

## Vacuum rhexis: a novel capsulorhexis technique for white cataracts

Cataract surgery has evolved in the past three decades from a mere vision restoring surgery to refractive surgery because of advances in the technique and availability of technology.

With availability of premium lenses, in the bag implantation of intra-ocular lens IOL has become mandatory. In the bag implantation with perfect refractive outcome can be achieved successfully only if we are able to perform precise capsulorhexis.

Performing a precise capsulorhexis consistently in all types of cataracts is an art based on science developed by Howard Gimbel and Thomas Neuhann in 1990. With this technique, a smooth circular opening with a strong capsular rim is created, which resists tearing even when stretched during removal of cataract or implantation of IOL.<sup>[1]</sup>

Performing a successful capsulorhexis in mature and intumescent cataract is always a challenge even for an experienced surgeon. For successful capsulorhexis in hyper-mature cataracts, we have to overcome four forces [Fig. 1]:

- 1) High intra-lenticular pressure
- 2) Forward thrust by vitreous
- 3) Centrifugal pull by zonules
- 4) Leakage of OVD from the anterior chamber.

Because of these forces, the edge of capsulorhexis tends to run away toward the periphery, increasing the risk of extension of rhexis to the posterior capsule and subsequent intra-operative complications.

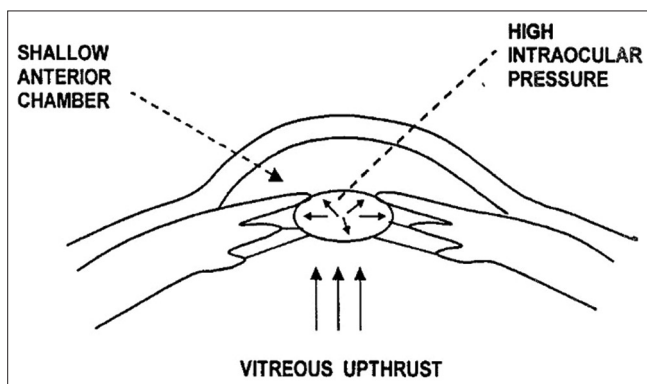
Capsulorhexis can be performed by various techniques. The most common method is use of 26 G needle cystitome alone or in combination with Utrata's forceps and micro-scissors.

Capsule holding micro-forceps can also be used for capsulorhexis through side ports. Femto laser-assisted capsulorhexis and Zepto precision pulse nanotechnology are

advanced technology-based procedures with limited access to everyone and with high cost. Laser shots directed at the anterior capsule get blocked because of sudden release of the milky fluid, leading to micro-adhesions and incomplete continuous curvilinear capsulorhexis (CCC) in femtosecond laser-assisted cataract surgery.

Laurence in 1995 described a technique in which a fine needle is used for capsulorhexis and a fine point of suction is applied to the torn flap of the anterior capsule. This technique offers excellent control of the tear and requires no viscoelastic to maintain the anterior chamber.<sup>[3]</sup> Bhattacharjee and others in 1999 have described a two-stage capsulorhexis in intumescent cataracts.<sup>[2]</sup> In the first step, there is decompression of the lens with frequent aspiration of the fluid using 26 to 30 G needles. In the second step, CCC is performed. Chan and others in 2003 have described a CCC technique in intumescent cataracts.<sup>[4]</sup> A sealed and stable anterior chamber, a water-tight needle tract, and ability to pressurize AC are keys for successful CCC in this technique. Kodavoor *et al.* have described a can vac technique.<sup>[5]</sup> 26G cystitome is used for creating a flap, and a 25 G flat tipped canula is used to hold the flap for creating capsulorhexis.

The technique described in this article is a type of vacuum capsulorhexis. Aspiration of liquified cortical material in white cataract must be easier because of use of 24 G needles as compared to 26 or 30 G because of wider lumen. Judicious use of a visco and avoiding overfilling of the anterior chamber are the key points as they allow egress of the intra-lenticular fluid, thereby reducing chances of extension of capsular tear to the periphery. Use of a 10 cc syringe can be a challenge for controlling suction force on the flap and maneuvering the capsular tear by shearing force. This technique can have challenges in the fibrosed or calcified anterior capsule. This technique is cost-effective as there is no need of any additional instrumentation. There is a learning curve, but once mastered, it can be of great help in performing capsulorhexis in white cataracts. For a better understanding and evolution of this technique, many surgeons should perform vacuum capsulorhexis in white cataracts.



**Figure 1:** Surgical Challenges in Capsulorhexis in White Cataract. Reproduced from Bhattacharjee K, Bhattacharjee H, Goswami BJ, Sarma P. Capsulorhexis in intumescent cataract. *J Cataract Refract Surg* 1999;25:1045-7

**Santosh Bhide**

Senior Consultant, Grant Medical Foundation, Ruby Hall Clinic, Pune and Bhide Clinic, Pune, Maharashtra, India

Correspondence to: Dr. Santosh Bhide, B 8 Malti Madhav Apt 819 Bhandarkar Road, Deccan Gymkhana, Pune, India. E-mail: bhidesantoshpune@gmail.com

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