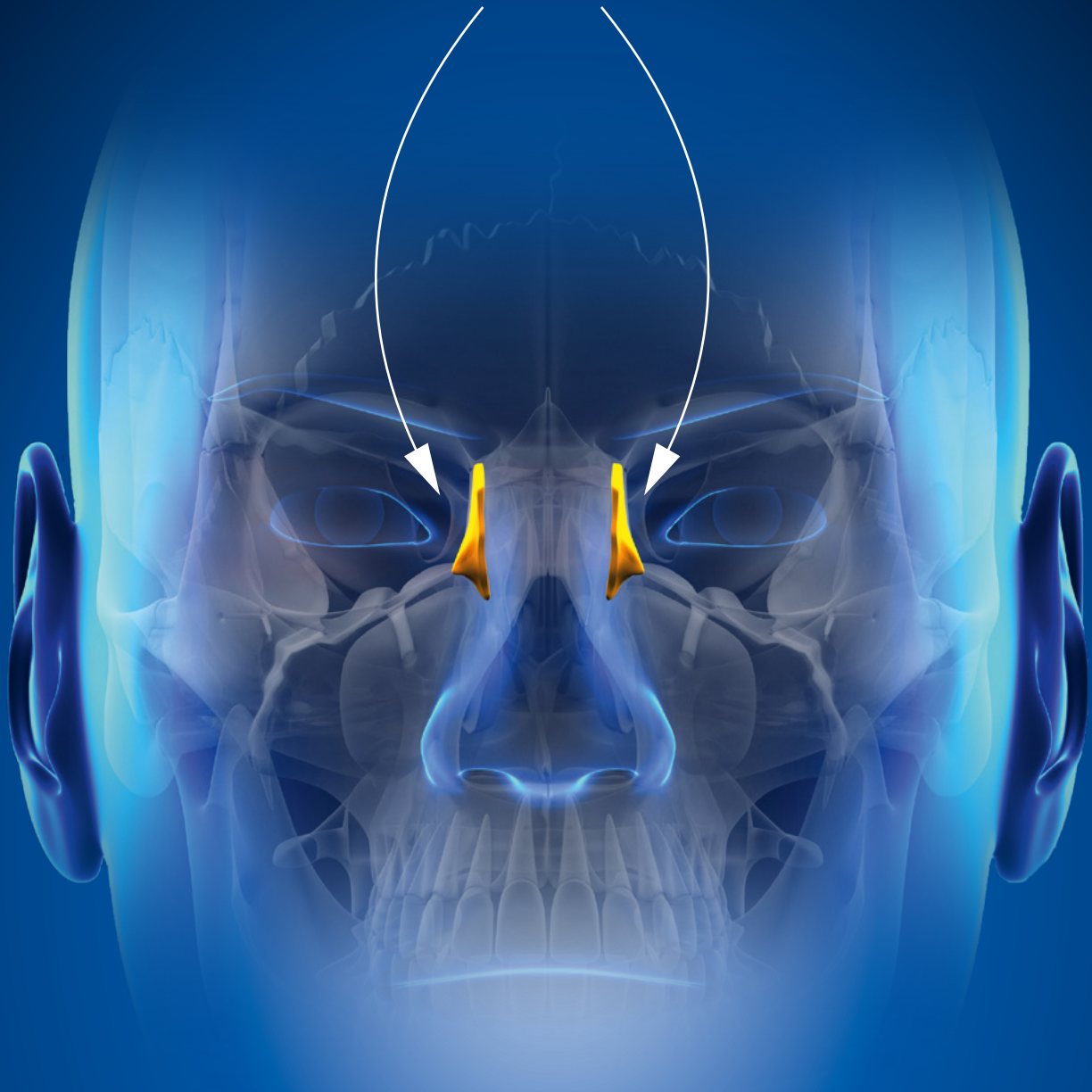




**LACRIMAL SURGERY**  
TCL-DCR TREATMENT

**A.R.C.**  
**LASER**  
MADE IN GERMANY ○ ● ● ●



# LITERATURE

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February 2015 – October 2021

## | A.R.C. Laser

We would like to keep you up to date with all the works published for transcanalicular laser assisted Dacryocystorhinostomy (**TCL-DCR**) over the last few years.

The following collection of publications lead to a better understanding of the use of diode laser in bypassing post-saccal blockage of the tear duct.

These valuable publications also highlight the unique benefits and capabilities of this minimally invasive treatment alternative to external DCR according Toti.

