

Perspectives on Ocular Adnexal Surgeries

Een blik op de chirurgie van de oculaire adnexen

Isabel Bleyen

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Perspectives on Ocular Adnexal Surgeries

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Chapter 1

General Introduction

Introduction

Ocular adnexal surgery comprises both lacrimal and eyelid surgery. This first chapter is a general introduction of the subjects, outlined in this thesis. The essentials of the anatomy and physiology of the lacrimal drainage system are summarized. Primary acquired nasolacrimal duct obstruction is defined and different treatment options are discussed. The normal upper eyelid anatomy is briefly described and different eyelid abnormalities together with their treatment possibilities are discussed.

Lacrimal drainage system

Anatomy and Physiology

Tears drain through the upper and lower lacrimal puncta, located medially on the margin of both the upper and lower eyelids. They are situated 6 mm from the medial canthus, are approximately 0.3 mm in diameter, and are directed slightly backwards. Each punctum is surrounded by its respective ampulla, which is 2 to 3 mm wide and 2 mm long. The puncta drain into the upper and lower canaliculi, which are approximately 8 mm long and sweep medially, usually joining for the last 2 mm to form the common canaliculus before entering the lacrimal sac (> 90% of subjects). The lacrimal sac lies within a bony fossa in the anterior medial orbit, bordered by the anterior and posterior lacrimal crests, to which the medial canthal tendon attaches. The medial wall of the fossa (lamina papyracea) is composed of the lacrimal bone posteriorly and the frontal process of the maxilla anteriorly. Medial to the lamina papyracea is the middle meatus of the nose, sometimes with intervening ethmoid cells. The height of the lacrimal sac is 10 to 15 mm. The nasolacrimal duct extends from the inferior part of the sac through the bony nasolacrimal canal, passing downward and slightly posteriorly. The canal is approximately 12 mm in length, and the duct usually extends for 5 mm beyond the termination of the canal, lying within the mucous membrane of the lateral wall of the nose, to open at the ostium lacrimale under the inferior turbinate (the inferior meatus)^{1,2} (figure 1).

The lacrimal drainage system is lined by pseudostratified columnar epithelium. The valve of Rosenmüller is found at the entry of the common canaliculus into the lacrimal sac, and

the valve of Hasner is situated at the opening of the nasolacrimal duct under the inferior turbinate.^{1,2}

Tears drain from the ocular tear film through the canaliculi to the lacrimal sac and then to the nose via the nasolacrimal duct. Drainage is split approximately equally between the upper and lower canaliculi. Most of the tear flow is actively pumped from the tear lake by the actions of the orbicularis muscle. The so called 'lacrimal pump' theory of Jones postulates a muscular compression of the canaliculi and probable expansion of the lacrimal sac during lid closure, creating a negative pressure with tears being drawn through the entire pathway into the nose.³ This theory was later modified by Rosengren and Doane.^{4,5}

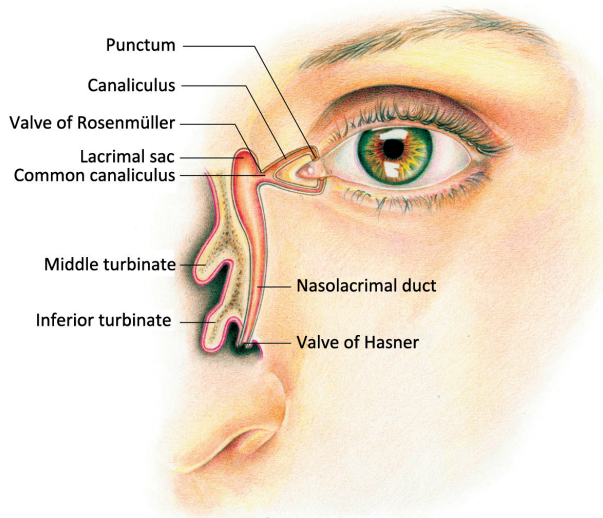


Figure 1 | (Illustration by Jessica Leenen)

Other factors that may aid tear drainage are the effect of gravity on fluid in the sac and capillary action in the nasolacrimal duct. In addition, evaporation of tears from the surface of the eye is often of importance.^{1,2} It is reduced by the oily outer layer of the tearfilm, produced by the Meibomian glands. Evaporation of tears can account for 20% or more of tear elimination in the elderly.

Primary acquired nasolacrimal duct obstruction

Epiphora is defined as watering of the eyes due to a blockage of the lacrimal drainage system or due to excessive secretion of tears. Excessive secretion of tears can be caused by ocular surface irritation or inflammation. These tears are often referred to as 'pseudo-epiphora'. Epiphora caused by lacrimal duct obstruction is a common ophthalmologic problem and accounts for 3% of all ophthalmologic clinical visits.⁶ Epiphora can be evaluated subjectively according to a scale proposed by Munk:⁷ 0 = no epiphora, 1 = occasional epiphora requiring drying or dabbing less than twice a day, 2 = epiphora requiring drying two to four times a day, 3 = epiphora requiring drying five to ten times a day, 4 = epiphora requiring drying more than ten times a day or constant tearing. Most patients have no relevant antecedent history. Primary acquired nasolacrimal duct obstruction occurs more frequently in women and most patients are younger than 50 years.⁸ Linberg and McCormick dissected the nasolacrimal ducts from a series of patients with 'primary acquired nasolacrimal obstruction' during dacryocystorhinostomy.⁸ They showed that obstruction began with focal areas of ulceration in the ductal epithelium. Infiltration of the submucosa with inflammatory cells, primarily lymphocytes, and increasing epithelial loss resulted in adhesions forming between ductal walls and progressive obstruction of the duct.

The traditional surgical treatment of a complete obstruction of the nasolacrimal duct is based on dacryocystorhinostomy, with a success rate of more than 90%.^{9,10,11,12} Using this surgical technique, a mucosal fistula is created from the lacrimal sac directly into the nasal cavity, in order to bypass the obstruction in the nasolacrimal duct. The traditional approach since the 1890's has been the external or transcutaneous route. Intranasal (endonasal) dacryocystorhinostomy was introduced by Caldwell in 1893, but only in the last two decades has attention turned back to an endonasal approach.^{11,13} In incomplete nasolacrimal duct obstruction, a variety of non-invasive treatment modalities have been proposed, including probing, silicone intubation and balloon dacryocystoplasty using an antegrade or retrograde technique, with or without radiographic and endoscopic nasal guidance. Silicone intubation is an efficient choice of treatment for congenital nasolacrimal duct obstruction, especially when repeated probings are unsuccessful.¹⁴ The silicone tube is passed through the upper and lower canalicular system, lacrimal sac and nasolacrimal duct and is retrieved under the inferior turbinate in the nose. It functions as a temporary stent in the nasolacrimal duct. Reported complications are

nasal migration of the tube, canalicular erosion, and granuloma formation.¹⁵ Only few studies have investigated the efficacy of silicone intubation in the management of (partial) lacrimal obstruction in adults.^{16,17,18,19,20} Success was noted in 22% to 62%. This variety in success rate is probably due to different inclusion criteria (severity and location of obstruction) and different definitions of success (based on subjective symptoms or probing and irrigation).

Recently, another noninvasive treatment method, balloon dacryocystoplasty, has gained popularity, especially for the treatment of congenital nasolacrimal duct obstruction.^{21,22,23,24} Using an antegrade technique, a lacrimal balloon catheter is introduced through the canaliculi into the lacrimal system, after which the balloon is inflated in order to create a dilating force to the lumen membranes.¹³ With a retrograde technique, the balloon catheter is passed over a guided wire via the nose. This can be done under radiographic or endoscopic surveillance. Several studies on the efficacy of dacryocystoplasty in adults with partial nasolacrimal duct obstruction report success rates that range from 25% to 90%.^{25,26,27,28,29} Again there is a high variety in success rate, most likely due to different inclusion criteria and different definitions of success. Only few studies have addressed the long-term efficacy of balloon dacryocystoplasty.^{16,29}

Blepharoptosis

Upper eyelid anatomy

The eyelid is divided into an orbital and tarsal portion by a horizontal skin crease and has distinct anatomical layers. In tarsal cross-section, these comprise skin, subcutaneous tissue, orbicularis muscle, tarsal plate, and conjunctiva. In the orbital portion, however, the layers posterior to orbicularis muscle comprise orbital septum, preaponeurotic fat pad, levator aponeurosis insertion, Müller's muscle and conjunctiva. The upper eyelid crease is created by anterior insertions of the levator aponeurosis, and lies 6 to 11mm above the lid margin in the occidental eye (Figure 2).

Eyelid opening is primarily due to the striated muscle, levator palpebrae superioris, innervated by oculomotor fibres, although the sympathetically innervated smooth muscle of Müller also contributes. The levator arises from the orbital apex, above the annulus of

Zinn, and passes forward beneath the orbital roof, sharing fascial connections with the adjacent superior rectus muscle. The superior transverse ligament of Whitnall is a dense fascial condensation which bridges the superior orbit between the trochlea and superior orbital notch medially, and the lacrimal gland fascia laterally. It causes the levator muscle to change direction 15 to 20 mm above the tarsal plate, shortly before it thins out to form an aponeurosis. Müller's muscle originates from the underside of levator at this level. The horizontal attachments of the aponeurosis consist of medial and lateral horns, which insert into the respective canthal ligaments and adjacent orbital walls. The lateral horn divides the lacrimal gland into its orbital and palpebral lobes. The anterior border of the aponeurosis merges with the orbital septum, and sends fibres through to fuse with pretarsal orbicularis and the anterior surface of the tarsus. The skin crease is created by these attachments in an area where orbicularis and skin are more firmly attached.^{1,2,30}

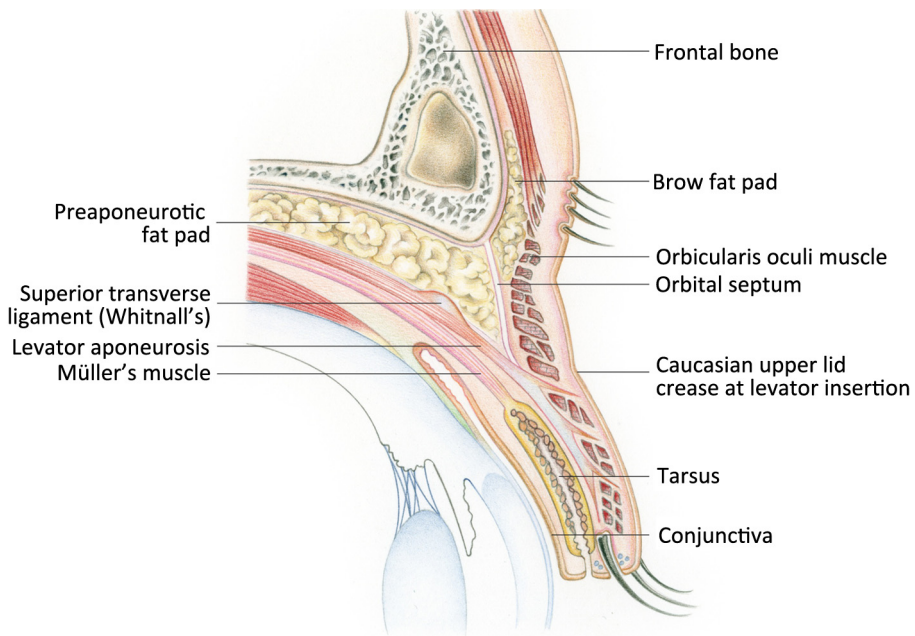


Figure 2 | (Illustration by Jessica Leenen)

Congenital ptosis

Congenital ptosis refers to a developmental dystrophy of the levator muscle or aponeurosis. It is the most common congenital eyelid anomaly.^{1,2} It may be unilateral or

bilateral, of variable severity, and does not improve with age. Ptosis at birth due to other causes (eg Horner's syndrome, myasthenia, third nerve palsies, or brain abnormalities) is far less common and generally excluded from this term. Congenital ptosis is frequently associated with weakness of the ipsilateral superior rectus. The ptosis can cause amblyopia, although this is more commonly a consequence of associated anisometropia or strabismus.^{31,32} Unless the visual axis is completely occluded, amblyopia is generally treated first, and ptosis correction is deferred until the age of 2 to 4 years. This allows more accurate measurement of both the degree of ptosis and the levator function, enabling the most appropriate procedure to be performed.³³

Surgical correction of ptosis potentially holds several complications. Exposure keratitis is the most devastating, since it may lead to corneal damage and visual loss.³⁴ The risk of this complication is inversely proportional to levator function, and seems to increase with age and in patients with poor Bell's phenomenon.³⁵ Bell's phenomenon is a defensive mechanism, defined as an upward movement of the eye, when an attempt is made to close the eyes.

