

# Endokapsular Carrusle Technology

Dr. Trpenoski Naumce

**Introduction:** There are two modifications of the Karrousel or carousel technique. The first, and the older is a supracapsular carol, where femoemulsification begins and ends in the anterior chamber. The second is endocapsular carousus, where phacoemulsification begins and ends in the back chamber. **Aim:** The aim is to demonstrate that the full performance of phacoemulsification in the posterior chamber with minimal faco-type diversion gives minimal swelling and lost of endothelial cells to the cornea and at the same time the patient is safe. **Material and Methods:** To perform this one-capsule phaco technique, a Ambati D faco type is required. It has three specifics. The end portion is curved 200c to allow the best fit in the peripheral right quadrant under the capsule. The second specific is the D aperture. The ends of this phaco type are rounded and not sharp. The third specificity is the third irrigation hole. If the two standard openings maintain the chamber, the third irrigation opening maintains the capsule bag inflated. The cut for this technique is 2.2mm. A spatula or nucleussusten is used to help vibrate. Rotation and phacoemulsification are performed entirely in the back chamber, far from the endothelium of the cornea. Use 25% to 40% ultrasound, 400mm vacuum, 110mm height and 40mm aspiration rate with specific viscoelastic. **Results:** Results of 6 patients aged 50-60 years, cataracts with grade 1 and grade 2. Pachymetry has been performed as well as counting of endothelial cells preoperatively. These were repeated on the first post-operative day and three months later. The results showed that the pachymetry cornea is thickened 4% -6% and there was loss of endothelial cells of 4%. The three-month period was sufficient to stabilize the pachymetry results, as well as endothelial cell loss. It is worth mentioning that these are cataracts of grade 1 and 2, but that expectations in these patients are relatively large. **Conclusions:** It can be said that the use of this endocapsular carousel technique and the departure of phacoemulsification from the cornea endothelium minimize the thermal injury of the cornea. The use of this 0.7mm phaco type allows smaller and easier movement of the front chamber. The use of the third orifice makes the capsule bag inflated, and hence beyond the phaco type, which makes the phacoemulsification process itself more efficient and thus safer for the patient.

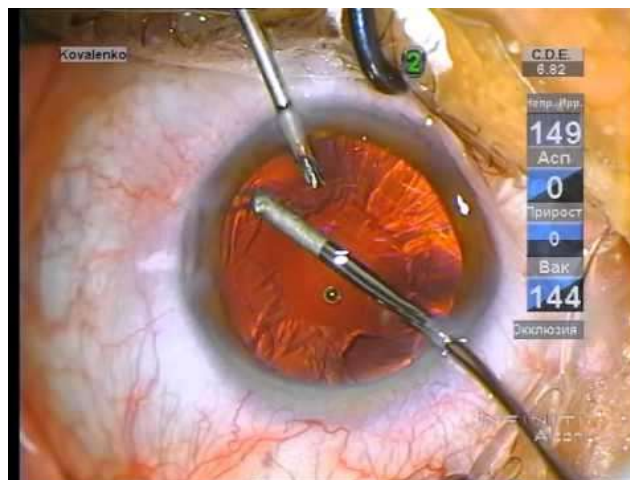
## 1. Beginning of Phacoemulsification

The beginnings of phacoemulsification date from 1967, and are associated with the name Chales Kelman, in which the phacoemulsification in its original technique was performed in the anterior chamber.

Already in 1978 Little describes a technique that transfers phacoemulsification from the front to the back vent. In that period, the term "Start Phacoemulsification in the anterior chamber is popular, then go into the back chamber and never return to the anterior chamber." Laser assisted cataract surgery is done in some centers, but today the most widely used method is phacoemulsification (with ultrasound). Most of the cataracts are removed by a technique called FACOMULSIFICATION. This technique uses ultrasound to soften the lens inside the eye, which is then aspirated through a small tube. First paracentesis with a scissor is 15 or 30 degrees, and anesthetics are inserted with topical anesthesia with lidocaine, it can cause burning and toxic keratitis, then we have applied a vioskostastik to which we reserve it further and is explained by which technique is applied and which vysokostalik. Capsularex is the most important part of the intake, the anterior room must be filled with viscoelastic, and a continuous circular capsulerex is made. Following the hydroresection, which is the next important step in the phaco operation, the lens is rotated, and we know that it is not glued and alike. And it comes to phacoemulsification, the goal is to remove the lens without damaging the cornea, it is best to run the vacuum more and less energy and ultrasound. After phacoemulsification, the aspiration of the cortex occurs, where the cortex needs to be caught and pulled out of the capsule, there is a danger of the back capsule being torn (Thomas, 2013).

