# Lacrimal Sac Compression, Not Massage

**To the Editors:**

Congenital nasolacrimal duct (NLD) obstruction is a common problem encountered in pediatrician offices and is one of the common reasons for referral to ophthalmologists. Symptoms include tearing and mucous or purulent matting of the eyelids and eyelashes. These can be irritating to the infant and alarming to the caregiver, and can lead to acute or chronic dacryocystitis. The duct of the lacrimal excretory system (Figure) is the last to canalize in development and can remain closed in up to 50% of infants at birth. The valve of Hasner is the fold of membranous mucosa at the distal end of the NLD, which drains into an ostium under the inferior turbinate in the nasal cavity. In most infants, the membrane spontaneously opens within several weeks of birth, before the onset of lacrimation. Of the remaining patients, symptoms resolve by 1 year of age in up to 90%. Conservative management includes the Crigler hydrostatic massage[1] to encourage patency of the NLD.

We find that parents and caregivers may not perform the "massage" correctly and are often frustrated with its lack of efficacy. They often report that they were instructed by primary healthcare professionals to repeatedly massage the area of the tear ducts in a circular motion or downward sweeping motion along the side of the nose, without attention to finger placement or technique.

We illustrate what we believe to be an effective method of NLD massage, which is more a motion of firm compression than gentle stroking. In a randomized prospective trial comparing different massage techniques, the "hydrostatic massage" group showed statistically significant improvement in resolution rates of NLD obstruction when compared to the "gentle massage" and control groups.[2] The goal of the maneuver is to occlude and compress the lacrimal sac to transmit the increased hydraulic pressure to the valve of Hasner.

The infant faces the caregiver. The contralateral palm is used to support the head while the compression is performed. The pad of the tip of the index finger with trimmed fingernail is placed over the area of the lacrimal sac; this would also occlude the lacrimal puncta and prevents backflow of the contents of the lacrimal sac. The sac and surrounding lacrimal fossa and bone should be felt with the light initial touch; no pressure should be placed on the globe itself.

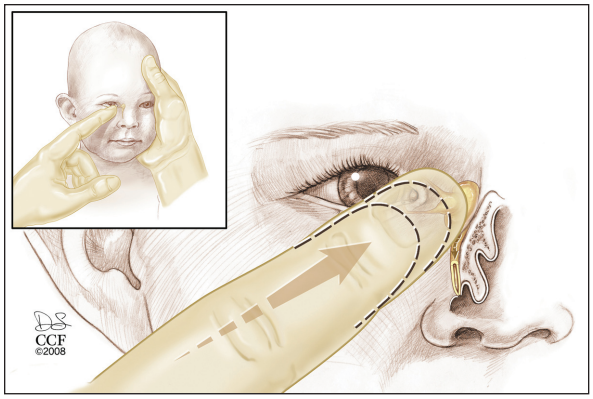


**Figure.** The infant faces the caregiver (insert). Note discharge from the right eye. The anatomy of the lacrimal system is shown with puncta, canaliculi, lacrimal sac, and valve of Hasner opening under the inferior turbinate. Proper support of the head (insert) and direct compression of the lacrimal sac toward the base of the nose and away from the eye using the tip of the index finger is performed. The obstruction at the distal end of the nasolacrimal duct is overcome and the mucus and fluid gushes into the nose. (Reprinted with permission from The Cleveland Clinic Foundation.)

The area over the lacrimal sac is firmly and relatively briskly compressed while the infant's head is supported on the opposite side (Figure). The purpose is to compress the distended lacrimal sac without reflux of material through the puncta and to directly transmit the pressure downward through the NLD to mechanically overcome the obstruction at the valve of Hasner area. If successful, a "pop" may be heard or a "giving way" of resistance may be felt.

We believe that this technique is effective in cases in which the obstruction is at the distal end of the NLD and can prevent unnecessary prolongation of symptoms, unnecessary visits to the ophthalmologist, and possibly unnecessary probings under anesthesia.