Frontalis suspension is usually used as the procedure of choice for children with severe congenital ptosis and poor levator function. Creating a link between the frontalis muscle and the upper eyelid tarsus allows the frontalis muscle to enable eyelid elevation.³⁶ It is an efficient and simple method of treatment. Various materials have been used for suspension, including autogenous fascia lata, banked fascia lata, and synthetic materials such as monofilaments, silicone rod, and polytetrafluoroethylene.³⁶ For many years now, autogenous fascia lata is the preferred material for frontalis suspension surgery in children because of its predictability and lasting results.^{37,38,39,40} Payr was the first to describe this technique in 1909,⁴¹ after whom Wright modified it in 1922⁴². In 1956, Crawford described the use of his fascia stripper.⁴³ With this technique, a small incision of 3 to 5 cm is made a few centimeters above the knee. Through this incision the Crawford stripper is induced and passed superiorly to create a fascia strip of 7 to 9 centimeters by 1 centimeter.

Aponeurogenic ptosis

Acquired aponeurogenic ptosis is the most common of all forms of blepharoptosis. It is caused by disinsertion, or thinning, of the levator muscle aponeurosis. It is characterized

by a decreased vertical palpebral aperture with good levator function (> 12 mm). There is a high or absent skin crease with supratarsal thinning.^{44,45,46} In the elderly, it is most often an involutional disorder. In the younger population, a period of rigid contact lens wear is reported to be the most common cause.^{44,47,48,49,50} Intraocular surgery, postoperative edema, ocular inflammation and topically applied steroids are other factors related to acquired blepharoptosis.⁴⁶ Relatively little is known on the relation between soft contact lens wear and acquired blepharoptosis. It can be hypothesized that soft contact lens wear could lead to some degree of mechanical disintegration of the aponeurosis as well, originating from incremental friction between lens and upper eyelid, manoeuvres during lens insertion or removal, allergic reaction with repetitive swelling of the upper eyelid, prolonged blepharospasm with levator muscle strain, toxic effects of the contact lens solution with inflammation or oedema.⁴⁷ One study by Reddy *et al.*, described soft contact lens wear to be a risk factor for acquired ptosis, clinically manifesting as an aponeurogenic ptosis, in patients under the age of 35 years.⁵¹

Surgical correction of aponeurogenic ptosis is based on levator aponeurosis advancement through an external (transcutaneous) or sometimes internal (transconjunctival) approach.

Cicatricial entropion and trichiasis

Definitions

Acquired inversion of the upper or lower eyelids results in contact between cilia and the globe. Inwardly rotated cilia and keratinized epithelium coming in contact with the ocular surface both cause repeated injury to the cornea and disabling symptoms, which include discomfort, foreign body sensation, tearing, blurred vision, and photosensitivity.⁵² The severity of the sequelae on the ocular surface depends, in addition, on the adequacy of the tearfilm, Bell's phenomenon, and corneal sensation.^{1,2}

Cicatricial entropion develops from vertical tarsoconjunctival scarring and internal rotation of the eyelid margin. This can be due to trauma, previous surgery, chemical burns, trachoma, infection, pemphigoid, Stevens-Johnson syndrome, radiation or longstanding anophthalmia.^{53,54,55}

The hair bulb of a normal lash is situated adjacent to the edge of the tarsal plate, the shaft exiting the lid margin anterior to the mucocutaneous junction and the meibomian orifices.^{1,2} Trichiasis describes an acquired misdirection of the lashes. It may be idiopathic or results from chronic blepharitis, long-term glaucoma medications (including prostaglandin analogues) or eyelid margin injuries.⁵⁴

Management of cicatricial entropion and trichiasis

Although many surgical approaches have been developed to reconstruct the eyelid margin, none of them is universally successful. These surgical techniques include lid splitting with tarsal advancement, internal lamellar lengthening with or without free grafts and lid margin rotation with partial or full thickness blepharotomy.^{53,54,55} These surgeries may fail because of a continuing cicatricial process or incomplete correction or may be cosmetically unacceptable.⁵⁴

As for trichiasis, one or two lashes may be treated with epilation or electrolysis, while broader areas can be treated with cryotherapy. Conventional surgical options include a pentagon excision for discrete areas or splitting the eyelid and dissecting aberrant lash roots off the posterior lamella. Epilation can be difficult to perform for patients and is temporary. Electrolysis, although sometimes permanent, has a relatively low success rate and may produce distortion of the lid margin if overdone.⁵⁴ Cryotherapy can also (permanently) reduce trichiasis, but may cause unacceptable depigmentation, loss of normal lashes and distortion of the lid margin.⁵⁴

Transverse blepharotomy and marginal rotation was first described by Wies in 1954 for the treatment of senile or spastic entropion of the lower eyelid.⁵⁶ This technique can also be used for the treatment of trichiasis and cicatricial entropion of both upper and lower eyelids. A full-thickness horizontal incision approximately 4 mm from the eyelid margin is made. A horizontal mattress suture is placed through the anterior thickness of the tarsus, and/or lower lid retractors proximal to the horizontal incision, and then threaded through orbicularis and skin on the distal eyelid bridge. Finally, the suture is tied over an elastic band or silicone bolster adjacent to the eyelash line.

Floppy eyelid syndrome

Ectropion of the eyelids is an outward turning of the lid margin, exposing the tarsal conjunctiva. Failure of apposition of the lid against the globe leads to exposure and dryness of the cornea, as well as inflammation and metaplasia of the exposed tarsal conjunctiva.^{1,2} Upper eyelid ectropion is rare, occurring occasionally as a result of lid trauma or gross horizontal lid laxity in floppy eyelid syndrome. This condition, first described by Culbertson and Ostler in 1981, predominantly affects obese, middle-aged men and is characterized by gross horizontal laxity and chronic papillary conjunctivitis.^{57,58} Sleep apnea is frequently associated. The upper lid spontaneously everts during sleep due to laxity (Figure 3). Symptoms of floppy eyelid syndrome mimic those of ocular surface disease; indeed, floppy eyelid syndrome itself can contribute to ocular surface damage causing foreign body sensation, tearing, ocular discharge and injection.^{58,59,60}

Floppy eyelid syndrome is initially treated conservatively with lubrication and patching or an eyelid shield at night. Frequently, surgical treatment is indicated (horizontal eyelid shortening). In addition, sleep studies are recommended to rule out sleep apnea.

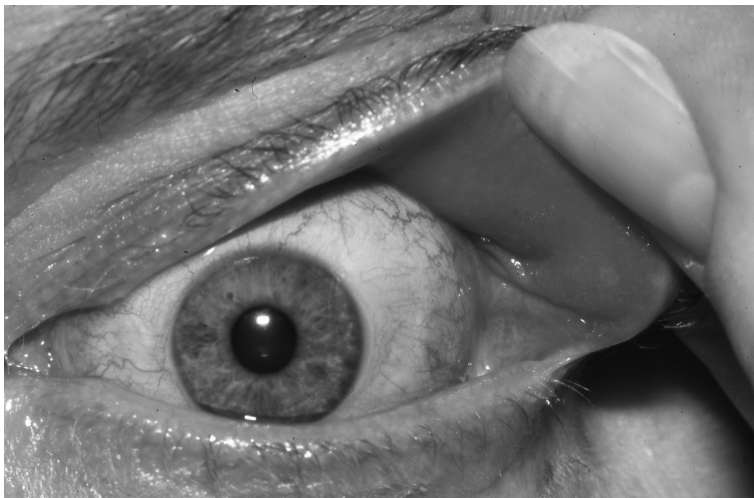


Figure 3 | (Courtesy of Dr. D Paridaens)

Merkel cell carcinoma

The Merkel cell is a neurotactile cell of the basal epidermis with neuroendocrine features, first described by Friedrich Merkel in 1875.^{61,62} Merkel cell carcinoma of the eyelid is a very aggressive tumor that occurs mostly in the elderly and immunocompromised. Polyoma virus infection as well as sun exposure may play a role.⁶³ Females are affected approximately twice as often as males. Clinically, Merkel cell carcinoma of the eyelid usually presents as a solitary, rapidly growing, purple red, painless nodule near the eyelid margin, with minimal loss of eyelashes (Figure 4). Its surface is smooth and often shows dilated teleangiectatic blood vessels.⁶² The overlying epidermis is usually intact. Regional lymph node metastases are common. Up to half of the patients develop distant metastases, most frequently within two years. Diagnosis is confirmed with electron microscopy and immunohistochemistry, which is characteristically positive for low-molecular weight cytokeratins, neuroendocrine markers and neurofilament protein.⁶² Primary treatment of the tumor consists of excision with wide margins or Moh's micrographic surgery with or without adjuvant radiotherapy.⁶⁴



Figure 4 | (Courtesy of Dr. D Paridaens)

Aims of this thesis

The first part of this thesis aims to evaluate different treatment options for acquired partial nasolacrimal duct obstruction. The first study compares dacryocystoplasty combined with silicone intubation versus silicone intubation alone in adults with incomplete nasolacrimal duct obstruction. The second study analyzes the results of all adult patients with partial nasolacrimal duct obstruction who underwent bicanalicular silicone intubation between 2001 and 2006.

The second part of this thesis considers different eyelid surgeries. In chapter 4, the long-term cosmetic and functional complications at the donor-site after harvesting autogenous fascia lata using the Crawford technique for frontalis suspension in children are discussed. Chapter 5 describes 29 young patients with aponeurogenic blepharoptosis. The only risk factor identified was prolonged contact lens wear. Chapter 6 analyzes the results of the Wies procedure (transverse blepharotomy and marginal rotation) for the treatment of trichiasis and cicatricial entropion of both upper and lower eyelids. In chapter 7, a patient with both upper eyelid ptosis and floppy eyelid syndrome is described. He was treated with a horizontal lid shortening with an upper lid tarsal strip and levator advancement on both upper eyelids. Chapter 8 is a report on two patients with Merkel cell carcinoma of the eyelid, whom were treated with wide excision and reconstruction. Both patients underwent postoperative radiotherapy. Finally, chapter 9 describes acute angle closure glaucoma as a rare complication of oculoplastic surgery in two different patients.

