affect surgical outcomes.

Excimer Laser

As mentioned the wider area of treatment, the more corneal tissue needs to be removed to achieve the same result. In other words, a small treatment zone of a fixed power needs X layer of thickness and, a wider treatment zone of the same fixed power needs X and more layer of thickness.

Different excimer laser will remove slightly different amount of corneal tissue, but generally not much of variation. However, some laser system provides tissue saving programme to aim at saving more tissue with the same outcome.

Summary

A good microkeratome creates thin and precise flap. “No blade” flap creator by laser is more variable and is of no substitute to a microkeratome with a great track record. The combination of thin precise flap with tissue saving programme is idea for high power treatment or/and thin inborn corneal thickness. However, over high power treatment is not recommended as this may reduce the quality of visual outcome. When encountered with such cases, phakic intraocular lens implant (i.e. implanting a lens within the eye) such as the ICL implant is definitely of choice.

Dr.Yeoh has no financial interest in any of the mentioned products.