

## Dacryostenosis: Clinical Evaluation, Surgical Management and Long-Term Outcomes in a Prospective Cohort

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### ABSTRACT

Dacryostenosis, a chronic ophthalmologic condition characterized by partial or total obstruction of the lacrimal drainage system, has been the subject of in-depth scrutiny in the medical literature. This article aims to comprehensively investigate dacryostenosis from a clinical and surgical perspective, providing a comprehensive analysis of its etiology, clinical manifestations, and available treatment options.

Through a critical review of the current literature and presentation of data from a prospective cohort of patients, we explore state-of-the-art diagnostic modalities, such as magnetic resonance dacryocystography and optical coherence tomography, which have revolutionized the evaluation of dacryostenosis.

Regarding surgical management, traditional techniques, such as dacryocystorhinostomy, are discussed, together with the latest innovations, such as endoscopic dacryoplasty and intranasal balloon dilatation. A detailed comparison of the advantages and disadvantages of these techniques is presented, along with their success rates and associated complications.

Finally, long-term outcomes are examined, including improvement in patients' quality of life, symptom reduction, and durability of surgical interventions. This article provides a comprehensive view of dacryostenosis, highlighting the importance of a multidisciplinary approach to its management and the pivotal role of surgery in restoring tear function and ocular well-being.

**KEYWORDS:** Dacryostenosis, ophthalmologic, obstruction, drainage.

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### INTRODUCTION

Dacryostenosis, a pathologic entity involving partial or complete obstruction of the drainage pathway of the lacrimal system, is an ophthalmologic problem of significant consideration in contemporary clinical practice. This condition is characterized by a diversity of clinical manifestations that can result in a significant alteration of patients' quality of life, due to compromised tear production, drainage and distribution, and its incidence is increasing in line with the longevity of the population and the increase in life expectancy. 1

Dacryostenosis is caused by a complex interaction of etiologic factors including congenital anomalies, inflammatory processes, chronic infections, trauma and degenerative changes in the anatomy and function of the

lacrimal ducts. This, in turn, results in a diverse range of symptoms, from intermittent epiphora to recurrent infections of the lacrimal apparatus, and can have an adverse impact on vision and overall ocular health. 1

Within the clinical context, the diagnosis and management of dacryostenosis have evolved considerably in recent years, thanks to the introduction of advanced diagnostic techniques such as magnetic resonance dacryocystography and optical coherence tomography. Similarly, surgical treatment options have undergone a revolution with the incorporation of endoscopic procedures and intranasal balloon dilatation, which have broadened the spectrum of therapeutic options and improved the prospects for success. 1,2

In this context, this article aims to provide a comprehensive and updated review of dacryostenosis, addressing its

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etiological, clinical, diagnostic and therapeutic aspects. In addition, the relevance of a multidisciplinary approach in the treatment of this pathology will be highlighted, in order to achieve maximum efficacy and quality of life for affected patients. Therefore, it is hoped that this analysis will contribute to the understanding and more effective management of this challenging clinical entity in contemporary medical practice. 2

### **EPIDEMIOLOGY**

Dacryostenosis, a pathology involving obstruction of the lacrimal drainage system, has significant medical relevance due to its ability to generate a diverse spectrum of ophthalmic symptoms and affect patients' quality of life. This clinical entity, although sometimes underestimated in terms of its overall impact, is associated with manifestations that include epiphora (excess tearing), recurrent infections of the lacrimal apparatus, chronic ocular irritation and, in severe and prolonged cases, even the possibility of keratitis and visual impairment.2

From an epidemiological perspective, dacryostenosis cannot be overlooked, as its prevalence and disease burden are constantly increasing, partly due to demographic aging and increased life expectancy in the population. It is estimated to affect a considerable percentage of the population, with a distribution that varies according to geography and specific population characteristics. Furthermore, dacryostenosis can occur in all ages, from newborns with congenital dacryostenosis to older adults with acquired dacryostenosis. 2,3

The epidemiology of this clinical entity has been enriched by the recognition of multiple potential risk factors, including genetic background, environmental exposures, anatomic predispositions and traumatic events. Dacryostenosis, therefore, is not only a prevalent condition but also multifaceted in its etiology, which further underscores its clinical and epidemiological relevance. 3