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Part 1

**Acquired partial nasolacrimal
duct obstruction**

Chapter 2

Silicone Intubation with or without Balloon Dacryocystoplasty in Acquired Partial Nasolacrimal Duct Obstruction

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Abstract

Purpose: To examine if the addition of (antegrade) balloon dacryocystoplasty to bicanalicular silicone intubation affects the success rate in adults with incomplete nasolacrimal duct (NLD) obstruction.

Design: Prospective, randomized trial.

Methods: Seventy eyes of 70 patients with incomplete NLD obstruction and severe epiphora (Munk score grade 3 or 4) were treated randomly with dacryocystoplasty (Lacricath) and silicone intubation (Ritleng; n = 35, group 1; mean age, 54.4 years; standard deviation [SD], 11.8 years) or silicone intubation alone (n = 35, group 2; mean age, 53.5 years; SD, 13.1 years; P > .05). The silicone tubes were removed after, on average, three months. At the visit, we assessed the grade of epiphora using the Munk score. Complete success was defined as Munk score of 0 or 1, partial success was defined as Munk score of 2, and failure was defined as Munk score of 3 or 4. Long-term Munk scores were obtained through a telephone survey nine to 76 months after surgery (mean, 43.4 in group 1 and 34.9 in group 2; P > .05).

Results: Complete success was reported by 18 patients (52%) in group 1 and by 20 patients (57%) in group 2. Partial success was reported by one patient in group 1 and by one patient in group 2. No improvement was reported by 15 patients (44%) in group 1 and by 14 patients (40%) in group 2. Differences between the two groups proved to be not significant (P = .8, exact chi-square trend test).

Conclusion: In our patients with acquired partial NLD obstruction, treatment with a combination of antegrade dacryocystoplasty and silicone intubation was not associated with a higher success rate compared with treatment with silicone intubation alone.

Complete nasolacrimal duct (NLD) obstruction usually is treated with dacryocystorhinostomy (DCR), with a reported success rate of more than 90%.^{1,2} In incomplete NLD obstruction, the choice of treatment is less straightforward.² Treatment with bicanalicular silicone intubation has been reported to yield success in 25% of patients with NLD obstruction and in only 22% after long-term follow up,^{3,4} but in these studies, no distinction was made between complete and incomplete obstruction. Recently, another noninvasive treatment method, balloon dacryocystoplasty, has gained popularity, especially for treatment of congenital NLD obstruction.⁵ Several studies on the efficacy of dacryocystoplasty in adults with partial NLD obstruction report success rates that range from 25% to 90%.⁶⁻⁹ To our knowledge, no prospective randomized study on the results of dacryocystoplasty combined with silicone intubation vs silicone intubation alone has been reported.

Methods

Between April 1, 2000 and December 31, 2005, we included 70 patients with severe epiphora and an acquired partial NLD stenosis. All patients were treated randomly with bicanalicular silicone intubation combined with balloon dacryocystoplasty ($n = 35$, group 1) or bicanalicular silicone intubation alone ($n = 35$, group 2). The mean age of patients was 54 years in group 1 (standard deviation [SD], 11.8 years) and 53 years in group 2 (SD, 13.1 years). Group 1 consisted of 31 females and four males, and group 2 consisted of 27 females and eight males. The right side was affected in 12 patients in group 1 and in 12 patients in group 2. The left side was affected in 14 patients in group 1 and in 12 patients in group 2. Both sides were affected in nine patients in group 1 and in 11 patients in group 2. If both sides were treated, only the left was included for randomization. There was no significant difference in mean age, gender, or right or left side involvement between the two groups ($P > .05$).

The severity of epiphora was evaluated subjectively according to the scale proposed by Munk (Table).¹⁰ Patients were included if they reported severe epiphora (Munk grade 3 or 4) that lasted at least three months. Partial stenosis of the NLD was considered to be present if the tear meniscus in the affected eye was clearly higher compared with that of the other eye and if the dye disappearance test results were negative. In bilateral cases of equal reported severity, we arbitrarily included the left side. Only patients who had

evident tearing and had positive irrigation with reflux at syringing were included. For the purpose of this study, we additionally performed a digital subtraction dacrycystography (DCG) to confirm the clinical diagnosis of a partial stenosis of the NLD and to rule out the presence of dacryoliths.

Patients were excluded if they showed signs of pseudoepiphora (any corneal staining with fluorescein, abnormal Schirmer I test results of less than 5 mm after five minutes, blepharitis, or conjunctivitis), any eyelid or punctal malposition, dacryocystitis, dacryolithiasis, or any sign of inadequate tear pump functioning, such as inadequate orbicularis oculi muscle function or scarring of the lower eyelid. We also excluded patients younger than 18 years, patients with a history of lacrimal surgery, and patients with insufficient mental capacity. Informed consent was obtained of all participants. Patients in whom the introduction of a balloon catheter, silicone tube, or both was not possible technically were not included.

Table 1 | Munk score

0	No Epiphora.
1	Occasional epiphora requiring drying or dabbing less than twice a day.
2	Epiphora requiring dabbing two to four times per day.
3	Epiphora requiring dabbing five to ten times per day.
4	Epiphora requiring dabbing more than ten times daily or constant tearing.

Surgical Procedure

All procedures were performed by the same surgeon (D.P.). Under general anaesthesia, the nose was packed with cotton soaked in Xylometazoline 10 mg/ml. In group 1, the inferior and superior puncta were dilated. Probing was performed with a Bowman (no. 1) probe. Using the metal-to-metal technique, the presence of the probe in the inferior meatus was confirmed. The deflated lacrimal balloon catheter (Lacricath; Atrion Medical Products, Birmingham, Alabama, USA) was introduced into the superior canaliculus and was advanced into the NLD to the floor of the nose. A 3-mm diameter balloon with a 15-mm long working segment was used in all cases. The catheter was advanced until the superior mark on the catheter (15 mm proximal to the beginning of the balloon) just reached the lacrimal punctum, meaning the most advanced position of the catheter in

the NLD. The presence of the catheter in the inferior meatus was confirmed, before the balloon was inflated to a pressure of 8 bar for 90 seconds, was deflated, and then was inflated again for 60 seconds. After deflation, the lower mark of the catheter (10 mm proximal to the beginning of the balloon) was placed at the superior punctum, and the inflation procedure was repeated. The catheter was withdrawn only after the balloon was deflated completely.¹¹ Next, bicanalicular silicone intubation was performed, using the Ritleng system (P. Ritleng, Issy-les-Moulineux, France). The two silicone tubes were tied together with a polypropylene 6-0 suture and was fixated to the lateral wall of the nose.¹² In group 2, bicanalicular silicone tube intubation, according to Ritleng, was performed directly after probing.

Postoperative Management

The patients were instructed to use topical dexamethasone with gentamicin thrice daily for two weeks. All patients were examined at six weeks and at approximately three months after surgery. At examination, the Munk score was assessed and slicing or extrusion was recorded. At three months, syringing was repeated and tubes were removed. Long-term outcome was evaluated with a telephone survey using the Munk scale. Complete success was defined as Munk grades 0 to 1, partial success was defined as Munk grade 2, and failure was defined as Munk grades 3 to 4.

Results

In both groups, the mean munk score was 4 before intervention (SD, 0.2). At three months after surgery, the mean Munk score was 1.6 in group 1 (SD, 1.8) and 1.3 in group 2 (SD, 1.9; $P = .6$, Mann–Whitney U test; Figure 1). In group 1, one patient was lost to follow up. At the telephone survey, the mean Munk score was 1.8 in group 1 (SD, 2) and 1.6 in group 2 (SD, 1.9; $P = .7$; Figures 2 and 3). Complete success was reported by 18 patients (52%) in group 1 and by 20 patients (57%) in group 2. Partial success was reported by one patient in group 1 and by one patient in group 2. Failure was reported by 15 patients (44%) in group 1 and by 14 patients (40%) in group 2. The differences between complete success, partial success, and failure between groups 1 and 2 proved not to be significant ($P = .8$, exact chi-square trend test).

Interestingly, in three patients for whom treatment failed in group 1, the outcome of syringing had changed from positive with reflux to positive without reflux. This discrepancy also was noted in seven patients in group 2. The tubes were removed after approximately 12 weeks after surgery (mean, 12.2 weeks [SD, 5.5 weeks] in group 1 and 11.5 weeks [SD, 5.6 weeks] in group 2).

No major complications were noted in either group. Slight nasal bleeding was observed in four cases in group 1 and in three cases in group 2, which resolved spontaneously. In group 1, two silicone tubes could not be retrieved during a removal attempt. In one case, the silicone tube was removed early (after seven weeks) because of an allergic reaction. In group 2, two silicone tubes fell out after one week and in one case the silicone tube could not be retrieved. In one other case, the silicone tube had to be removed early (after five weeks) because of a slit inferior punctum.

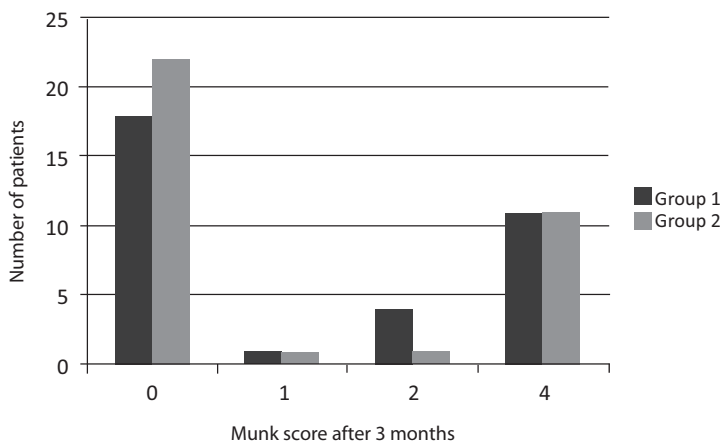


Figure 1 | Bar graph showing the comparison between epiphora in patients with acquired partial nasolacrimal duct obstruction three months after treatment with either dacryocystoplasty combined with silicone intubation (group 1) or silicone intubation alone (group 2). The epiphora was graded according to the Munk score: 0, no epiphora; 1, occasional epiphora requiring drying or dabbing less than twice daily; 2, epiphora requiring dabbing two to four times daily; 3, epiphora requiring dabbing five to 10 times daily; 4, epiphora requiring dabbing more than 10 times daily or constant tearing.

Follow up from the time of surgery ranged from nine to 76 months in group 1 (mean, 43.4 months; SD, 19.6 months) and from 14 to 68 months in group 2 (mean, 34.9 months; SD, 16.6 months; $P > .1$).

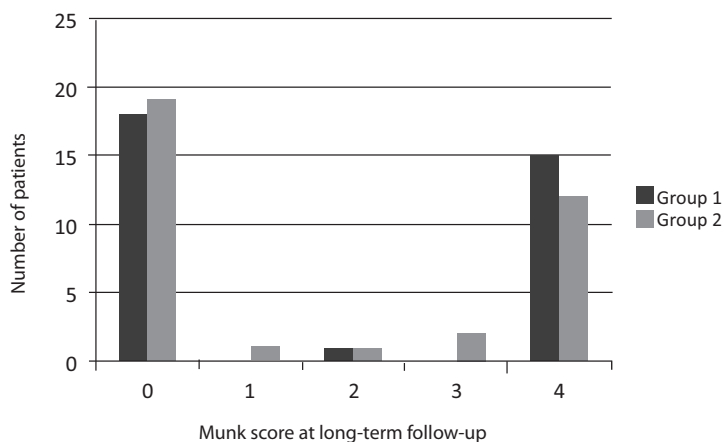


Figure 2 | Bar graph showing the comparison between epiphora in patients with acquired partial nasolacrimal duct obstruction at long-term follow up telephone survey after treatment with either dacryocystoplasty combined with silicone intubation (group 1) or silicone intubation alone (group 2). The epiphora was graded according to the Munk score.