# ABSTRACTS

## FOX IN TCL-DCR

February 2015 - October 2021

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# ABSTRACTS

## TCL-DCR TREATMENT

### February 2015

K.R. Koch · H. Kühner · C. Cursiefen · L.M. Heindl

Department of Ophthalmology, University of Cologne

#### **Significance of Transcanalicular Laser Assisted Dacryocystorhinostomy in Modern Lacrimal Drainage Surgery**

Der Ophthalmologe 2 - 2015 · 112:122–126

DOI 10.1007/s00347-014-3179-9

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<https://doi.org/10.1007/s00347-014-3179-9>

#### **Abstract**

For the treatment of postsaccal lacrimal drainage obstructions transcanalicular laser dacryocystorhinostomy (TCL-DCR) represents a less invasive alternative to external Toti procedures. Herein, a diode laser optical fiber is inserted into the lacrimal sac via the canaliculi. Under visual control with a nasal endoscope laser energy is applied until a patent osteotomy between the sac and nasal mucosa has been created. Published success rates of 70–90% get close to the excellent results of Toti procedures. Besides describing therapy planning and surgical technique, pros and cons of TCL-DCR are discussed.

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### February 2016

K.R. Koch, C. Cursiefen, L. M. Heindl

Department of Ophthalmology, University of Cologne

#### **Transcanalicular Laser Dacryocystorhinostomy: One-Year-Experience in the Treatment of Acquired Nasolacrimal Duct Obstructions**

Klinisches Monatsblatt Augenheilkunde 2016; 233: 182–186

© Georg Thieme Verlag KG Stuttgart · New York · ISSN 0023-2165, Online-published 26.11.2015

<http://dx.doi.org/10.1055/s-0041-106653>

#### **Abstract**

**Background:** External dacryocystorhinostomy (DCR) is at present the gold standard for the surgical treatment of acquired nasolacrimal duct obstructions, but tremendous progress has been made in recent years in improving minimally invasive techniques, sparing not only the skin, but also the medial lid structures, which contribute to the physiological palpebral-canalicular pump mechanism. The purpose of this study is to report our 1-year experience with the surgical technique, complications and results of transcanalicular laser assisted DCR.

**Patients and Methods:** 48 consecutive transcanalicular laser-assisted DCRs combined with bicanalicular silicone intubation were performed for acquired nasolacrimal duct obstruction, and evaluated for intra- and postoperative complications, as well as subjective and objective success rates.

**Results:** Transcanalicular laser-assisted DCR combined with bicanalicular silicone intubation was surgically feasible in 45 cases (94%). In 3 patients (6%) it was impossible to position the aiming beam correctly at the anteroinferior rim of the middle turbinate using the superior canalicular approach, due to superior orbital rim prominence. Therefore 2 patients received no silicone intubation, despite a patent osteotomy at the back of the middle turbinate, and 1 patient underwent intraoperative conversion to external DCR due to anatomical narrowness of the nasal cavity. Perioperatively, 1 patient developed canalicular infection, 1 patient exhibited thermal injury to the canaliculus, and 4 patients exhibited premature prolapse of the silicone tube. At 6-months follow-up, functional success – defined as resolution of preoperative symptoms – was achieved in 35 of 45 surgically successful transcanalicular laser-assisted DCRs (78%). Of the 10 postoperative failures (22%), all patients reported epiphora, 6 patients were unable to irrigate the lacrimal drain age system, and 6 patients required surgical revision using external DCR.

**Conclusions:** Transcanalicular laser assisted DCR is a promising minimally invasive approach for the surgical treatment of acquired nasolacrimal duct obstruction, in order to fill the gap between recanalizing first step procedures and external DCR.

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# ABSTRACTS

## TCL-DCR TREATMENT

### May 2017

K. R. Koch, C. Cursiefen, L. M. Heindl

Department of Ophthalmology, University of Cologne

#### Minimally Invasive Bypass Surgery for Nasolacrimal Duct Obstruction. Transcanalicular Laser-Assisted Dacryocystorhinostomy

Der Ophthalmologe 2017 · 114:416–423

DOI 10.1007/s00347-017-0466-2

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<https://doi.org/10.1007/s00347-017-0466-2>

#### Abstract

**Background:** In recent years, the minimally invasive surgical procedure of transcanalicular laser-assisted dacryocystorhinostomy (TKLDCR) has gained importance in the treatment of primary acquired nasolacrimal duct obstructions (PANDO).

**Objectives:** Surgical indications, functional success rates, potential advantages, and complications of TKL-DCR are presented and compared with the standard procedures external (EXT-DCR) and endonasal DCR (ENDCR).

