

## Avoiding Complications with Femtosecond Cataract Surgery

H Burkhard Dick

Chairman, University Eye Hospital Bochum, Bochum, Germany

DOI: <http://doi.org/10.17925/USOR.2016.09.01.1a>

### Abstract

Many potential complications in laser cataract surgery (LCS) can be avoided by careful patient selection. Patients with kyphosis, restlessness, and massive obesity might profit from other cataract surgery options. Miosis, a problem obviously caused at least in part by the femtosecond laser, can be prevented by preoperatively applying nonsteroidal anti-inflammatory drug (NSAID) eye drops. Intumescent white cataracts should receive a miniature capsulotomy first. To detect capsular tags, a modified dimple-down technique is recommended.

### Keywords

Femtosecond laser, cataract surgery, complications

**Disclosure:** H Burkhard Dick has nothing to disclose in relation to this article. No funding was received in the publication of this article. This article is a short opinion piece and has not been submitted to external peer reviewers.

**Open Access:** This article is published under the Creative Commons Attribution Noncommercial License, which permits any noncommercial use, distribution, adaptation, and reproduction provided the original author(s) and source are given appropriate credit.

**Received:** December 1, 2015 **Published Online:** March 5, 2016 **Citation:** *US Ophthalmic Review*, 2016;9(1): Epub ahead of print

**Correspondence:** H Burkhard Dick, University Eye Hospital Bochum, Universitätsstraße 150, 44801 Bochum, Germany. E: burkhard.dick@kk-bochum.de

The femtosecond laser has propelled cataract surgery into a new age: with more precise capsulotomies, less need to expose the eye to ultrasound energy and a few other pearls.<sup>1</sup> But even when employing 21st century state-of-the-art technology to benefit our patients, the supreme rule from the first millennium B.C. holds as true as ever: *primum nil nocere*. Preventing any harm that might befall our patients is the *leitmotif* for a cataract surgeon, no matter whether he or she uses the phaco tip or the femtosecond laser.

The first step to avoid complications in laser cataract surgery (LCS), which might occur pre-, intra- and postoperatively is the proper selection of patients. LCS has rightfully been described as an all-comers approach because, patients a surgeon would conventionally shy away from operating upon, have profited from it, such as those with small pupils or those with intumescent white cataracts. But—as always in life—there are a few exceptions, even from the ‘all’ in ‘all-comers’. It can prove difficult to position somebody with severe kyphosis or adipositas permagna (monstrous obesity) in the confined space some current systems provide. The cataract surgeon should also be reluctant to employ LCS on somebody with tremor or restless legs syndrome—in these cases a conventional approach under general anesthesia may place everybody on the safe side.

Intraoperative miosis is among the least desirable occurrences during cataract surgery.<sup>2</sup> In LCS, the device itself rather than the patient can be the cause of small pupils. We have demonstrated that the laser applications, in particular laser capsulotomy, leads to the release of prostaglandins, which in turn induce miosis. The effect is time-dependent: the longer the patient has to wait after capsulotomy before the surgeon

removes the lens and implants the intraocular lens (IOL), the greater the chances for intraoperative miosis are. In our view this is another valid argument—besides issues of sterility—for performing femtosecond laser (pre-) treatment and lens extraction/IOL insertion in the same room.<sup>3</sup> If the patient is swiveled around on his or her treatment bed from under the laser platform to the adjoining position under the operating microscope, the prostaglandins released by capsulotomy hardly have the time to exert their effect on the *Musculus sphincter pupillae*.<sup>4</sup> There is, however, a proven pharmacologic prophylaxis: administering nonsteroidal anti-inflammatory drugs (NSAIDs), one eye drop three times on the day of surgery before initiating treatment reliably prevents miosis.<sup>5</sup> Of the last 500 eyes that received these drugs in our clinic, the number with miosis was a solid zero.<sup>6</sup>

While high-volume surgeons have gotten used to a work rhythm that sometimes seems to resemble Henry Ford's assembly line of endless Model Ts, the value of a golden tradition in sports cannot be stressed enough: the team time-out. LCS is a procedure highly dependent on precise data. Therefore, just sit back for a few seconds and review the charts and procedure settings—check one more time the corneal tomography, IOL calculation, the calculation and planned placement of the arcuate incisions and the lens density grade, which is crucial for choosing the appropriate grid size. Champs like the Black Hawks, the Rangers, the Capitals take a time-out before starting over with renewed determination—and so can you.

Capsulotomy tears are a nuisance but can be prevented in most cases by employing the laser platform's imaging system to your advantage. Optimize your laser energy as well as pulse settings and do not hesitate to start anew when problems arise: redock if the docking seems to be decentered;

rescan if eye movement occurs. If a hint of an incomplete capsulotomy can be detected, a second, larger capsulotomy can be performed, which currently may mean a second click fee depending on the laser platform company. If visualization of the capsulotomy is difficult after intense lens fragmentation, the dimple-down (or an adjusted) technique that has been described by us is an easy and efficient way to separate the free edge from the surrounding peripheral capsule and to confirm a continuous 360-degree free disk.<sup>7</sup> After careful filling of the anterior chamber with ophthalmic viscosurgical device (OVD) the disk can be taken out through the sideport using a microforceps for subsequent inspection for integrity.

Not a larger but rather a smaller capsulotomy is recommended to prevent complications in eyes with intumescent white cataract.

A laser so-called mini-capsulotomy of just 2 mm diameter or smaller has proved to be effective in preventing an uncontrolled tearing during the initial opening of the anterior capsule in these eyes in which usually an immense intracapsular pressure exists.<sup>8</sup> Subsequently the fluid milky lens material can be aspirated from the anterior chamber and a larger second capsulotomy is performed under controlled conditions after redocking.

The postoperative management of LCS patients does not differ from the care patients receive after conventional cataract surgery. While LCS is regarded by those who perform it as a further refinement of an already extremely successful medical procedure—cataract surgery—it should never be forgotten: LCS still is surgery. And the triumphs of surgery don't come by law of nature - they have to be earned. In every patient. ■

- 
1. Grewal DS, Schultz T, Basti S, Dick HB, Femtosecond laser-assisted cataract surgery-current status and future directions, *Surv Ophthalmol*, 2015; Epub ahead of print.
  2. Hashemi H, Seyedian MA, Mohammadpour M, Small pupil and cataract surgery, *Curr Opin Ophthalmol*, 2015;26:3-9.
  3. Dick HB, Gerste RD, Plea for femtosecond laser pre-treatment and cataract surgery in the same room, *J Cataract Refract Surg*, 2014;40:499-500.
  4. Schultz T, Joachim SC, Stellbogen M, Dick HB, Prostaglandin release during femtosecond laser-assisted cataract surgery: main inducer, *J Refract Surg*, 2015;31:78-81.
  5. Schultz T, Joachim JC, Szuler M, et al., NSAID pretreatment inhibits prostaglandin release in femtosecond laser-assisted cataract surgery, *J Refract Surg*, 2015; 31:791-4.
  6. Dick HB, Gerste RD, Schultz T, Laser cataract surgery: curse of the small pupil, *J Cataract Refract Surg*, 2013;29:662.
  7. Arbisser L, Dick HB, Schultz T, Central dimple-down maneuver for consistent continuous femtosecond laser capsulotomy, *J Cataract Refract Surg*, 2013;39:1796-7.
  8. Schultz T, Dick HB, Laser-assisted mini-capsulotomy: a new technique for intumescent white cataracts, *J Refract Surg*, 2014;30:742-5.