How to perform **the best incision in MICS**

Disposable micro-incision knives versus the diamond knife

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Performing MICS is the best way to improve our results by reducing surgical trauma and providing our patients with the best post-operative visual outcomes.

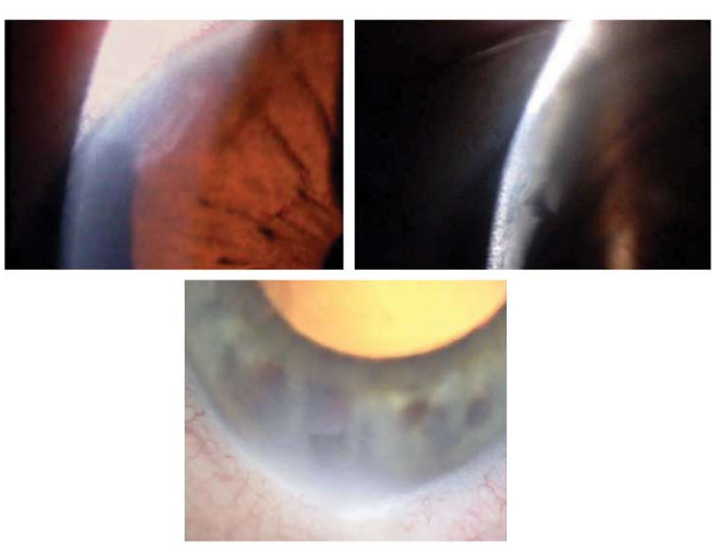
While a lot of emphasis is often placed on the decrease in incision size, the main advantages of biaxial MICS or Bi-MICS, in my opinion, are enhanced anterior chamber stability, improved safety through the separation of irrigation and aspiration, best wound architecture and preservation of wound integrity.

Together with a good knowledge in fluidics and tuning of the phacoemulsification device, the knife is a critical instrument to achieve a secure MICS procedure and avoid stromal tears (**Figure 1**), Descemet's tears (**Figure 2**) and leakage.

In short...

Dr Gilles Lesieur found that penetration and cutting results varied — which is an important factor to consider in relation to wound architecture when performing B-MICS.

Figure 1: Anterior stromal tear.



In our study, the performance of various single-use micro-incision knives was evaluated in comparison with a diamond knife. We first presented our results in a fre paper at the 2008 ESCRS meeting.

A specific device (**Figure 3**) was used to measure the forces exerted when cutting a 0.4 micron polyurethane film.

Several disposable knives were tested and compared with a diamond knife: 16 Intrepid (Alcon), 20 MicroCut (PhysIOL) and 20 MICS knives (Kai) and the diamond knife was tested 20 times.

Maximum load (penetration force) and friction

Figure 2: Descemet tear.

Figure 3: Device for measurements of penetration and cutting.

(resistance to cut) were recorded. Results were expressed in Newton (**Figure 4**).

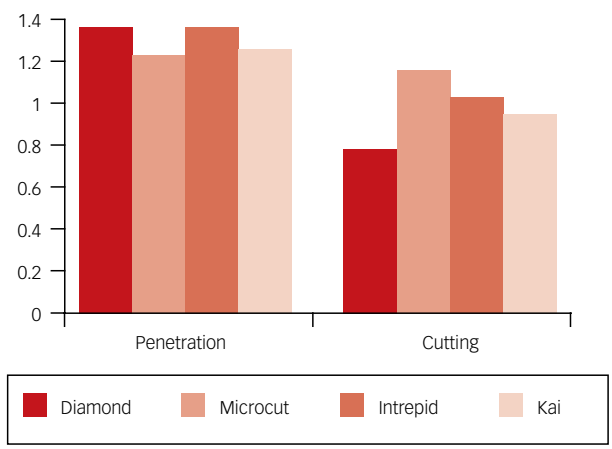
The diamond knife considered as a reference showed the highest penetration force (mean 1.347 N) and the lowest resistance to cut (mean 0.775 N).

With a mean penetration force of 1.222 N and 1.226 N respectively, the single-use PhysIOL MicroCut (**Figure 5**) and Kai MICS knives outperformed the diamond knife in terms of cut. The differences versus the diamond knife were statistically significant ($p<0.0001$).

There was no statistically significant difference between Intrepid (mean 1.350 N) and the diamond knife ($p=0.8904$).

Among the single-use knives, best cutting (mean friction) was achieved with Kai (0.883 N), followed by Intrepid (0.965 N), and MicroCut (1.137 N).

Figure 4: Comparison of penetration force and resistance to cut.



Results are expressed in Newton.
- Best penetration: Kai MICS and PhysIOL MicroCut knives
- Best cutting (lowest resistance to cut): Diamond knife followed by Kai MICS and Alcon Intrepid knives

Figure 5: PhysIOL MicroCut knife.

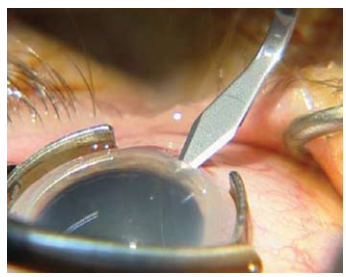
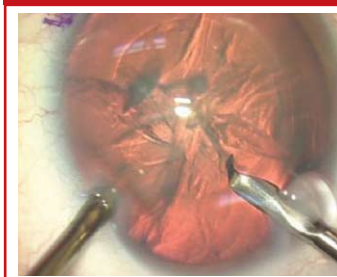
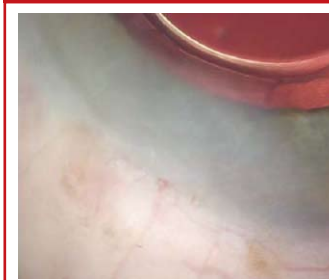


Figure 6: Three recommended incision steps.



Step 1: Trapezoidal Incision for increasing instruments mobility
Step 2: Introduction of Hydrochopper
Step 3: Oblique introduction of phaco Dewey tip MST®.

Figure 7: Final incision with the best conservation of wound architecture.



The differences of each of these knives versus the diamond knife were statistically significant ($p<.0001$).

However surgeons must be aware that achieving the best final incision is not only a matter of performing the incision itself but also a matter of preserving its integrity.

As illustrated in **Figure 6**, we recommend following three steps:

- trapezoidal incision for increasing instruments mobility
- introduction of Hydrochopper (incision size 1mm)
- oblique introduction of phaco Dewey tip MST (incision size 1.2mm)

In conclusion the performance of disposable micro-incision knives was superior to the diamond knife in terms of penetration but not in terms of cutting. Considering the importance of wound architecture when performing B-MICS, this could be considered as an advantage in terms of surgical control.

Special Contributor Gilles Lesieur, MD is working in private practice in Albi, France. He may be reached by E-mail: g.lesieur@iridisinnov.fr
He has a financial interest with PhysIOL as a consultant and earns royalties from its ophthalmic product. No financial interest with MST.