**Methods:** The study comprises a PubMed literature review and our own clinical results.

**Results:** Using TKL-DCR either as the primary surgical treatment for PANDO, or as a secondary procedure following failure (reobstruction of the surgical ostium) of previous EXT-DCR resulted in good functional success rates (60–90%). The duration of surgery (10–15 min) and the period of recovery are significantly shorter than in EXT-DCR. Visible cutaneous scars and significant postoperative nose bleeding are not among the complications of TKL-DCR, due to the lack of a skin incision and the coagulative ability of the diode laser. The smaller sized surgical ostium has been considered the main disadvantage of TKL-DCR, since it might be prone to earlier reobstruction. On the other hand, TKL-DCR spares the anatomical structures that form the physiological tear pump, which should favor tear drainage. In very few cases, thermal damage to the canaliculus has been observed as a complication

**Conclusions:** Given the satisfying functional results, TKL-DCR is a valid alternative to the “gold standard” procedure EXT-DCR, especially in patients who particularly request speedy recovery and who do not want to take the risk of visible skin scarring. Future studies will have to investigate whether the smaller surgical ostia of TKL-DCR remain patent and whether functional success rates decrease during a longer follow-up period of >2 years.

### October 2017

Joel M. Mor, Yongwei Guo, Konrad R. Koch, Ludwig M. Heindl

Department of Ophthalmology, University of Cologne

#### Transcanalicular Laser Dacryocystorhinostomy: One-Year-Experience in the Treatment of Acquired Nasolacrimal Duct Obstructions

Journal of Visualized Experiments

DOI: 10.3791/55981

Published: 10/13/2017

<https://www.jove.com/video/55981>

#### Abstract

Today's gold standard in the treatment of infrasaccal primary acquired nasolacrimal duct obstruction (PANDO) is external dacryocystorhinostomy (DCR), a relatively invasive procedure that can be performed after failure of recanalizing treatments. However, with progress in the field of diode laser technology, new approaches have emerged. Laser-assisted transcanalicular DCR with subsequent bicanalicular silicon intubation is a new option showing great promise as a viable minimally invasive procedure. Under permanent endoscopic visual control from the nasal cavity, a diode laser fiber is inserted into the lacrimal sac and laser energy is applied to create a bony ostium between the lacrimal sac and the nasal cavity. Since no skin incision needs to be made, advantages of this method comprise the sparing of the skin as well as the medial palpebral structures and the physiological palpebral-canalicular pump mechanism. The duration of surgery as well as reconvalescence is generally shorter than with external DCR. Complications include silicon tube prolapse, mild swelling and, rarely, canalicular infection and thermal injury. One-year functional success rates, defined as complete resolution of symptoms and ostium patency, are high, yet still range behind those of external DCR. However, secondary external DCR after failure of laser-assisted DCR can be performed without difficulty. Thus, laser-assisted transcanalicular DCR is a valid option that should be considered as a second-step procedure after failure of recanalization procedures and before external DCR.

# ABSTRACTS

## TCL-DCR TREATMENT

### November 2018

Joel M. Mor, Mario Matthaei, Holger Schruppf, Konrad R. Koch, Edwin Bölke and Ludwig M. Heindl

Department of Ophthalmology, University of Cologne

### Transcanalicular Laser Dacryocystorhinostomy for Acquired Nasolacrimal Duct Obstruction: An Audit of 104 Patients

European Journal of Medical Research (2018) 23:58

<https://doi.org/10.1186/s40001-018-0355-4>

#### Abstract

**Purpose:** External dacryocystorhinostomy (DCR) is considered as the gold standard in the treatment of acquired nasolacrimal duct obstruction. However, many advances have been made towards the development of modern minimally invasive therapies. These new techniques were proven less harmful to the patients' skin and medial palpebral structures with their palpebral-canalicular pump mechanism. Options include endonasal and transcanalicular procedures. Here, we report on our 2-year experience with the surgical technique, results and complications of transcanalicular laser-assisted DCR.

**Methods:** This is a retrospective study. A total of 104 patients with acquired nasolacrimal duct obstruction underwent transcanalicular laser-assisted DCR combined with bicanalicular silicon intubation. We then analyzed intra-/ post-operative complications and subjective and objective success rates. The institutional ethics committee ruled that approval was not necessary. The trial was registered with the German Clinical Trials Register (DRKS00012879).

**Results:** Transcanalicular laser-assisted DCR in combination with bicanalicular silicon intubation could be performed surgically successfully in 101 patients (97%). In three cases (3%) using the superior canalicular approach, positioning of the laser instrument at the anteroinferior rim of the middle turbinate failed. Complications included thermal injury to the canaliculus (one), canalicular infection (two) and silicon tube prolapse (ten). Functional success (resolution of preoperative symptoms) was achieved in 80 cases (77%), functional failure occurred in 24 cases with all patients reporting persisting epiphora, 15 reporting failure to irrigate the nasolacrimal duct and 15 requiring secondary external DCR.

**Conclusions:** Laser-assisted DCR shows promising results with few complications. It seems well suited as a secondstep procedure after failed recanalization and before external DCR.