Discussion

A variety of noninvasive treatment methods that aim to restore patency mechanically have been proposed for the treatment of incomplete NLD obstruction. Probing was shown to have limited success of approximately 50% of adult patients.¹³ The reported success rate of silicone intubation without concomitant balloon dilatation in adults with NLD obstruction varies. Fulcher and associates found a 25% success rate after 15 months,³ and in a later study, Connell and associates found only a 22% success rate after seven years.⁴ These studies, however, did not differentiate between complete and incomplete NLD obstruction. Another study reported a 59% complete success rate after bicanalicular silicone intubation in adults with incomplete NLD obstruction.¹⁴ This is comparable with our findings, although different definitions of complete success have been used.

		Munk at end of FU					Total	
		0	1	2	3	4		
Group 1	Munk At 3 Months	0	16				2	18
		1			1			1
		2	2				2	4
		3						
		4					11	11
		Total	18		1		15	34
Group 2	Munk At 3 Months	0	18	1	1	1	1	22
		1	1					1
		2					1	11
		3						
		4				1	10	11
		Total	19	1	1	2	12	35

Figure 3 | Chart showing the change in epiphora (according to the Munk grading scale) in patients with acquired partial nasolacrimal duct obstruction treated with either dacryocystoplasty combined with silicone intubation (group 1, above) or silicone intubation alone (group 2, below) between three months after surgery and the long-term follow up telephone survey.

Recently, dacryocystoplasty was introduced as an alternative nonincisional treatment method for incomplete NLD obstruction. It may be performed through an antegrade or through a retrograde technique.⁶⁻⁹ The reported success of dacryocystoplasty alone ranges widely, from 25% to 50%^{6,8} to 90%.^{9,11} When (antegrade) dacryocystoplasty was combined with silicone intubation, two studies showed a six-month success rate of 56% to 60% in patients with incomplete NLD obstruction.^{2,15} Kashkouli and associates recently compared endoscopically assisted balloon dacryocystoplasty and silicone intubation with silicone intubation alone in adults in a retrospective nonrandomized case series.¹⁴ They found no difference in outcome between the two treatment methods (61% vs 54%).

Although different definitions of success were used, with a complete success rate of 52% for dacryocystoplasty combined with silicone intubation and 57% for silicone intubation alone, our results are in a similar range as those reported by Kashkouli and associates.¹⁴ Our data show that the addition of antegrade dacryocystoplasty to silicone intubation

does not improve the success rate. However, our study was hampered by the relatively small numbers of patients per group, which limited the statistical power. Larger series may demonstrate a difference. In addition, we used subjective measurements (Munk score) in this prospective, randomized study that compares two different methods of treatment of patients with severe epiphora. The use of the semiquantitative grading system for epiphora is not new.¹⁰ We chose the subjective Munk score as the main outcome parameter because we consider it important and clinically relevant for a patient regardless of whether a procedure leads to clearance of symptoms such as a tearing eye, rather than improvement of patency of the lacrimal system. We believe its use as the main outcome parameter in this study is justified, because several studies, including ours, have shown a discrepancy between patency and clearance of symptoms of tearing, at least in a subset of patients.^{9,15,16} In this study, we found that the lacrimal system was patent in 10 of 16 patients with severe epiphora after treatment. We performed only irrigation tests at three months after surgery and not at long-term follow up, when data were collected through a telephone survey. Therefore, the agreement between irrigation test results and Munk scores at long-term follow up was not studied. The preoperative DCG was used for inclusion purposes and to rule out dacryolithiasis and was not used as an evaluation parameter.

Although the reported success rate of silicone intubation with or without dacryocystoplasty is lower than that of DCR, it holds several advantages: instead of creating a nonphysiologic bypass of the NLD, the normal anatomic pathway is reestablished and the procedure is nonincisional.¹⁶ Furthermore, in our hands, the less invasive nature of dacryocystoplasty allows for continuation of anticoagulation and antiplatelet therapy without a significant risk of bleeding. Although silicone tubing may cause complications in itself,¹⁶ these proved relatively minor in our series. Dacryocystoplasty occasionally may prove impossible because of the difficulty in introducing the catheter in the narrowed NLD.

In conclusion, our findings suggest that dacryocystoplasty does not improve the results of silicone intubation in the treatment of incomplete NLD obstruction. Further, our results with either dacryocystoplasty combined with silicone intubation or silicone intubation alone for this indication compare unfavorably with the reported outcomes after DCR.^{1,2}

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Chapter 3

Bicanalicular Silicone Intubation in Acquired Partial Nasolacrimal Duct Obstruction

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Bull Soc Belge Ophtalmol 2008; (309-310):23-26.

Abstract

Purpose: To assess the effectiveness of bicanalicular silicone intubation (SI) in acquired partial nasolacrimal duct (NLD) obstruction.

Design: retrospective nonrandomized case series.

Methods: 72 tear ducts from 53 patients with severe epiphora due to acquired partial NLD obstruction underwent bicanalicular SI. Mean age at intubation was 55.9 years.

The silicone tubes were removed after, on average, 10.4 weeks. Mean follow up period was 29.3 months (range 6 to 66 months). The results were assessed using the Munk score: 0-1: complete success, 2: partial success and 3-4: failure.

Results: Complete success was reported in 47% (31/66). Partial success was reported in 3% (2/66), and no improvement in 50% (33/66). 12% (8/66) was subsequently treated with dacryocystorhinostomy (DCR).

Conclusion: In patients with acquired partial NLD obstruction we noted a low success-rate for bicanalicular SI. Although it may be considered in patients who refuse DCR surgery, the relatively poor outcome compared to DCR does not justify its use for this indication.

The traditional surgical treatment of an obstruction of the NLD is a DCR, with a success rate of more than 90%.^{2,3} As an alternative, a variety of non-invasive treatment modalities have been proposed, which aim to mechanically restore patency. Probing was shown to have limited success of about 50% in adult patients.⁸ SI alone without a DCR was first reported by Keith in 1968.⁸ He did not differentiate, however, between adults and children.

Only few studies have investigated the efficacy of SI in the management of (partial) lacrimal obstruction in adults.^{1,4,6,7,15} Success was noted in 22% to 62%. These studies only investigated a limited number of patients (varying from 5 to 39 patients). We reviewed the results of a large series of 53 adult patients who underwent SI (72) for partial NLD obstruction between February 2001 and February 2006.

Materials and methods

Between February 2001 and February 2006, 72 tear ducts from 53 patients underwent bicanalicular SI for severe epiphora due to acquired partial NLD obstruction. The mean age of patients at the time of surgery was 55.9 years (SD 13). There were 43 females and 10 males. The right side was affected in 20 patients, the left side in 14 patients and both sides in 19 patients.

The severity of epiphora was evaluated subjectively according to the scale proposed by Munk (Table 1).¹⁴ Patients underwent bicanalicular SI if they complained of severe epiphora (Munk grade 3 ($n = 1$) or 4 ($n = 71$)) that existed at least 3 months. At examination, they had a high tear meniscus and a negative Jones-1 test (dye disappearance test). Furthermore, during the Jones-2 test (irrigation through the inferior lacrimal punctum), patients reported some fluid coming into the nose with reflux through the superior punctum (partial stenosis of the NLD). In addition, a DCG (digital subtraction dacryocystography) was performed to confirm the site and extent of the (relative) obstruction and to rule out dacryolithiasis.

Patients did not undergo nasolacrimal intubation if they showed signs of pseudo-epiphora (any corneal staining with fluorescein, a Schirmer test less than 5 mm, blepharitis or conjunctivitis), any eyelid or punctal malposition, dacryocystitis, or any

signs of inadequate tear pump functioning such as inadequate orbicularis oculi function or scarring of the lower eyelid. All patients were 18 years of age or older. Patients with a history of lacrimal surgery were excluded.

Table 1 | Munk score

0	No Epiphora.
1	Occasional epiphora requiring drying or dabbing less than twice a day.
2	Epiphora requiring dabbing two to four times per day.
3	Epiphora requiring dabbing five to ten times per day.
4	Epiphora requiring dabbing more than ten times daily or constant tearing.

Surgical procedure

Under general anaesthesia, the nose was packed with cotton soaked in Xylometazoline 10 mg/ml HCl Sandoz®. The inferior and superior puncta were dilated. The Bowman probe was then passed gently through the inferior canalicular system, overcoming any obstructions, until a ‘hard stop’ was felt in the lacrimal sac. The probe was then rotated to pass down the NLD to enter the nasal cavity under the inferior concha. The probe was then withdrawn via the inferior punctum. One of the two methods was used for intubation: the method described by Ritleng¹³ (P Ritleng, 20 Boulevard Gallieni, BP 111, Issy-les-Moulineux, France) or that by Bernard and Fayet (Bernard JA and Fayet B, 20/22 Rue Louis Armand, BP 40062, 75722 Paris Cedex 15, France). The Ritleng probe was inserted into the canaliculus and advanced to the nose. The guide was threaded through the probe and removed from the nose using a hook. The Ritleng probe was then removed from the lacrimal system. With the second method, intubation was carried out using a silicone tube connected by each of its extremities to a malleable steel guide. The probe was retrieved by placing a grooved director under the inferior turbinate to guide the probe out of the nose, after which the steel guide was cut from the silicone tube.

The procedure was then repeated through the other punctum. The two silicone tubes were tied together with a Prolene 6,0 suture and fixated to the lateral wall of the nose.

All patients were instructed to use topical dexamethason with gentamicin (dexamytrex®) 3 times daily for 2 weeks. The tubes were removed in the outpatient department by

cutting the suture at the lateral wall of the nose and cutting the tube between the lacrimal puncta.

According to the protocol for SI in lacrimal surgery in our institute, the silicone tubes remained in situ for 10.4 weeks on average (SD 5.1). The mean follow up since intubation was 29.3 months (SD 17.8, range 6 to 66 months).

No major complications were noted. Slight nasal bleeding was observed in 4 cases, which was easily controlled. No patient developed dacryocystitis or dacryolithiasis during silicone tube-wear. 6 silicone tubes could not be found at the day removal was planned. In 4 cases, the silicone tube fell out early, respectively after 1 (2x), 6 and 7 weeks, due to sneezing, rubbing, or accidentally. In 4 other cases, the silicone tube was removed early, respectively after 1, 3 (2x) and 5 weeks, because of a slit inferior punctum.

Results

Overall, complete success was reported in 47% (31/66). Partial success was reported in 3% (2/66). Failure was reported in 50% (33/66). DCR was required in 12% (8/66) of cases. 38% (25/66) refrained from additional treatment. 6 patients in total were lost to follow up.

In the cases where the tube fell out early (4 cases), or had to be removed early due to a slit inferior punctum (4 cases), 2 reported complete success, 4 reported failure and 2 were lost to follow up.

