



High-speed cutting in vitrectomy: a new world to discover

What is the benefit of high-speed cutting?

Every surgeon wants to minimize traction generated by the cutter close to the retina. One very efficient way to reduce traction is

In the following, you will see why increasing the cutting rate is the most elegant way to minimize traction without losing efficiency in the aspiration and in the cutting quality.

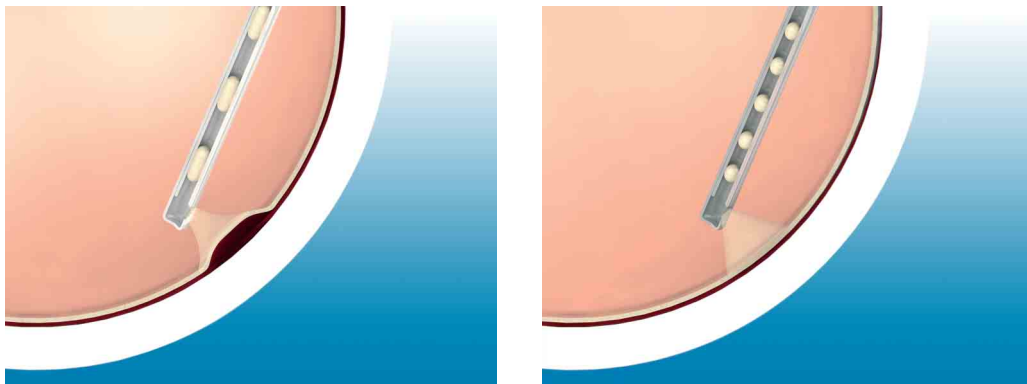


Fig. 1

to cut only small pieces of vitreous (see Fig. 1); this can be achieved in three ways: a) reducing the flow rate / vacuum, b) reducing the size of the opening of the cutter (venturi pump) or c) increasing the cutting rate.

By the way: “high-speed cutting” means cutting rates **higher than 1500 cuts/min.**

... but there can be no compromise on the fluidics!

If it is not done expertly, higher cutting rates will cause a degradation in the fluidics: in order to have perfect fluidics, the cutter has to remain open for no less than 50% of the cutting cycle. This is very difficult for cutters in which the closing cycle depends on a spring; the spring is simply too slow and will not allow for complete and fast opening of the cutter. The surgeon will observe that the aspiration decreases.

The Twinac-principle of the Oertli® pneumatic cutter allows very fast control; the cutter, the valves and the electronics are perfectly harmonized and a duty-cycle of 50% can be guaranteed for up to 3000 cuts/min. This can be proven by Fig. 2: for cutting rates from about 1200 cuts/min up to 3000 cuts/min the flow rate is constant and corresponds to a duty-cycle of 50%. Going to cutting rates lower than about 1200 cuts/min increases the flow rate: this means that at these low cutting rates the cutter remains open for more than 50% of the cycle.

Fig. 2 also shows a comparison of the Oertli® system with B&L (Lightning electric cutter) and with Alcon (pneumatic cutter) (source of data: B&L website and B&L promotional documents). It is very clear that the Oertli® system has by far the best aspiration efficiency; even at 3000 cuts/min, Oertli® has better performance than the two competitors at 1500 cuts/min!

... and neither do we accept compromises in cutting quality

One main parameter characteristic of the cutting quality is the closing force of the cutter: how great is the force applied on the tissue to be cut during the closing cycle of the cutter? Both in electrical and in pneumatic cutters this force decreases when the cutting rate is increased. In the Oertli® high-speed vitrectomy system, even at 3000 cuts/min a cutting force of at least 0.2 kg can be applied on the tissue ... and this is more than enough for vitreoretinal surgery on the highest level.

By the way: there is no need for a special "high-speed cutter", since the well proven Twinac cutter can be used.