Once the blurred lens is removed, the space with the vioskostastik is filled, the IOL is implanted, there are complications like setting up the lens buckle, the IOL is not

centered, damaged IOL and the like. Finally, shovels are put in place if necessary. Sometimes small nylon threads are used to close the wound. These threads are removed in the hospital when the patient comes to the control examination. During the operation, the patient will be alert but will not be able to see what is happening. His lens which helped him to see was removed during surgery and is usually replaced by an artificial intraocular lens. This lens corrects the sight after cataract surgery, but some people, though having an implanted intraocular lens still need glasses. Serious complications of cataract surgery are rare. Complications may occur during or after surgery. During the operation, the lens cap and the lens contents in the vitreous eye of the eye may break apart. It is also possible to have more extensive bleeding inside the eye. These complications are treated with further surgical treatment, which often requires general anesthesia. Then operational complications are rare, but patients need to know the symptoms to reverse the review if they occur.



However, one of the most common complications is damage to the corneal endothelium. It can be damaged mechanically

by the instruments themselves, from the pieces of the natural lens, when they are trimmed with the help of ultrasound, or by the use of a higher intensity of ultrasound, which is necessary in the overcast cataracts. It can also cause permanent damage to the endothelium of the cornea, which requires the replacement of the cornea, ie its transplantation.

From this it is more important to use high quality viscoplastics to protect the endothelium of the cornea, as well as using the appropriate surgical techniques for its application.

## 2. The Are A Number of Dominant Theories About the Damage of the Corneal Endotel

Thermal damage and damage caused by the formation of free radicals. Both factors are proportionately dependent on the strength and duration of ultrasound. Direct contact of nuclear fragments with the endothelium. Corneal dystrophies caused by the movement of the fakotype, and often unwanted mechanical damage to the endothelium caused by the movements of the chopper.

## 3. Should be Operated at Least

Corneal dystrophies caused by the movement of the fuco type, and often unwanted mechanical damage to the endothelium caused by the movements of the choper. Working with the Stop End Chop technique, with Myoshi chopper as a technique of personal choice, and noting the difficulty of performing this technique in Soft cataracts, especially in Soft Cataracts of first degree, primarily because of the inability to create occlusion of the phaco type vacuum, because of the softness of the cataract, showing interest in Carusel ie. carousel technique



## 4. Modifications To Carousel Technique

### 1) Supracapsular carousel

• The first, which is also older, is the traditional Carusel technique. It is essentially a phacoemulsification that begins with a faecal and ends in the anterior chamber. Fako's type is tangentially placed on the same side with the chopper. This represents SUPRACAKSULAR KARUSEL. With it, after making the capsulerebate, a hydrodesection is performed at 6

o'clock, with the so-called HYDRO MOST being made, and the lower equatorial edge is raised in the anterior chamber. The upper edge at the pressure of the manipulator at 12 o'clock is pushed into the back chamber.

- The phacoemulsification itself begins at the equatorial edge, there are soft zones and it is very easily aspirated. The back capsule is far away and safe, there are very few Faro-type movements, but there is damage to the endothelium from the liberated thermal energy because it is very close to the endothelium of the cornea, and of course the damage is greater due to the nuclear fragments, how much they were soft .

### 2) Endocapsularcarasel

- Another variant of the carousel technique versus the Supracapsular is the ENDOCAPURAL CARSEL.
- It is relatively easy to perform and does not require extensive knowledge of the Stop End Chop technique as well as the Divide End Conquer, which as techniques are relatively more difficult and more complex for beginners of surgeons, who know that for the start they want the softer cataracts as seemingly ideal cataracts for beginners.

### 3) Used: Fako type AMBATI - real relief

- The first specificity is at the top that is curved by 20 degrees, as would enabled it after anatomical collapse in the perferent right quadrant under the capsule, while the slope is directed towards left.
- The second specific is the "D" hatch (An opening in the form of the Latin letter D). Peak is so designed to prevent occurrence of larger equatorial recesses that would appear if a classic Kelman-type type would be used, and would allow continuous rotation during the entire process. The ends of this phaco type are rounded, not sharp, because it is primarily about soft cataracts, and most importantly these obliquencies tear the back capsule if they engulf it.
- The third specificity is the third irrigation hole. If the two standard openings maintain the chamber, this third irrigation opening maintains the capsule bag inflated by which the cataract or lens will be easier to rotate, and also delimitally makes the hydrodesection. The third irrigation opening gives the direction of movement vice versa from the clock of the clock with the strength of the infusion jit which improves this peripheral phacoemulsification of the lens that turns in the direction of the clock .The cut for this technique is 2.2mm. It enters the right quadrant, the slope is oriented to the left. A spatula, a nucleus sustainer, or a quick cooper with a sharp tip is used to help turn. The spin and emulsification itself is carried out completely in the back chamber, which is far from the endothelium of the cornea. It is used 25% to 40% ultrasound ie Phaco Power, 400 mmHg Vakum, Ozil, 110 mm height and 40 ml aspiration rate. A high aspiration rate and high position of the infusion bottle 110 mm are used to keep the chamber and improve the lens movement. Eyefill DC was used from the visculoskeletal system.
- The results are monitored for 6 patients.
- The age of the patients is 50-60 years.
- The cataracts were gradus 1 and gradus 2
- Used Alcon Infiniti apparatus
- Pachymetry and counting were done endothelial cells of the cornea preoperatively and they were repeated the first post operative day and three months.