### October 2021

Christophe Pinto <sup>1</sup>, Tatiana Queirósa <sup>2</sup>, and Carla Ferreira <sup>1</sup>

<sup>1</sup> Department of Ophthalmology, Hospital De Braga, Braga, Portugal;

<sup>2</sup> Department of Ophthalmology, Centro Hospitalar E Universitário De Coimbra, Coimbra, Portugal

### Transcanalicular Diode Laser-Assisted Dacryocystorhinostomy – Success Rates and Related Factors During 3 Years of Follow-Up

Seminars in Ophthalmology

DOI: 10.1080/08820538.2021.1890785

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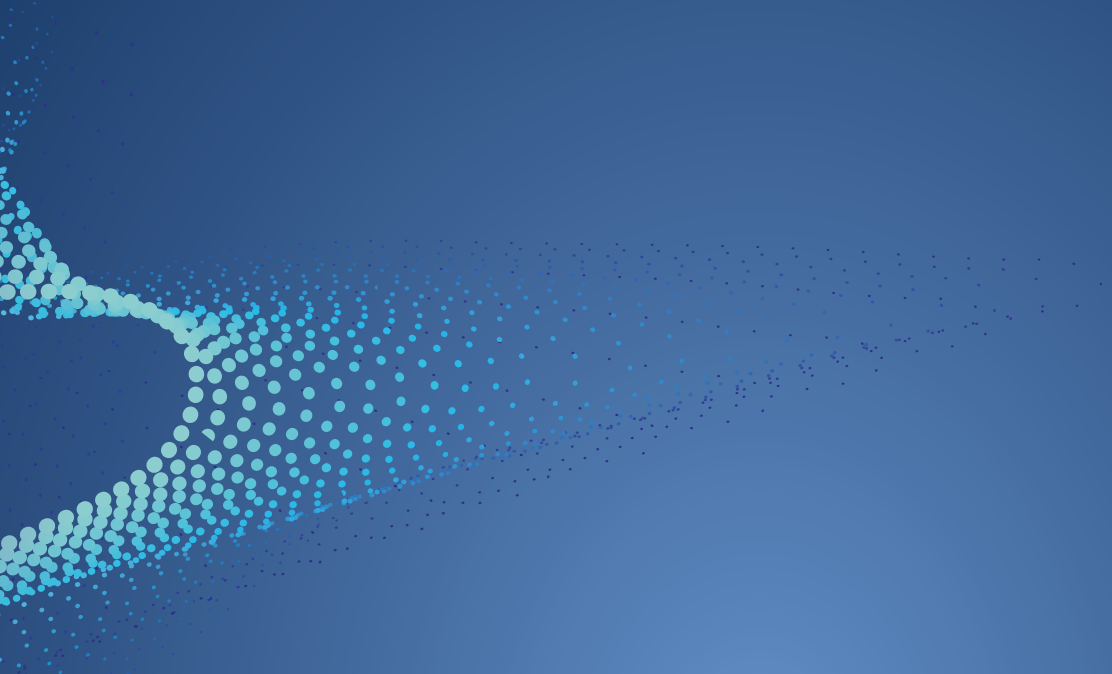
#### Abstract

**Purpose:** To evaluate the success rates of transcanalicular diode laser-assisted dacryocystorhinostomy (TCL-DCR) during 3 years of follow-up and to find clinical factors that influence surgical outcomes.

**Methods:** Major outcomes were the anatomical success defined as a patent neo-ostium tested by irrigation and the functional success defined as a patent osteotomy with the absence of epiphora, accessed at 6-month, 1, 2, and 3-year follow-up visits. To determine which factors influence success rates, patients were divided according to gender, age, previous lacrimal surgeries, nasosinus anatomy, energy employed, treatment with topical prostaglandin analogs, and timing of extubation.

**Results:** A total of 134 eyes were included. 55.2% of patients underwent peribulbar block. The surgical mean duration was 30.6 min. We obtained anatomical and functional success rates of 80.0% and 70.8% at 6 months; 69.3% and 61.4% at 1 year; 64.2% and 58.0% at 2 years; 56.4% and 46.2% at 3 years, respectively. Functional success was significantly higher in younger patients ( $p = .008$ ). Bicanalicular intubation for 2 months improved anatomical and functional success rates ( $p = .028$  and  $p = .001$ , respectively). No other factors showed a significant impact. 85.8% of patients didn't experience any complications. Palpebral swelling was the most frequent complication.

**Conclusions:** TCL-DCR is a minimally invasive, repeatable, and safe alternative to treat nasolacrimal duct obstructions. We found success rates comparable to literature and stated that younger patients and those intubated for 2 months show better results.



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**A.R.C. Laser GmbH**  
Bessemerstr. 14  
90411 Nürnberg

**Telefon:** +49(0) 911-21779-0  
**Telefax:** +49(0) 911-21779-99  
**E-Mail:** [info@arclaser.de](mailto:info@arclaser.de)