Discussion

In this study we report complete success of bicanalicular SI in 47% of cases. For NLD obstructions, Fulcher *et al.*, reported only a 22% complete success (n = 12) after 6,2 years of follow up^{1,4}, whereas Pashby *et al.*, found a success rate of 60% (n = 5) after a follow up period of 9 months.¹⁵ Kashkouli *et al.*, found a 59% complete success rate with bicanalicular SI in adults with incomplete NLD obstruction (n = 22) after a mean follow up period of 15 months.⁷ Compared with these results, our series shows a 47% complete

success rate in a much larger group of patients with partial NLD obstruction (n = 53). None of the previous studies uses the well-established Munk score in their follow up assessment, which might as well explain the lower success rates in our patients.

Although the reported success rates of SI are lower than those of DCR, advantages of SI (alone) include the conservation of the normal anatomic pathway (as opposed to the creation of a non-physiologic bypass of the NLD), the shorter operating time, and the smaller risk of haemorrhage.⁷

Several authors have reported slitting of the punctum and canaliculi after bicanalicular SI of the nasolacrimal drainage system.^{7,10,11,16} Other complications of bicanalicular SI include tube displacement, infection, corneal abrasion, tube breakage, and retained tube after severance of the canthal loop. Additionally, removal of bicanalicular tubing has been problematic without recruiting a nasal endoscope in some cases.⁷ In this series, there were 4 slit inferior puncta, and 4 premature extrusions of the tube. There were no problems removing the tube.

Recently, another non-invasive treatment modality, i.e. balloon dacryocystoplasty, has gained popularity. This is especially prevalent in the treatment of congenital NLD obstruction. Previous studies have reported success rates for balloon dilatation varying between 20% and 90% utilizing a variety of techniques.^{5,6,9,12,17}

In conclusion, the overall success rate of SI (as a single procedure) in patients with partial NLD obstruction is low compared to DCR. DCR (with or without SI) remains the golden standard in the treatment of this condition. The main advantages of SI are that it is easy to perform, less time-consuming and less traumatic than DCR. However, although it may be considered in patients who refuse DCR surgery, the relatively poor outcome compared to DCR does not justify its use for this indication.

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Part 2

Perspectives on Eyelid Surgeries

Chapter 4

Muscle Prolapse after Harvesting autogenous Fascia lata used for frontalis Suspension in Children

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Abstract

Purpose: To evaluate the long-term results at the donor-site in children who underwent harvesting of autogenous fascia lata for frontalis suspension in ptosis correction.

Methods: The study design consists of a retrospective, nonrandomized case series. Medical records of 30 patients were reviewed. Each patient was reexamined, evaluating bulging at the donor-site. Muscle prolapse was graded as not visible and not palpable, not visible but palpable, mildly visible or obviously visible. Measurement of the width and length of the leg scar was recorded. Discomfort at the donor-site was graded as no discomfort, occasional discomfort or frequent discomfort.

Results: The mean age of the patients was 7 years (range 1 to 15) with a mean follow up period of 27 months (range 3 to 63). 15 patients (50%) had invisible and impalpable bulging, 2 patients (6.7%) had invisible but palpable bulging, 5 patients (16.7%) had mildly visible bulging and 8 patients (26.7%) had obviously visible bulging. The mean width of the scar was 7.5 mm and the mean length was 3.6 cm. 27 patients (90%) had no functional discomfort of the leg, 2 patients (6.7%) had occasional discomfort and 1 patient (3.3%) had frequent discomfort occurring at exercise.

Conclusion: Following fascia lata harvesting, most patients had no cosmetic complaints or functional complications. The technique of harvesting fascia lata using a Crawford stripper appears to be safe and satisfactory. Since this study, we have modified our technique by closing the fascia in its visible portion leaving only the superior portion opened to further minimize the risk of prolapse.

For many years now, autogenous fascia lata is the preferred material for frontalis suspension surgery in children because of its predictability and lasting results.¹⁻³ Payr was the first one to describe the technique in 1909⁴, after whom Wright described it in 1922.⁵ In 1956, Crawford modified Wright's technique and described the use of his fascia stripper.⁶ In this paper we describe the long-term cosmetic and functional complications at the donor-site after harvesting autogenous fascia lata using the Crawford technique for frontalis suspension.

Materials and Methods

A retrospective medical record analysis was conducted on 30 patients with congenital ptosis, aged 1 to 15 years, who underwent frontalis suspension surgery with autogenous fascia lata at St.-Justine hospital in Montreal, Quebec, Canada. All patients were contacted and reexamined at the hospital.

To evaluate the cosmetic outcome at the donor-site, the bulging of the vastus lateralis of the quadriceps muscle was evaluated and according to this, patients were divided into 4 groups. The first group consisted of patients with invisible and impalpable bulging, the second group of patients had no visible but palpable bulging, the third group of patients had mildly visible bulging (figure 1) and the fourth group of patients showed obviously visible bulging (figure 2). Additionally, the length and width of the leg scar were measured. Evaluating the discomfort at the donor-site, the child or the parents were asked if there had been any complaints postoperatively of discomfort during rest or exercise. The patients were then divided into 3 groups. The first group consisted of patients who never reported discomfort or pain, the second group of patients who reported rare discomfort during the postoperative period and the third group of patients who reported discomfort on a regular basis.

Surgical technique

Harvesting of the fascia lata and the sling operation were in all cases done by one surgeon (F.C.) at St.-Justine hospital in Montreal, Quebec, Canada. The method used for fascia harvesting was based on the technique described by Crawford, using his stripper.⁶ The procedure was performed with the patient under general anaesthesia, lying supine with

the leg rotated medially. After antiseptic preparation and draping of the lateral surface of the thigh from the knee to the upper portion of the thigh, a line was drawn from the anterior superior iliac crest to the head of the fibula. With a number 15 Bard Parker scalpel, a vertical skin incision of 3 to 5 cm in length was made in the lower part of the drawing, a few centimeters above the knee. Dissection was performed down through subcutaneous tissue and fat to the fascia, which can be seen as a glistening white sheet of avascular tissue, with fibers running parallel to the axis of the leg.² With the same scalpel, 2 vertical incisions were made in the fascia, parallel to the fascial fibers, about 1 centimeter apart. A full-thickness horizontal incision connecting the 2 vertical ones was then made. The Crawford stripper was introduced and passed 7 to 9 centimeters superiorly. The bands were cut at the superior end by closing the stripper head⁶. The subcutaneous tissues were closed with interrupted absorbable sutures using polyglactin 910 (Vicryl, Ethicon, inc., Sommerville, New Jersey, USA) 4-0. The skin was closed with Plain Catgut (DemeTech Corporation, Miami, Florida, USA) 5-0 interrupted sutures. An elastic bandage was placed from the foot to the upper portion of the wound and left in place for 24 hours.



Figure 1 | Mildly visible bulging of the left leg muscle.



Figure 2 | Obviously visible bulging of the left leg muscle.

Results

The mean age of the patients at the time of surgery was 7 years, the median age at the time of surgery was 5.75 years (range 1 to 15 years). The mean follow up period was 27 months and the median follow up period was 24 months (range 3 to 63 months).

15 patients (50%) had invisible and impalpable bulging of the vastus lateralis of the quadriceps muscle, 2 patients (6.7%) had invisible but palpable bulging, 5 patients (16.7%) had mildly visible bulging (figure 1) and 8 patients (26.7%) had obviously visible bulging (figure 2).

The mean width of the scar was 7.2 mm (median width of 7 mm) and the mean length was 3.6 cm (median length 3.25 cm).

27 patients out of 30 (90%) had no functional discomfort or pain of the leg postoperatively. 2 patients (6.7%) had minimal discomfort, the first one complained of occasional discomfort at rest the first few weeks postoperatively and the second one had 1 episode of discomfort at rest during a viral infection. 1 patient out of 30 (3.3%) had functional complaints of discomfort and pain during exercise without any signs of inflammation or swelling.

Discussion

Payr was the first one to describe the use of fascia lata in frontalis suspension in 1909³, after whom Wright described it in 1922.⁵ In 1956, Crawford modified Wright's technique and described the use of the fascia stripper.⁶ Many alternative materials have been suggested, including donor fascia lata, either fresh, irradiated or lyophilized, and synthetic materials, such as nylon, polyester, PTFE, polypropylene, ethibond and silicone.⁷ Autogenous fascia lata has been considered to result in lower ptosis recurrence and lower complications rate and therefore has been considered the material of choice.³

Harvesting fascia lata requires an extra procedure making the overall surgical and anaesthetic time longer. Although it is a relatively safe technique, complications have been reported. Dubiel and Wigren assessed functional and cosmetic complications after harvesting a 10 X 20 cm area of fascia lata used for heart valve surgery. They reported muscle herniation in 36%, weakness of hip flexion and knee extension, numbness, pain, haemorrhage, superficial phlebitis, and wound infection.⁸

Frontalis suspension surgery requires much less fascia lata excision (7-9 X 1 cm) and can be harvested using a closed technique. Leibovitch *et al.* found no neurologic deficit or loss of leg function after harvesting fascia lata for frontalis suspension.² They described 1 patient out of 9 (11%) who developed a hypertrophic leg scar.² Wheatcroft *et al.* reported early postoperative problems with pain on walking (67%); limping (38%), and wound pain (57%) for less than 1 week.³ The final cosmetic appearance of the scar caused minor concerns in 8 of his 21 patients (38%). He did not report any bulging of the vastus lateralis of the quadriceps muscle.³

We reported visible bulging of the wound in almost 44% of our patients, 8 of which (26.7%) had obviously visible bulging. So we have subsequently changed to closing the lower part of the fascia defect with polyglactin (Vicryl) 3-0 interrupted absorbable sutures. Compartment syndrome has been reported in deep trauma to the thigh.⁹ Leaving the superior portion of the fascia opened should prevent the occurrence of this rare but severe complication. A new study is necessary to investigate the results of this modification. Another alternative might be to harvest the fascia superiorly on the thigh opposed to the inferior part above the knee, as described by Naugle *et al.*¹⁰ Muscle bulging using this technique has not been reported.

One patient in our series of 30 had functional complaints of discomfort and pain during exercise starting 4 months postoperatively. She also had obviously visible bulging. She was referred to an orthopaedic surgeon who concluded that the discomfort during exercise was due to adhesions between the subcutaneous tissues and the muscle. Physiotherapy improved her symptoms.

In conclusion, fascia lata is often the preferred material when performing frontalis suspension for ptosis correction in children. Following fascia lata harvesting, almost 75% of the patients had no or minimal bulging at the donor-site without any cosmetic complaints. 90% of the patients did not present any functional discomfort of the leg. The technique of harvesting fascia lata using a Crawford stripper appears to be safe and satisfactory and does not appear to cause long standing significant complications in most patients. Leg muscle bulging should be discussed with patients or parents when this option is considered.

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Chapter 5

Blepharoptosis induced by Soft Contact Lens Wear

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Submitted.

Abstract

Purpose: The authors attempt to establish a relation between prolonged soft contact lens wear and upper eyelid ptosis.

Methods: In a retrospective consecutive series, we included all patients between the ages of 18 to 50 years who presented with uni- or bilateral ptosis between January 2002 and December 2005. Patients with a history of ophthalmic surgery or disease, trauma, giant papillary conjunctivitis, unknown duration of contact lens wear or muscular or neurological disorders were excluded. We compared this study group to a Dutch reference population, defined as the total underlying population from which the ptosis cases derive.

Results: 35 patients met the inclusion criteria. Of these, 20 (57%) (age 18 to 50 years, average 37 years) had been wearing hard contact lenses for – on average – 17.6 years (range 6-27 years); 9 (26%) (age 18 to 45 years, average 30 years) had been wearing soft contact lenses for – on average – 9 years (range: 1,5 - 20 years) and 6 (17%) (age 23 to 39 years, average 33 years) had no history of contact lens wear. We found that the odds ratio for soft contact lenses is 9.3 (4.2-50.7 ; CI=95) and for hard contact lenses is 97.8 (22.5-424).