It becomes essential to address dacryostenosis from a comprehensive approach, including early and accurate identification of cases, assessment of individual risk factors and selection of optimal treatment strategies. Furthermore, given its prevalence and the impact it can have on ocular health and quality of life, continued research in terms of epidemiology and innovative therapies is warranted, with the aim of improving the management of this pathology and reducing its burden on the affected population.3

### **CLINIC**

Dacryostenosis, an ophthalmologic entity characterized by partial or complete obstruction of the lacrimal drainage system, manifests a complex and varied symptomatology that reflects disruptions in the physiologic balance of the lacrimal apparatus and its ability to maintain ocular homeostasis. The clinical manifestations of dacryostenosis encompass a broad spectrum of manifestations, the presentation and severity of

which can vary substantially depending on the etiology, location and extent of the obstruction, as well as the presence of comorbidities or additional contributing factors. The main clinical manifestations of dacryostenosis are described in detail below:

**Epiphora:** Epiphora, or excessive tearing, represents the cardinal symptom of dacryostenosis. It occurs due to the accumulation of undrained tears on the ocular surface as a result of lacrimal obstruction, which can result in an uncomfortable cosmetic effect and constant irritation of the periorbital skin. 4,5

**Recurrent Infections:** Tear stasis in the lacrimal sac and clogged ducts can promote bacterial proliferation, predisposing the patient to chronic infections of the lacrimal apparatus and eyelids, such as dacryocystitis and blepharitis, which can manifest with painful symptoms, erythema and localized edema. 5

**Ocular Irritation and Foreign Body Sensation:** The accumulation of undrained tears can lead to a burning sensation, itching and ocular discomfort, along with the perception of a foreign body in the eye, which can negatively impact the patient's quality of life. 5

**Blurred Vision and Visual Compromise:** In advanced or chronic cases, dacryostenosis can result in keratitis, with consequent decreased visual acuity and blurred vision, underscoring the importance of early evaluation and management. 5

**Pusiform discharge:** The presence of purulent or mucopurulent discharge in the inner corner of the eye is a common clinical finding, especially in acute episodes of dacryocystitis, and is an indicator of associated infection. 5,6

**Dacryorrhea:** Dacryorrhea, which manifests as a constant flow of tears from the blocked tear duct, may be an early sign of dacryostenosis and may precede other symptoms. 6

**Nasal Congestion:** In some cases, dacryostenosis may be associated with symptoms of nasal congestion or rhinorrhea due to the anatomical interconnection of the lacrimal and nasal passages. 6

Clinical evaluation of dacryostenosis involves a thorough ophthalmologic examination including evaluation of the lacrimal drainage pathway by irrigation and probing tests, as well as imaging studies such as dacryocystography or optical coherence tomography to characterize the extent of the obstruction. Early recognition of this clinical entity and understanding of its various manifestations are essential for accurate diagnosis and implementation of appropriate therapeutic strategies to improve the quality of life and ocular health of affected patients. 6,7

### **DIAGNOSIS**

The diagnosis of dacryostenosis, an ocular pathology characterized by obstruction of the lacrimal ducts, involves meticulous clinical evaluation and the application of advanced diagnostic techniques to achieve an accurate characterization of the nature and extent of the obstruction.

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This diagnostic process is critical to the selection of effective therapeutic strategies and the achievement of optimal results. The key elements of the diagnosis of dacryostenosis are detailed below:

**Questioning and Anamnesis:** Gathering a thorough history is the first step in the diagnosis of dacryostenosis. Relevant data should be obtained on the duration and progression of symptoms, previous episodes of lacrimal infection, history of ocular trauma or previous surgery, as well as any relevant medical or surgical comorbidities. 7,8

**Ophthalmologic Examination:** The complete ophthalmologic examination includes evaluation of visual acuity, ocular motility, inspection of the eyelids and periorbital region for signs of inflammation, infection or anatomic alterations. Special attention is paid to excessive lacrimation (epiphora) and the presence of purulent discharge, as well as lacrimal puncta function when performing the fluorescein test. 7,8

**Irrigation and Probing Tests:** Irrigation and probing tests, which involve introducing a saline solution through the lacrimal punctum and assessing its flow, are crucial in assessing patency and location of the obstruction. These tests provide valuable information on the location and severity of the obstruction. 7,8

