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Introducing VITOM® in Lacrimal Surgery

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Editorial

Endoscopic dacryocystorhinostomy is a well-proven surgical technique performed in patients affected by nasolacrimal duct obstruction [1]. Over the years, it established its significance as a comparable technique to external dacryocystorhinostomy in terms of controlling lacrimal sac infections (dacryocystitis), showing additional and better results in the post-operative control of the epiphora because of sparing Jones lacrimal pump [2]..

In our experience in the ENT department of Humanities Research Hospital in Rozzano (Milan), 420 adult patients underwent endoscopic dacryocystorhinostomy. Each patient was examined preoperatively by both an ophthalmologist and an ENT surgeon, on one side through the assessment of lacrimal punctae and medial canthal region (with irrigation), on the other by studying the anatomical abnormalities of the nasal cavity and nasal obstruction. To more clearly define the etiology of the condition, a CT scan with iodine contrast dye was conducted in most of patients for mapping nasolacrimal anatomy. Besides recurrent dacryocystitis, indications to endoscopic treatment were continuous epiphora despite probing/irrigation and epiphora with mucopurulent discharge. Once the obstruction was demonstrated at the level of lacrimal sac or duct, the patient was amenable to DCR. The collaboration between the ophthalmologist and the ENT surgeon has proved efficient during the entire diagnostic and therapeutic pathway [3].

The most demanding step we found in the time of the DCR procedure performed by the ophthalmologist was the intubation of the lacrimal way, in which the surgeon - who often is not wearing magnifying loops – is forced to move close to the patient's eye for an easier seeing of the lacrimal punctae. Moreover, the field might often be unproperly lit, making the intubation and the following ophthalmological steps require more visual efforts to the surgeon. The magnification and lighting of the eye area through the ENT endoscope does not prove to be sufficient.

We have recently introduced the use of a compact video microscope (VITOM® 2D/3D by Karl Storz, Endoscopy GmbH, Tuttlingen, Germany) in endoscopic dacryocystorhinostomy, which guarantees great optical magnification and precise anatomical detail in this type of surgery. It is a video system exoscope conjugating 4K resolution view and three-dimensional technology, displaying images on a flat screen with superb quality. The 2D/3D exoscope camera, provided with an enlarging power up to 8-30x and depth of field between 7 and 44 mm, is held by a supporting arm at a 20-50 cm operative distance over the surgical field; the endoscope is a very light (about 300 grams) and ergonomic 0° or 30° optic camera. Both produce full HD quality video.

VITOM technology is increasingly being used in several surgical specialties, carrying interesting initial outcomes [4-6].

In our DCR procedures, we applied the picture-in-picture (PiP) display view, therefore having a split screen with simultaneous picturing of both the outer ocular field and the nasal endoscopy. The ocular area was framed by the VITOM exoscope while endoscopy was performed with a 4K Karl Storz endoscope. Recordings of all procedures were taken thanks to VITOM's integrated control unit.

The advantages we observed in using the exoscope were, first, the excellent quality of surgical field visualization on the 4K display. We noticed an elevated image enlargement without the unnatural rounded-shaping deformation usually caused by endoscopes, as per the above-mentioned insufficient visualization of the eye area for the ophthalmologist procedures. Indeed, the magnification of the lacrimal punctae along with the PiP endoscopic visualization of the ethmoidal structures allowed a greater precision in the lacrimal intubation and a superior control of the probe direction, thereby lowering the risk of making false paths.

By virtue of this new video-telescopic approach to DCR, we also experienced a better understanding between ENT surgeon and ophthalmologist, as well as among surgeons, anesthesiologist, scrub nurse and assistant nurse, because each member of the operating team had the same *visual inputs* during the entire procedure.

Moreover, the VITOM system has an undeniable potential value in intraoperative teaching. Attending trainees thought that their visualization of the operations was significantly upgraded, thus increasing their understanding of the procedures and enhancing the teaching environment. In addition, thanks to high quality video documentation, it is possible to use footages for later teaching or for reviewing critical steps of the operations to prepare for future cases.

Finally yet importantly, we believe that leaving the *direct-vision* traditional surgery and lacrimal intubation towards an *indirect-vision* operating modality might be a worthy training for surgeons, especially for ophthalmologists, in this very case. It is known that practicing with different sensory inputs increases functional plasticity, which might eventually entail the surgeon's improvement of manual skills and acquirement of new visual capabilities and awareness. Although the initial time spent in training surgeons at using the indirect vision might be prolonged, we did not experience a longer average duration of surgeries, since the video magnification made lacrimal intubation easier thus less time-consuming.

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Overall, we confidently consider the VITOM exoscope as an excellent complementary tool to dacryocystorhinostomies, both for its valuable use in the procedure itself and its potential teaching usefulness.

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