Resolution of Dacryostenosis After Osteopathic Manipulative Treatment

Theresa E. Apoznanski, OMS III; Reem Abu-Sbaih, DO; Michael J. Terzella, DO; and Sheldon Yao, DO

Dacryostenosis is an obstruction of the nasolacrimal duct and is the most common cause of epiphora and ocular discharge in newborns. Whereas most cases resolve spontaneously, invasive treatment may become necessary if symptoms persist past age 6 to 12 months. In the present case, a 9-month-old boy with persistent dacryostenosis was scheduled for lacrimal duct probing after first-line treatments failed. After a single session of osteopathic manipulative treatment, the patient’s epiphora and other symptoms resolved, and he no longer needed surgical probing. A review of the literature highlights key pathophysiologic processes, management options, and musculoskeletal aspects of dacryostenosis. Physicians should consider osteopathic manipulative treatment in the management of dacryostenosis.

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Report of Case

A 9-month-old boy was brought to the health care clinic by his mother, who reported increased tearing and crusting around the boy’s right eye upon waking. The patient had a history of dacyrystositis since birth, as diagnosed by his pediatrician and ophthalmologist. The mother had been performing nasolacrimal massage on the patient twice per day as symptoms occurred since the patient’s birth. At the time of the visit, the patient was on day 5 of polymyxin B sulfate-trimethoprim ophthalmic solution (10,000 U-1 mg/mL) and bacitracin ophthalmic ointment (500 U/g). The mother reported that the antibiotics would alleviate the patient’s symptoms temporarily, but that his symptoms would reappear within a few weeks after stopping antibiotics. Because of the recurrent symptoms, the patient was scheduled for nasolacrimal probing.

The patient had no notable medical or family history. He was born at 38 weeks gestation to a primigravid mother by cesarean delivery for failure to progress. He had no known drug or seasonal allergies. His ophthalmologist reported no additional vision or ocular problems. No pets were in the patient’s home and neither parent smoked cigarettes or used drugs.

Physical examination revealed that vital signs were within reference range. The patient was meeting all developmental milestones appropriately. Examination of the head was notable for increased tearing of the right eye without pus or blood. The right orbit appeared smaller compared with the left orbit because of increased edema of the soft tissue surrounding the eye (Figure 1A). The remainder of the physical examination findings were unremarkable.

Osteopathic structural examination findings included internal rotation somatic dysfunction of the right nasal bone, right frontal bone, and right maxillary bone; bilateral condylar compression; right scalene spasm; spinal levels C2 through C3 flexed, rotated, and sidebent right; spinal level C5 extended, rotated, and sidebent left; right first rib inhalation dysfunction; and spinal level T1 flexed, rotated, and sidebent right. The patient was treated with OMT techniques including nasion spread, cranial bone lifts such as frontal lift and maxillary lift, balanced ligamentous tension of the cervical and upper thoracic regions, bilateral condylar decompression, and myofascial release of the cervical spine and thoracic inlet.

Immediately after treatment, edema around the patient’s right eye decreased. During 3 follow-up telephone calls, the patient’s mother reported the following: At 1 week after treatment, epiphora and ocular discharge had decreased. At 3 weeks after treatment, epiphora had resolved, ocular discharge was present, and the edema around the right eye had decreased (Figure 1B). At 6 months after treatment, no symptoms were present. Surgical nasolacrimal probing or nasolacrimal massage were no longer required, and the patient had not needed antibiotics since receiving OMT.

Discussion

Physiologic and Pathologic Process

The NLD originates at the nasolacrimal fossa in the medial wall of the orbit. The nasolacrimal fossa comprises the lacrimal bone posteriorly and the frontal process of the maxilla anteriorly. Canalization begins during the third month in utero and starts superiorly at the punctum and ends distally at the Hasner valve, which covers the opening to the inferior meatus of the nasal cavity (Figure 2). When tears enter the puncta, a combination of orbicularis oculi muscle contraction, fascial traction, and negative pressure creates a pumping action to force tears farther into the NLD.

The most common cause of dacyrystositis is an unopened membrane at the Hasner valve (Figure 2). Other causes include interosseous narrowing from dysfunctions of the adjacent frontal, maxilla, and ethmoid bones. Intraosseous compression may also occur within the lacrimal bone, because the bones of an infant are soft and easily molded by surrounding stressors.
The lacrimal sac. It may also help to rupture the unopened Hasner valve. If symptoms persist after the patient is aged 6 to 12 months, NLD probing may be necessary. If probing fails, balloon dilation or temporary silicone stents may be used. In rare cases, permanent measures are available, such as the construction of a window between the lacrimal sac and nasal cavity.

### Osteopathic Approach and Considerations

To understand the role of OMT in alleviating stenosis, one must be familiar with the anatomy of the NLD and its surrounding bones, muscles, and fasciae. Structurally, the osseous canal through which the NLD traverses can narrow if the frontal process of the maxilla is driven posteriorly or if the lacrimal bone is driven anteriorly. One objective of a cranial bone lift is to manage dysfunctions of the associated bones in relation to their sutural or dural connections. In cases of dacryostenosis, cranial bone lifts can be used to manage the stresses placed on the lacrimal bone by the surrounding maxillary, frontal, and ethmoid bones. The canal may become more patent and drain more easily if the bony articulations are decompressed.

Orbital muscles also play a role in dacryostenosis. The orbicularis oculi muscle originates at the lacrimal bone and inserts into the zygomatic bone. A small portion, known as the Horner muscle, runs posteriorly to the lacrimal sac and posterior lacrimal crest (Figure 2). The Horner muscle is responsible for proper NLD function and contracts to pump tears through the canal. Another portion of the orbicularis oculi muscle surrounds the ampulla and tightens to prevent retrograde movement of tears. In our case, cranial bone lifts at the bony origins and insertions of the orbicularis oculi muscle addressed muscular restrictions with the goals of improving muscle function and increasing the efficacy of the pumping mechanism of tear drainage.

Osteopathic manipulative treatment may have a role in normalizing autonomic tone of the orbit. Somatic dysfunctions along the pathways of cranial nerves and
The innervations of the orbicularis oculi muscle and lacrimal gland take a rather tortuous course through the cranium. Cranial bone lifts and myofascial techniques to restricted areas may improve autonomic balance, and direct inhibition of the pterygopalatine ganglion may affect lacrimation.

Addressing the myofascial strains that create bony restrictions may augment lymph drainage by activating lymphatic stretch reflexes and normalizing sympathetic effects on the contractile elements of lymphatic vessels. Even indirect techniques, such as cranial bone lifts, alter the pressure on smaller lymphatic vessels. In our case,
the management of cervical and thoracic somatic dysfunctions potentially addressed restrictions that were preventing proper lymphatic drainage from the head and neck, which may have facilitated the subsequent decrease in periorbital edema. Orbital lymphatic vessels first drain into the preauricular, parotid, and submandibular nodes and then drain into the right thoracic duct. By understanding the anatomy of the venous and lymphatic systems surrounding the NLD, physicians can better orient their application of OMT.

Conclusion

As demonstrated in the present case, OMT may decrease the need for antibiotics and invasive procedures in patients with persistent dacryostenosis. Additional research is needed to support these findings and to evaluate the role of OMT as a potential conservative first-line treatment for these patients.

References


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