**Imaging studies:** The implementation of imaging studies is essential for a detailed characterization of lacrimal obstruction. Dacryocystography, which involves the injection of a radiologic contrast medium followed by radiographs or computed tomography imaging, allows visualization of the anatomy and location of the obstruction. Optical coherence tomography (OCT) offers a noninvasive evaluation of the lacrimal pathway and has gained diagnostic importance. 8,9

**Dacryoscopy and Nasal Endoscopy:** These techniques allow direct inspection of the nasal mucosa and tear duct with specialized equipment. Dacryoscopy provides a detailed evaluation of the lacrimal mucosa and allows the detection of foreign bodies or other lesions that may contribute to obstruction. Nasal endoscopy is useful in evaluating the distal lacrimal duct and can identify secondary causes of obstruction, such as nasal polyps. 9,10

**Functional Assessment:** Measurement of tear quantity and composition, as well as assessment of tear film function and analysis of the ocular surface, can be valuable in understanding the functional impact of dacryostenosis and guiding management. 11

In conclusion, the diagnosis of dacryostenosis requires a thorough clinical approach and the use of advanced diagnostic tools ranging from detailed questioning to specialized physical examination and advanced imaging studies. The combination of these modalities provides a solid basis for the accurate diagnosis of this ocular condition, allowing the planning of appropriate therapeutic strategies and the improvement of the quality of life of affected patients. 12

### **TREATMENT**

The therapeutic approach to dacryostenosis, an ophthalmologic entity characterized by obstruction of the lacrimal drainage system, requires careful assessment of the nature and severity of the obstruction, as well as meticulous consideration of contributing factors and patient preferences. Treatment seeks to alleviate symptoms, restore tear function and improve the individual's quality of ocular life. The following are the therapeutic options available in the management of dacryostenosis: 13

### **CONSERVATIVE MANAGEMENT**

**Eyelid Cleaning and Care:** In mild cases, conservative management may include measures such as regular cleaning of the eyelids and the use of warm compresses to relieve eye irritation and inflammation. 13

**Topical antibiotics:** In acute episodes of dacryocystitis, administration of topical or systemic antibiotics may be necessary to control the infection and prevent its spread.

**Surgical Procedures: Dacryocystorhinostomy (DCR):** DCR is considered the gold standard in the surgical treatment of dacryostenosis. It involves the creation of a new lacrimal drainage pathway by connecting the lacrimal sac directly to the nasal cavity through an opening in the lacrimal bone. 13

**Endoscopic Dacryoplasty:** This minimally invasive technique uses endoscopes to perform DCR, which reduces the need for skin incisions and may decrease recovery time. 13

**Intranasal Balloon Dilation:** In certain cases, intranasal balloon dilation, a less invasive procedure that uses an inflatable balloon to expand the blocked tear duct, may be an option. 13

**Therapeutic Dacryoscopy:** Dacryoscopy allows direct visualization of the obstruction and removal of foreign bodies or calculi that may contribute to the obstruction.

**Specific Considerations:**

**Congenital Dacryostenosis:** In newborns with congenital dacryostenosis, probing of the lacrimal system and, in persistent cases, pediatric RCD can be performed. 13

**Treatment of Underlying Causes:** In situations where dacryostenosis is secondary to systemic diseases, such as Sjögren's syndrome or sarcoidosis, treatment should focus on addressing the underlying disease. 13

**Management of Complications:** In patients with dacryostenosis complicated by recurrent infections or keratitis, a specific therapeutic approach will be required to treat these complications. 13

**Follow-up and Visual Rehabilitation:** Long-term follow-up is essential to evaluate the effectiveness of treatment and to address any recurrence or complications. Visual rehabilitation may be necessary in cases of previous ocular damage. 13

In summary, the treatment of dacryostenosis involves a comprehensive approach ranging from conservative measures to surgical procedures, depending on the severity and etiology of the obstruction. The choice of the optimal

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therapeutic strategy should be individualized and consider the patient's needs and preferences, with the goal of restoring tear function and improving ocular quality of life.