- The first post operative day we had a result which says that the pachymetric cornea is thickened 4-6%, and we had a loss of endothelial cells of 4%.
- The three-month period was sufficient for stabilizing the pachymetric results as well as for the ultimate loss. Of course you have to note that these are cataracts from gradus 1 and gradus 2, but it is certainly said that in these cataracts patients have relatively high expectations.

## 5. Conclusion

The use of this endocapsular carousel technique and the departure of phacoemulsification from the cornea endothelium minimizes thermal damage. Using this 0.7 mm fcc type allows small and light movements vis-a-vis the front chamber. Using the third orifice makes the capsule bag inflated, which makes the process of phacoemulsification more efficient and consequently increases the safety of the recipients .

## References

- [1] Kelman CD. Phaco-emulsification and aspiration; a new technique of cataract removal;a preliminary report. *Am J Ophthalmol.* 1967;64:23–35. [PubMed]
- [2] Maurice DM. A scanning slit optical microscope. [Accessed October 21, 2010];*Invest Ophthalmol.* 1974 13:1033–1037. Available at: <http://www.iovs.org/cgi/reprint/13/12/1033>. [PubMed]
- [3] Olson RJ, Mamalis N, Werner L, Apple DJ. Cataract treatment in the beginning of the 21st century. *Am J Ophthalmol.* 2003;136:146–154. [PubMed]
- [4] Cameron MD, Poyer JF, Aust SD. Identification of free radicals produced during phacoemulsification. *J Cataract Refract Surg.* 2001;27:463–470. [PubMed]
- [5] Hayashi K, Hayashi H, Nakao F, Hayashi F. Risk factors for corneal endothelial injury during phacoemulsification. *J Cataract Refract Surg.* 1996;22:1079–1084. [PubMed]
- [6] Walkow T, Anders N, Klebe S. Endothelial cell loss after phacoemulsification: relation to preoperative and intraoperative parameters. *J Cataract Refract Surg.* 2000;26:727–732. [PubMed]
- [7] Zetterström C, Laurell CG. Comparison of endothelial cell loss and phacoemulsification 8. Lundberg B, Jonsson M, Behndig A. Postoperative corneal swelling correlates strongly to corneal endothelial cell loss after phacoemulsification cataract surgery. *Am J Ophthalmol.* 2005;139:1035–1041.[PubMed]
- [8] Miyata K, Maruoka S, Nakahara M, Otani S, Nejima R, Samejima T, Amano S. Corneal endothelial cell protection during phacoemulsification; low- versus high-molecular-weight sodium hyaluronate. *J Cataract Refract Surg.* 2002;28:1557–1560. [PubMed]
- [9] O'Brien PD, Fitzpatrick P, Kilmartin DJ, Beatty S. Risk factors for endothelial cell loss after phacoemulsification surgery by a junior resident. *J Cataract Refract Surg.* 2004;30:839–843. [PubMed]
- [10] Richard J, Hoffart L, Chavane F, Ridings B, Conrath J. Corneal endothelial cell loss after cataract extraction by using ultrasound phacoemulsification versus a fluid-based system. *Cornea.* 2008;27:17–21.[PubMed]
- [11] American Academy of Ophthalmology. *Fundamentals and Principles of Ophthalmology, Section 2, 2008-2009.* San Francisco, CA: American Academy of Ophthalmology; 2008. Basic and Clinical Science Course.
- [12] Reneman RS, Arts T, Hoeks APG. Wall shear stress – an important determinant of endothelial cell function and structure – in the arterial system in vivo; discrepancies with theory. [Accessed October 21, 2010];*J Vasc Res.* 2006 43:251–269. Available at: <http://content.karger.com/ProdukteDB/produkte.asp?Aktion=ShowPDF&ArtikelNr=91648&Ausgabe=231661&ProduktNr=224160&filename=91648.pdf>. [PubMed]
- [13] Samijo SK, Willigers JM, Barkhuysen R, Kitslaar PJEHM, Reneman RS, Brands PJ, Hoeks APG. Wall shear stress in the human common carotid artery as function of age and gender. [Accessed October 21, 2010];*Cardiovasc Res.* 1998 39:515–522. Available at:<http://cardiovascres.oxfordjournals.org/content/39/2/515.full.pdf+html>. [PubMed]