Conclusion: This study suggests that soft contact lens wear may induce upper eyelid ptosis, but probably less frequent than hard contact lens wear.

Aponeurogenic blepharoptosis is assumingly caused by disinsertion, or thinning, of the levator muscle aponeurosis. Typically, levator function is good, and a high eyelid crease is usually found.^{1,2} Aponeurogenic ptosis occurs most often in the elderly as either an involutional disorder or due to anterior segment surgery.^{3,4} It is less common in younger patients in whom it may be associated with ocular surgery or trauma, periocular infection, recurrent eyelid edema, eyelid rubbing, giant papillary conjunctivitis or contact lens wear.^{4,5,6,7,8,9} While hard contact lens wear is widely assumed to be causally related to acquired blepharoptosis,^{4,6,7,8,9} relatively little is known on the relation between soft contact lens wear and acquired blepharoptosis. In our practice, we encountered 35 patients below the age of 50, who had developed an aponeurogenic blepharoptosis of unknown cause. In 9 of these patients, the only potential risk factor we could identify was prolonged soft contact lens wear. This confirms one previous report of soft contact lens wear as an underreported etiological factor for acquired ptosis in young patients.⁶

Methods

We retrospectively included all patients, aged 18 to 50 years, who were seen with aponeurogenic blepharoptosis in the Rotterdam Eye Hospital between January 2002 and December 2005. Blepharoptosis was defined as a vertical lid fissure (the distance between the inferior corneal limbus and the lower margin of the upper eyelid) smaller than 7 mm and/or an asymmetry in upper eyelid position greater than 2mm with no scleral show superiorly. Patients were included if levator muscle function, determined as the maximum excursion of the upper eyelid from down-gaze to up-gaze while fixating the brow, was at least 10mm. Patients with a history of ophthalmic surgery, ophthalmic disease, trauma, giant papillary conjunctivitis, unknown duration of contact lens wear or muscular or neurological disorders were excluded.

History was obtained on past contact lens wear, including duration and types of contact lenses. Ophthalmological examination included evaluation of the vertical lid fissure, levator muscle function and symmetry and height of eyelid creases. External examination was performed to rule out any evidence of old trauma or sequelae of orbital inflammatory episodes. Slitlamp examination with eversion of the eyelid and evaluation of the underlying tarsal conjunctival surface was performed in each case. If both upper eyelids were involved, the most ptotic eyelid was included, or, if both sides were symmetrically

involved, one eyelid was randomly included. Patients were divided into 3 groups: (1) No contact lens wear. (2) Hard contact lens wear for more than 1 year. (3) Soft contact lens wear for more than 1 year. Patients who were wearing soft contact lenses and had ever worn hard contact lenses for more than 6 months were only included in the hard contact lens group.

We acquired data on the frequency of contact lens wear in the general population in the Netherlands, for the age group 18-50 years, based on a survey from 2003 performed by CBS ('Centraal Bureau voor Statistiek' or 'Central Office for Statistics') in the Netherlands.¹⁰ We calculated the ratio of hard contact lens wear versus soft contact lens wear per age group based on a survey for Specsavers, the Netherlands, performed by TNS NIPO, a Dutch market research agency, in 2006.¹¹ This survey was being held under 752 glasses and contact lens wearers using a computer assisted self interviewing technique.

Results

We included 35 patients. Of these, 20 (57%) (age 18 to 50 years, average 37 years) had been wearing hard contact lenses for – on average – 17.6 years (range 6-27 years); 9 (26%) (age 18 to 45 years, average 30 years) had been wearing soft contact lenses for – on average – 9 years (range: 1,5-20 years) and 6 (17%) (age 23 to 39 years, average 33 years) had no history of contact lens wear (Table 1).

The frequency of contact lens wear in the general population in The Netherlands, for the age group 18-50 years, is 12.5% (Figure 1).¹⁰ Hard contact lenses are worn by 14-36% and soft contact lenses are worn by 64-86% .¹¹ Thus, it is estimated that in the general population in The Netherlands, in the age group 18-50 years, 9.4% wears soft contact lenses and 3.1% wears hard contact lenses (Table 2).

Table 1 | Characteristics of patients, between 18 and 50 years of age, meeting the inclusion and exclusion criteria: age in years (yr), gender (m/f), right (R) and/or left (L) sided ptosis, history of contact lens wear (CL), hard contact lens wear (HCL), soft contact lens wear (SCL), duration of contact lens wear in years (yr), vertical lid fissure measurement (VLF).

Age (years)	m/f	Eye	CL	Duration (years)	Previous HCL	VLF (mm)
23	f	L+R	none			7/7
29	f	L	none			11/9
33	m	L	none			9/7
35	f	L	none			11/8
37	f	L+R	none			7/5
39	f	R	none			8/10
18	f	R	HCL	7		6/8
23	m	L+R	HCL	6		7/7
25	f	L+R	HCL	8		7.5/7.5
28	f	L	HCL	10		8/5
32	f	L	HCL	20		8/6
35	f	L	SCL	4	14	10/6
36	f	R	HCL	14		6/7.5
37	f	L+R	HCL	26		5/3.5
37	f	L+R	HCL	18		7/6.5
39	f	R	HCL	24		7/9
40	m	L+R	HCL	20		6/7
40	f	L	HCL	24		8/6
41	f	L+R	HCL	24		6,5/6,5
41	f	L+R	HCL	20		3.5/6
42	m	L+R	HCL	20		8/6
44	f	L+R	HCL	22		7/8
45	f	L	HCL	20		8/7
46	f	L+R	HCL	18		5.5/7.5
48	m	L	HCL	10		5/5
50	f	L+R	HCL	27		6/6
18	m	R	SCL	2		6/8
19	m	L	SCL	4		10/8
23	f	R	SCL	10		8.5/10.5
25	f	R	SCL	10		7/9,5
27	f	L	SCL	7		9.5/7.5
35	f	L	SCL	1,5		9/6.5
40	m	R	SCL	18		6,5/10
42	m	L+R	SCL	20		5/7
45	m	L	SCL	10		9/7

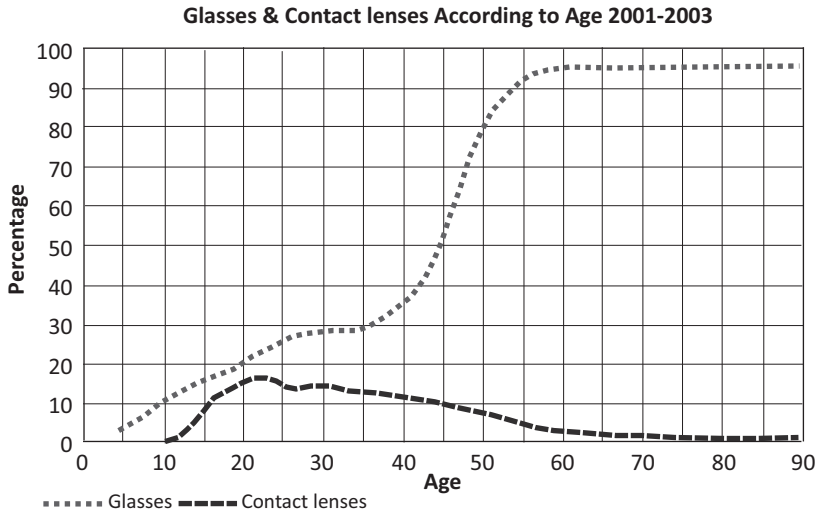


Figure 1 | Distribution of glasses and contact lens wear per age (Frenken F. CBS, webmagazine 2004 July).

This reference population is assumed to be so large, that the distribution of lens wearing in this population is a fixed distribution, not (or hardly) subjected to sampling variability. The odds ratio for soft contact lens wear is 9.3 (4.2-50.7; CI = 95%). The odds ratio for hard contact lens wear is 97.8 (22.5-424).

Table 2 | Patient group and control group, between 18 and 50 years of age, divided into 3 subgroups: no contact lens wear (no CL), soft contact lens wear (SCL) and hard contact lens wear (HCL).

	No CL	SCL	HCL	Total
Ptosis Patients	6 (17%)	9 (26%)	20 (57%)	35 (100%)
Dutch Population	88%	9%	3%	100%

Discussion

Hard contact lens wear is a widely accepted risk factor for acquired blepharoptosis.^{4,7,8,9,12,13} In 1991 Epstein et al. described a possible relation between the use of hard contact lenses and the acquisition of secondary blepharoptosis in 5 patients, age 26 to

55 years.⁹ Van den Bosch and Lemij reported 17 patients with hard contact lens wear and involuntional ptosis in a group of 73 patients (23%).⁸ Kersten *et al.*, found that 39 out of 91 young patients with acquired ptosis, had worn hard contact lenses (43%).⁴ This made contact lens induced ptosis a much more common cause of acquired ptosis in young and middle-aged adults than had been suspected previously. We describe aponeurogenic ptosis in 20 patients under 50 years of age with hard contact lens wear and confirm the increased risk of developing aponeurogenic blepharoptosis with prolonged hard contact lens wear.

A growing number of individuals, especially the younger to middle-aged adults, favour soft contact lenses. Reddy *et al.*, described 13 patients under the age of 35 with unspecified acquired ptosis, 9 of which reported soft contact lens use (69%).⁶ Our findings confirm that soft contact lens wear increases the relative risk of developing aponeurogenic blepharoptosis. The percentage of patients with soft contact lens wear and ptosis might even be higher, because, most likely, not all patients with contact lens wear and mild ptosis visit an ophthalmologist. Also, the duration of soft contact lens wear in our study, was on average much shorter than the duration of hard contact lens wear. This could suggest that the odds ratio for soft contact lens wear might even be higher than calculated in our study. Further studies with a longer soft contact lens wearing time are necessary to confirm the relation between soft contact lenses and acquired ptosis.

This study, however, is hampered by some weaknesses. Firstly, the prevalence of blepharoptosis in the general population is uncertain. Van den Bosch *et al.* demonstrated that there was only one ptotic eyelid in a control group of 50 persons with a mean age of 35.6 years, with no contact lens wear. We therefore assumed that persons in the general population did not have blepharoptosis.⁸ Secondly, the ratio of male to female patients is unbalanced in the 3 groups (no CL: 83% females, HCL 80% female and SCL 44% females). It is not known whether aponeurogenic ptosis predominantly affects females or whether females more typically ask for it to be corrected. Thirdly, we cannot explain why 8 out of 9 SCL wearers had unilateral ptosis and bilateral CL wear. This discrepancy might be caused by a small sample size.

The clinical features of contact lens wear-induced aponeurogenic blepharoptosis do not differ from those found in patients with aponeurogenic blepharoptosis from other

causes. They include a mildly to markedly reduced vertical lid fissure, a normal function of the levator muscle and an elevated lid crease in the upper eyelid.^{5,8}

Although removal of soft contact lenses usually does not require abnormal force to the eyelids or lateral pulling on the eyelids, we believe that lens insertion and removal can play a role in the pathogenesis in those SCL wearers who touch their eyelids while removing their contact lenses. Furthermore, irritation due to the lens or toxic reaction to the lens solution, leading to eye rubbing can play a role. Giant papillary conjunctivitis is known to cause ptosis in patients with soft contact lens wear,^{4,14,15} however, patients with conjunctival changes were excluded from our study. The difference between hard and soft contact lenses in material, size and shape of the lens and thickness of the lens margin possibly leading to differences in mechanical trauma and contact with the levator aponeurosis, could help explain the difference in frequency of ptosis in patients with hard versus soft contact lenses.