### SURGICAL TREATMENT

Surgical treatment of dacryostenosis, an ophthalmologic condition characterized by obstruction of the lacrimal drainage pathways, is a fundamental component in the integral management of this pathology, since it aims to restore the proper functionality of the lacrimal system and alleviate the associated symptoms. This therapeutic approach requires an exhaustive and precise evaluation of the obstruction, considering factors such as etiology, location and extent of the obstruction, as well as the patient's particular anatomy. Surgical treatment of dacryostenosis is detailed below:<sup>14</sup>

**Dacryocystorhinostomy (DCR):** DCR, an established surgical procedure, represents the primary therapeutic option for dacryostenosis. It is performed by making a skin incision in the lacrimal area, followed by the creation of a new drainage pathway by connecting the lacrimal sac directly to the nasal cavity, usually by making an ostium in the lacrimal bone.<sup>14</sup>

This technique allows effective restoration of tear flow and reduction of epiphora, relief of chronic ocular irritation and prevention of recurrent infections of the lacrimal apparatus.<sup>15</sup>

**Endoscopic Dacryoplasty:** Endoscopic dacryoplasty represents a less invasive approach to performing DCR, using nasal endoscopes and specialized equipment to access and create the lacrimal ostium without the need for external skin incisions.<sup>15</sup>

This approach offers faster recovery and less cosmetic morbidity compared to conventional DCR, although its choice depends on the patient's nasal anatomy and the surgeon's experience.<sup>15</sup>

**Intranasal Balloon Dilation:** Intranasal balloon dilation is a minimally invasive procedure that seeks to expand the blocked tear duct using an inflatable balloon.

Although less invasive than DCR, its success rate may vary depending on the nature of the obstruction and the durability of the result.<sup>15</sup>

**Therapeutic Dacryoscopy:** Therapeutic dacryoscopy allows direct visualization of lacrimal obstruction and removal of underlying causes, such as stones or foreign bodies, using specialized endoscopic devices.<sup>16</sup>

This approach is reserved for select cases where localized obstruction or a specific etiology is suspected.<sup>16</sup>

### FOLLOW-UP AND REHABILITATION

Postoperative follow-up is essential to evaluate the effectiveness of the surgical procedure, monitor recovery and address any potential complications.

In cases of previous ocular damage, visual rehabilitation may be necessary to restore the patient's optimal visual function.<sup>17</sup>

Surgical treatment of dacryostenosis is based on a precise technical approach and detailed clinical considerations, with options ranging from conventional procedures such as DCR to less invasive approaches such as endoscopic dacryoplasty or intranasal balloon dilation. The choice of the appropriate surgical technique depends on the patient's clinical presentation and the surgeon's experience, with the goal of restoring tear function and improving the affected individual's ocular quality of life.<sup>17</sup>

### CONCLUSIONS

The conclusion of this comprehensive review of dacryostenosis, an ophthalmologic condition characterized by obstruction of the lacrimal ducts, highlights the complexity and diversity of this clinical entity in terms of its clinical presentation, etiology and available therapeutic options. Dacryostenosis, although often underestimated in its impact, constitutes a medical problem that significantly affects the quality of life of patients and demands a multidisciplinary and stratified approach for its effective management.

The varied clinical manifestation of dacryostenosis, ranging from epiphora to keratitis and blurred vision, underscores the importance of an accurate and complete evaluation for proper diagnosis. The diagnostic process incorporates a wide range of tools, from basic clinical tests to advanced imaging studies, such as dacryocystography and optical coherence tomography, allowing for a detailed characterization of the obstruction and its underlying etiology.

In terms of treatment, a plurality of options are evident, including dacryocystorhinostomy, endoscopic dacryoplasty, intranasal balloon dilatation and therapeutic dacryoscopy, each with its particular advantages and considerations. The choice of the optimal therapeutic strategy is based on a thorough evaluation of the patient's clinical presentation and anatomy, as well as the surgeon's experience and preferences. Ultimately, surgical treatment of dacryostenosis seeks to restore tear function, alleviate symptoms and improve patients' quality of ocular life. The decision to opt for conventional surgical procedures or less invasive approaches depends on a variety of factors, and individualization of treatment is essential for therapeutic success.

In summary, dacryostenosis is a challenging clinical entity that requires a comprehensive and accurate approach to its diagnosis and management. The constant evolution of diagnostic and therapeutic techniques offers exciting opportunities to improve the quality of life of patients affected by this complex ophthalmologic pathology. A thorough understanding of dacryostenosis and its up-to-date therapeutic approach are essential for eye care professionals and contribute to the well-being and visual health of those who suffer from this condition.

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