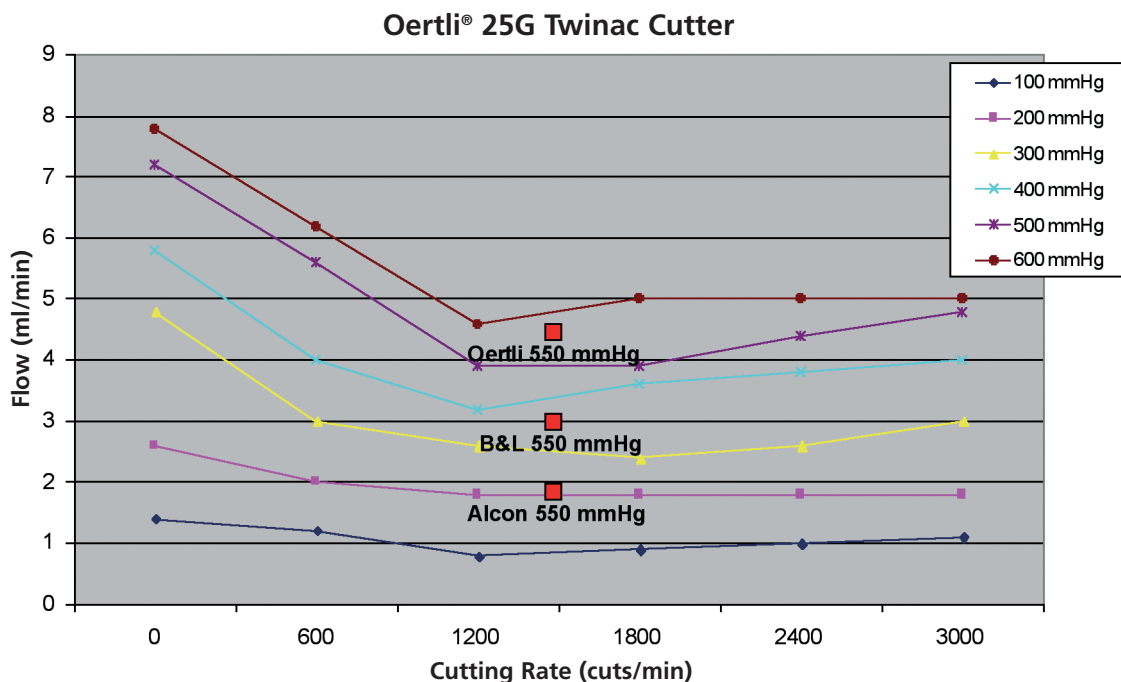


Fig. 2

APPLICATION NOTE



Peristaltic or venturi pump?

All these advantages are available by using either the peristaltic or the venturi pump. Some of the surgeons using the peristaltic pump will claim that they do not need higher cutting rates, because they can minimize traction by simply reducing the flow rate. But when using high-speed cutting, they have the flexibility of having both: minimum traction even at higher flow rates.

As there are no differences in the fluidics between about 1200 cuts/min and 3000 cuts/min (see Fig. 2), there is no need to change the fluidic settings in this range.

20G / 23G / 25G ?

The advantages of high-speed cutting can be seen in all the different sizes.

In which surgical situations?

Although the main advantage of high-speed cutting will become manifest when working close to the retina, the high cutting rates can also be used in core vitrectomy without losing aspiration efficiency.

Summary

The Oertli® high-speed vitrectomy (up to 3000 cuts/min) opens a new world to the surgeon:

- Minimum traction to the retina
- Most efficient aspiration
- Perfect cutting properties

None of our competitors has a similar system, so it will be a new experience for the surgeon (e.g. Bausch & Lomb: only up to 1500 cuts/min, restricted aspiration efficiency, electrical cutter).

The system speaks for itself: the reaction of the vitreoretinal surgeons is very enthusiastic, from the very first surgery performed.

Technical requirements

For OS3 units with serial numbers older than 36000656, an upgrade kit can be ordered (VX100937).

For OS3 units newer than 36000656 a code is required to release the cutting range higher than 1500 cuts/min (VE830005).

There are no changes in the pneumatic cutter.



Dr. Marco Zemella, Belluno:

The first time I used the 3000-cuts Oertli® cutter, I wasn't convinced it would work. In my experience with high-speed cutters, I couldn't find efficacy over 1200-1500 cuts/min. I was really surprised during my short experience (1 full macular translocation, 1 giant tear retinal detachment, and 1 primary vitrectomy for retinal detachment with 23 gauge) to find that the 3000-cuts cutter worked very well, either close to free flaps of the retina (the most harmful situations) or during core vitrectomy. 3000 cuts is really efficient and safe. This is my initial impression, of course, but I was using it for complex cases.

Dr. Detlev Breyer, Düsseldorf:

After using the 23G system with the high-speed vitrectomy for the first time three months ago, I immediately switched completely to this system for all my vitrectomies (approx. 500 annually). The decisive factors for me were the minimal trauma for the patient, the short operating time and the stability of the instruments.