In conclusion, this study shows that not only hard contact lens wear, but also soft contact lens wear may induce ptosis of the upper lid through levator disinsertion. Compared to soft contact lenses, the prolonged wear of hard contact lenses most likely carries a much higher risk of developing this disorder. In our practice, we advise patients with blepharoptosis and CL wear to discontinue CL wear for 3 months. If the ptosis does not resolve, ptosis surgery can be planned.

Acknowledgements

The authors wish to thank Specsavers Netherlands and CBS Netherlands for providing data on the frequency of hard contact lens and soft contact lens wear in the general population in The Netherlands, for the age group 18-50 years.

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Chapter 6

The Wies Procedure for Management of Trichiasis or Cicatricial Entropion of either Upper or Lower Eyelids

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Br J Ophthalmol 2009; 93: 1612-1615.

Abstract

Purpose: To report the efficacy of the Wies procedure (transverse blepharotomy and marginal rotation) in the management of trichiasis or cicatricial entropion of the upper or lower eyelid.

Methods: A retrospective chart review was performed of all cases of Wies eyelid rotations supervised or performed by one surgeon for cicatricial entropion or trichiasis of the upper or lower eyelids over a 17 year period to assess the indications, success rate and complications of the procedure. Where follow up was less than 6 months, telephone interviews were conducted to assess patient satisfaction with the surgery. Patients who could not be reached, or had their Wies procedure less than 6 months ago were excluded from the final analysis. Success was defined as no recurrence of the entropion or trichiasis and/or patient satisfaction at least 6 months postoperatively. Statistical analysis was performed using a chi square test.

Results: 154 eyelids (94 upper eyelids, 60 lower eyelids) in 110 patients (69 single eyelid, 39 multiple eyelids) with a mean age of 69 years (range 8-98 years) underwent a Wies procedure between 1991 and 2008. 126 eyelids (77 upper lids, 49 lower lids) in 89 patients (53 single eyelid, 33 multiple eyelids) with a mean age of 68 years (range 8-98 years) who had a follow up period of at least 6 months were studied. The mean follow up period was 67 months (range 6-188 months). The overall success rate was 85%. 13 eyelids (10%) developed complications. 18 eyelids (14%) developed recurrence that required a second procedure. 10 of these second procedures were repeat Wies procedures, 1 of which was followed by electrolysis. All these second Wies procedures were successful.

Conclusion: The Wies procedure (transverse blepharotomy and marginal rotation) is reasonably successful in managing trichiasis and cicatricial entropion of either upper or lower eyelids.

Cicatricial entropion and trichiasis involving either the upper or lower eyelids present a difficult problem in diagnosis and management.¹

Cicatricial entropion develops from conjunctival scarring due to trauma, previous surgery, chemical burns, trachoma, infection, pemphigoid, Stevens- Johnson, radiation or longstanding anophthalmia.² Many surgical approaches have been developed to treat this, including lid splitting with tarsal advancement, internal lamellar lengthening with or without free grafts and lid margin rotation with partial or full thickness blepharotomy.² These surgeries may fail because of a continuing cicatricial process, incomplete correction or may be cosmetically unacceptable.³

Trichiasis may be idiopathic or result from chronic blepharitis, long-term glaucoma medications (including prostaglandin analogues) or lid margin injuries. One or two lashes may be treated with epilation or electrolysis, while broader areas may be treated with cryotherapy. Conventional surgical options include a pentagon excision for discrete areas or splitting the eyelid and dissecting aberrant lash roots off the posterior lamella. Epilation may be difficult to perform for patients and is temporary, while electrolysis has a relatively low success rate and may produce distortion of the lid margin if overdone. Cryotherapy may cause unacceptable depigmentation, loss of normal lashes and distortion of the lid margin.³

Transverse blepharotomy and marginal rotation was first described by Wies in 1954 for the treatment of senile or spastic entropion of the lower lid.⁴ We present the results of this same technique for additional indications including trichiasis and cicatricial entropion of both upper and lower eyelids.

Methods

A retrospective chart review was performed on 110 patients who had undergone a Wies procedure under the supervision of one surgeon (PJD) for cicatricial entropion or trichiasis of the upper or lower eyelids at the Department of Ophthalmology and Visual Sciences, University of British Columbia during a 17-year period (1991 to 2008). Only patients with a follow up period of at least 6 months were included in the final analysis. Data collected included age and gender, indications for surgery, eyelid(s) involved, previous surgeries,

follow up period, outcome, complications, recurrence and onset of recurrence, repeat surgeries and their outcome. Success was defined as no recurrence of the entropion or trichiasis and/or patient satisfaction at least 6 months postoperatively. chi square tests were used to compare these parameters between upper and lower lid cases, trichiasis and cicatricial entropion cases and between cases with and without previous surgery.

Surgical technique

The procedure is performed with the patient awake and lying supine. A drop of topical anaesthetic is instilled in both eyes to reduce irritation from the fumes of the skin antiseptic. The length of lid involved by trichiasis or entropion is marked with a surgical pen 4 mm from the lid margin. Local anaesthetic consisting of two thirds bacteriostatic saline (containing benzyl alcohol) and one third xylocaine 1% with 1/100,000 epinephrine⁵ is injected subconjunctivally in the surgical area of the eyelid and subcutaneously adjacent to the eyelid margin. The patient's face is cleaned and draped to expose the entire face. Oxygen supplied via a facial mask is contraindicated with the use of hot-wire cautery because of the risk of fire.⁶ A 4-0 silk retraction suture is placed through the grey line and a chalazion clamp is applied with the opening facing anteriorly. A number 15 Bard Parker blade is used to create a full-thickness horizontal incision approximately 4 mm from the eyelid margin through the opening of the clamp, pushing through to the metal clamp posteriorly (figure 1). Haemostasis is achieved with the hot-wire cautery and the chalazion clamp is removed. Using Westcott scissors, the wound can be extended temporally and nasally if necessary along the desired length of the eyelid involved. Hemostasis is achieved in the same manner. A cotton bud can be placed behind the lid through the opening to displace it forward away from the eye and provide protection and dry the tissues while cautery is applied.

A horizontal mattress suture using 5-0 chromic gut or synthetic absorbable material is placed partial thickness through the anterior thickness of the tarsus and/or lower lid retractors proximal to the horizontal incision, and threaded through orbicularis and skin on the distal eyelid bridge, and tied over an elastic band or silicone bolster adjacent to the eyelash line (figure 2). In the upper lid, care must be taken to avoid allowing any of the suture to protrude posteriorly and chafe the cornea. Additional horizontal mattress sutures can be placed for broader segments of involved lid. The skin edges are closed with interrupted 6-0 prolene or remnants of the 5-0 absorbable sutures prior to tightening

the everting sutures over the bolsters. The retraction suture is removed and antibiotic ointment applied on the wound (figure 3a and b). The silicone bolster and sutures are removed approximately 10 days after surgery.

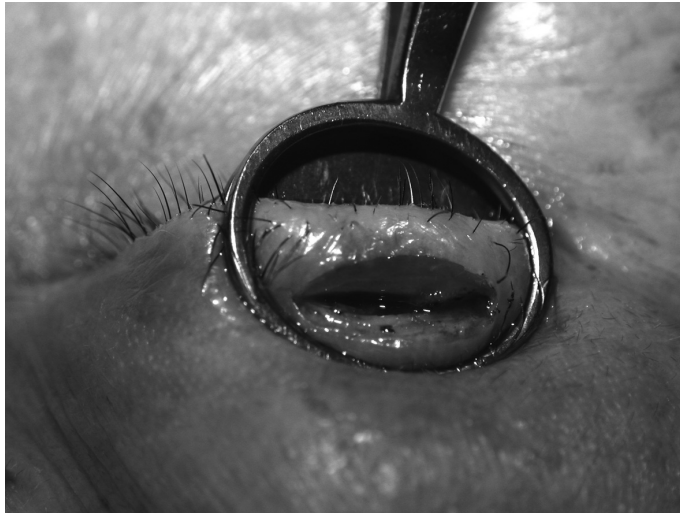


Figure 1 | A full-thickness horizontal incision has been created through the opening of the chalazion clamp along the length of the affected eyelid.



Figure 2 | A horizontal chromic gut suture is threaded from the proximal partial-thickness tarsal plate edge through the anterior lamella of the eyelid bridge distal to the incision, and tied over an elastic band bolster.

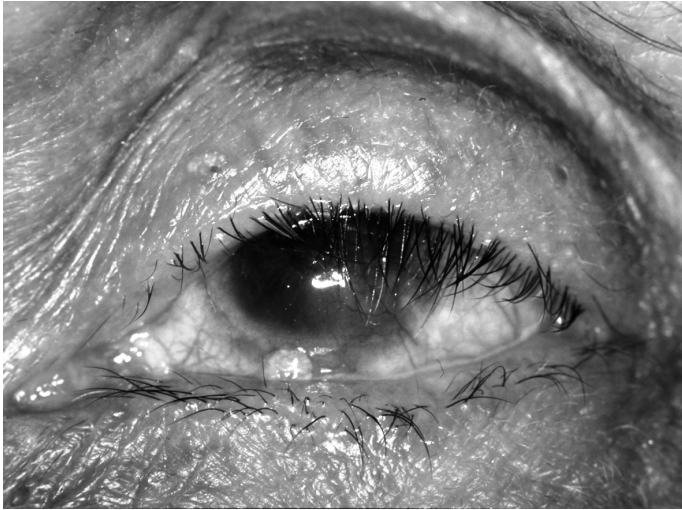


Figure 3a | Patient with upper lid cicatricial entropion from previous trachoma.

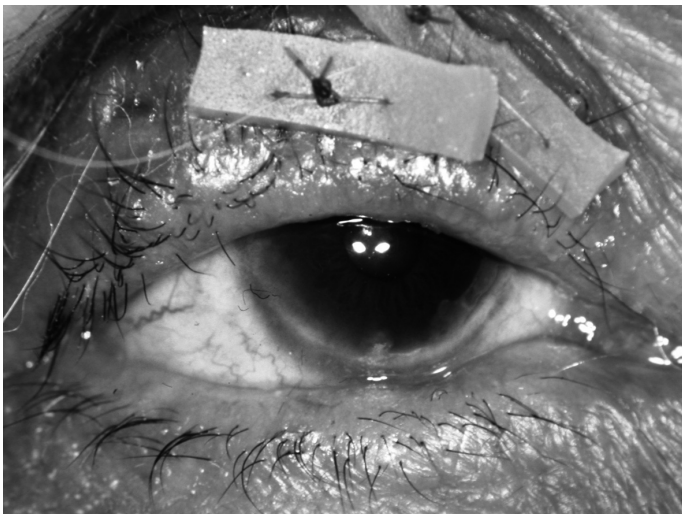


Figure 3b | Same patient postoperatively with Wies rotation suture in place.

Results

The study included 110 patients and 154 eyelids, (comprised of 94 upper and 60 lower lids). 69 patients underwent the procedure on one eyelid, and 39 patients had more than one lid repaired. The average age was 69 years (range, 8-98 years), and the majority were females (75 females; 35 males).