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**Ying Qian, MD**
**Elias I. Traboulsi, MD**
Cole Eye Institute
Cleveland Clinic Foundation
Cleveland, Ohio

# Frequent ROP Associated With Hypoxic Protocol

**To the Editors:**

Chow et al.[1] suggested a protective effect on retinopathy of prematurity (ROP) by careful control of neonatal oxygen saturation similar to in utero conditions. Others have not been able to achieve the same success.[2] At approximately the same time, modifications in the definition of threshold ROP were published.[3] The Alaska neonatal intensive care unit (NICU) has a high proportion of high-risk race (Alaska native and Asian) infants.[4] We wondered if our initial implementation of a reduced oxygen saturation policy would lead to reduced rates of new threshold ROP.

With Institutional Review Board approval from Providence Hospital, we have retrospectively monitored outcomes of ROP in Alaska since September 1989. In October 2004, we implemented two important changes: reduced goal oxygen saturations from very low birth weight infants and a transition from the 1989 ICROP definition of threshold ROP to recent ROP threshold guidelines—specifically stage 2, zone 2 with plus disease and advanced posterior ROP.[3]

The reduced oxygen levels were monitored transcutaneously with the goal of 88% to 92% with the Masimo monitor system (Masimo Corporation, Irvine, CA). NICU staff were given an inservice presentation on the use of Masimo oxygen saturation monitoring and urged to keep their patients within goal range. The staffing level for these infants was 1 to 3 infants per nurse with one neonatal respiratory therapist per 8 to 15 patients. We monitored patients' gender, birthweight, gestational age, maternal-stated race, and the most severe level of ROP reached.

The cumulative trend of infants reaching threshold ROP versus date is shown in the figure. The interval between threshold treatments was less for the 35 patients who received less oxygen (27 ± 8 days; standard error of the mean) versus the 107 patients before oxygen reductions (52 ± 5 days; analysis of variance, $F = 6.6$, $P = .01$). Since we began reduced oxygen saturation, 5 infants have been referred for ROP worse than stage 3; before reduced oxygen saturation, only 10 patients progressed to ROP worse than stage 3.

Simple adoption of reduced oxygen saturation goals combined with new ROP threshold guidelines did not result in a reduced frequency of threshold ROP in the level 3 NICU in one high-risk state. Strict adherence and close staff monitoring may be required to achieve reductions in ROP severity. We urge careful evaluation of staff adherence and oxygen saturation goals. We hope that protocols and staff education, and feedback oximeter–ventilator mixer technology, will allow better adherence with guideline ranges and that we can reduce the prevalence of threshold ROP.[5]

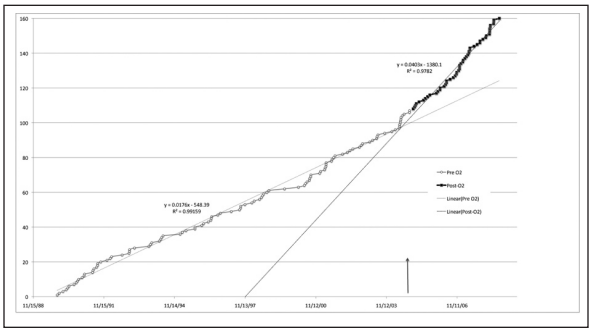


**Figure.** Cumulative trend of Alaska neonates reaching threshold retinopathy of prematurity (ROP). In October 2004, two changes were implemented: very low birth weight infants had goal oxygen saturation monitored transcutaneously by the Masimo system (Masimo Corporation, Irvine, CA) between 88% and 92%, and the definition of ROP threshold was liberalized to include stage 2, zone 2 with plus disease and advanced posterior ROP.

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**Lucas Pratt**[1]
**Robert W. Arnold, MD**[1]
**Jack Jacob, MD**[2]
Ophthalmic Associates[1]
and
Alaska Neonatology Associates[2]
Anchorage, Alaska


*Drs. Arnold and Jacob are board members of Glacier Medical Software, which develops ROP monitoring software.*

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