Table 1 | Indications for the surgery

Etiology	No of eyelids
Cicatricial entropion	
– Trachoma	25
– Stevens Johnson	12
– Previous surgery	7
– Failed involucional entropion repair	4
– Ocular pemphigoid	7
– Undetermined	41
– Socket anophthalmia	6
Trichiasis	
– Previous notch excision/tarsorrhaphy	5
– Trauma/thermal burn	3
– Blepharitis	3
– Xalatan use	2
– Undetermined	39

126 eyelids (77 upper lids, 49 lower lids) in 89 patients (53 single eyelid, 33 multiple eyelids) with a mean age of 68 years (range 8-98 years) who had a follow up period of at least 6 months were studied. 47 eyelids had undergone previous surgeries elsewhere of which 20 eyelids had undergone multiple procedures.

Of the cases with trichiasis, 9 had electrolysis, 1 had a pentagon wedge excision, and 1 underwent an undefined previous surgery.

Of the cicatricial entropion cases, 5 had electrolysis, 4 had mucosal grafting, 2 had lid split surgery, 1 had Quickert transverse sutures done, 1 had anterior lamellar surgery, 1 had retractor plication done and 2 underwent undetermined previous surgery.

Of the eyelids that had undergone multiple previous surgeries, 3 had electrolysis twice and 2 had electrolysis 3 times, 2 had electrolysis and a wedge excision, 1 underwent a wedge excision twice, 1 had a wedge excision and an anterior lamellar recession, 1 had electrolysis twice, Quickert everting sutures and a Wies procedure, 1 had electrolysis once and cryotherapy twice, 1 underwent a Wies procedure 4 times, 1 had 3 lid split procedures with mucosal grafting, cryotherapy and a Wies procedure, 1 had 2 lid split procedures with mucosal grafting, cryotherapy and a Wies procedure, 1 underwent cryotherapy twice, 2 had a lid fracture procedure and a lid split with recession of the anterior lamel, 1 had retractor plication, ectropion repair and Wies procedure and 2 underwent multiple undetermined procedures.

Mean follow up was 67 months (range, 6-188 months). The overall success rate was 85% with no statistical difference in success between the upper and lower lids ($p > 0.05$) or between cicatricial entropion and trichiasis ($p > 0.05$). In cases with previous surgery, the success rate was lower (76%) ($p < 0.05$, chi square).

Table 2 | Success rates per group

Etiology	Success rate
Cicatricial entropion	
– Socket anophthalmia	100%
– Trachoma	89%
– Ocular pemphigoid	86%
– Previous surgery	67%
– Stevens Johnson	64%
– Failed involuntional entropion repair with scar	50%
– Undetermined	93%
Total cicatricial entropion	85%
Trichiasis	
– Prostaglandin-analog drops	100%
– Blepharitis	67%
– Previous notch excision/tarsorrhaphy	60%
– Trauma/thermal burn	50%
– Undetermined	94%
Total trichiasis	86%

13 eyelids (10%) had complications: six eyelids had inflammation of the skin underlying the bolster. This led to early removal of the bolster in two cases. One eyelid initially had slight wound gaping that healed spontaneously. 4 eyelids developed a chalazion, 2 needed treatment with oral antibiotics (erythromycin orally 250mg QID or Keflex 500mg QID) and warm compresses, 1 was treated with warm compresses only and 1 needed incision and drainage. In 2 of these cases the Wies procedure was unsuccessful. 2 patients developed a pyogenic granuloma. 2 cases had slight overcorrection initially.

18 eyelids (14%) had recurrence of their trichiasis or entropion, all of which underwent further surgery: 10 of them had a second Wies, 1 of which with electrolysis at the same time. All these Wies procedures were successful. 5 had electrolysis done, 2 had a wedge excision done and 1 had a lid split procedure performed.

Discussion

Cicatricial entropion and trichiasis of upper and lower eyelids present a problem in diagnosis and management.¹ Different surgical techniques have been described with variable results.^{1,3,7,8,9,10,11,12} Bercovici *et al.* reported a success rate of only 57% for transverse blepharotomy and marginal rotation for cicatricial entropion.⁸ Adamu *et al.* reported a response rate of 92,2% for bilamellar tarsal rotation and tarsotomy for upper eyelid trichomatous trichiasis but only with a follow up period of 3 months.¹² Kersten *et al.* reported a similar 85% success rate with a single tarsotomy at a mean follow up of 13 months.³

Ballen¹³ was the first to describe the application of the uniquely simple procedure of Wies² to the upper lid in 1964. In 1989 Millman *et al.* described an 85% success rate using the Wies technique² for different causes of cicatricial entropion of both the upper and lower lid. He did not, however, compare the outcome between the two. We found no difference in surgical success for the Wies procedure between the upper and lower eyelid ($p > 0.05$).

We believe the Wies procedure has equal merit for cases of trichiasis involving greater lengths of the upper or lower eyelid than could be treated with traditional electrolysis or wedge excision. This application has not been emphasized in other reports.

The Wies procedure has several advantages. It is simple to master and perform with minimal operative time. The complication rate is low. In our series we found six eyelids with irritation from the healing process and/or bolster. This did not affect the outcome, but only led to early removal of the bolster in 2 of them. One eyelid initially had slight wound gaping. This improved spontaneously. 4 eyelids (cicatricial entropion due to pemphigoid, Stevens Johnson, pseudopemphigoid and socket anophthalmia) developed a chalazion that needed treatment with warm compresses and/or oral antibiotics and incision and drainage in 1 case. In 3 out of these 4 cases the surgery was unsuccessful, perhaps because the suture divided or possibly because of ongoing inflammation. Other complications described in the literature include overcorrection or consecutive ectropion after Wies procedure;^{2,14,15} undercorrection;² eyelid fistula following Wies entropion repair¹⁶ and conjunctival granuloma². We identified 2 pyogenic granulomas, 1 of which was a failure, and 2 slight initial overcorrections.

The Wies procedure has a wide range of indications: both trichiasis and cicatricial entropion of the upper or lower lid with different etiologic causes can be treated with an overall success rate of 85%. If previous surgery is performed, we found a lower success rate (76%), but the procedure can easily be repeated in case of failure. In our series we performed 10 repeated Wies procedures, all of which were successful.

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Chapter 7

Floppy Eyelid Syndrome and Ptosis in a Patient with Pachydermoperiostosis

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Accepted Ophthalmic Plastic and Reconstructive Surgery.

Brief Abstract

A patient with the rare condition of pachydermoperiostosis (PDP) with secondary ptosis and floppy eyelid was successfully treated with a combination of levator advancement and an upper lid tarsal strip. This is the second report in the literature of combined floppy eyelid and ptosis with this condition and the first report of this surgical approach for its management. The histopathology of the excised lid tissue found changes consistent with both PDP and floppy eyelid syndrome.

Pachydermoperiostosis or primary hypertrophic osteoarthropathy is a rare inherited disorder characterized by digital clubbing, periostosis and facial enlargement. Ophthalmic features may include bilateral eyelid ptosis while an associated floppy eyelid syndrome has been described once previously. We report a patient with both bilateral eyelid ptosis and floppy eyelid syndrome successfully treated with an upper lid lateral tarsal strip and levator advancement. The histopathological findings are discussed.

Case Report

A 29-year-old male was referred complaining of recurrent upper eyelid ptosis and ocular discharge and irritation on awakening. Both he and his brother were diagnosed with pachydermoperiostosis (PDP) in mid-adolescence. He was treated with upper lid blepharoplasties and levator advancement by a plastic surgeon five years previously and repeat left upper lid levator advancement and horizontal shortening with a central pentagon excision by another ophthalmologist one year later. Two years later he underwent bilateral refractive surgery (LASIK) and excision of bilateral nasolabial and glabellar rugae.

On presentation he had markedly thickened, oily and furrowed skin (figure 1a). His hands and feet were enlarged with distal clubbing (figure 1c). There were no signs of prognathism or macroglossia. X-ray examinations showed cortical thickening of the long bones of the extremities with a thin periosteal reaction. Blood tests revealed a mild leukopenia and a normochromic normocytic anaemia.

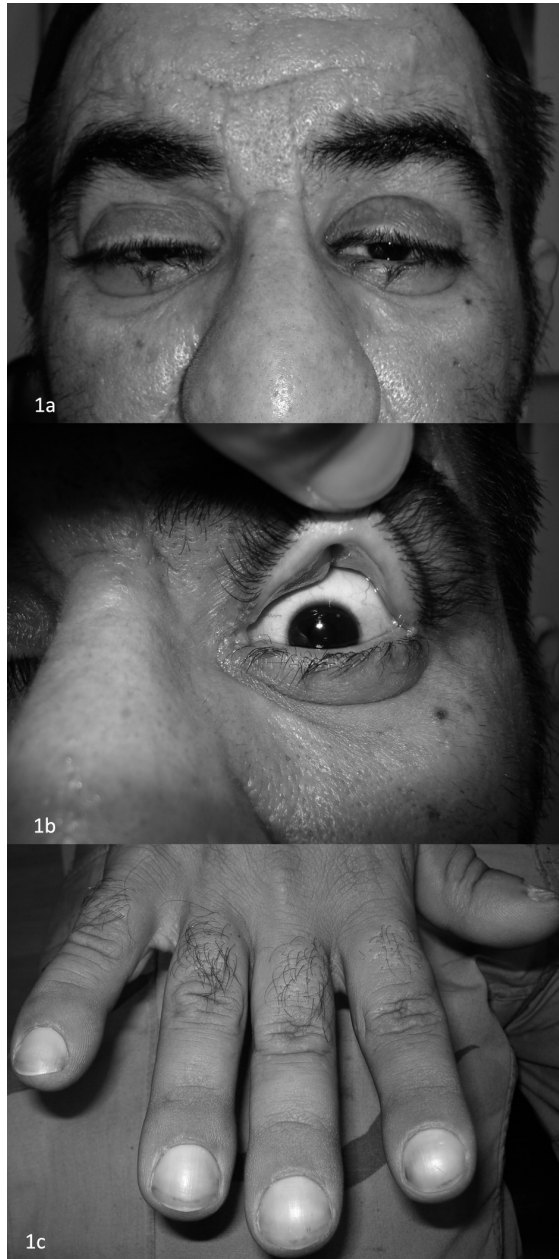


Figure 1 | **1a** 29-year-old male with thickened, oily facial skin and prominent folds in the forehead and face. **1b** Upper eyelid is floppy and easily everted to demonstrate velvety, giant papillae on the palpebral conjunctiva. **1c** Large hands and clubbed fingers typical of PDP.

Visual acuity was 20/50 right and 20/30 left. His upper lid skin was elastotic and the lids were thickened and overrode the lower ones. They were horizontally lax and could easily be everted, demonstrating a velvety, papillary conjunctival reaction (figure 1b). Both upper lids were ptotic with a margin-reflex distance of 0 mm right eye and 1 mm left eye. He had good levator function. Surgical scars were visible in both upper lid creases and an irregularity was evident in the left upper lid centrally at the site of a previous wedge excision (figure 2b). His corneae had mild inferior punctate epithelial erosions. The remaining ocular examination was normal.

The diagnosis of bilateral residual ptosis and floppy eyelid syndrome secondary to PDP was made. Bilateral upper lid horizontal tightening with tarsal strips and levator advancement were performed (figures 2a and 2b). The patient was pleased with the improved field of vision and reduced morning discharge. Tissue from the left eyelid was submitted for histopathology and showed thickening of the tarsal plate, meibomian gland hyperplasia, thickening of the dermis (figure 3a), perivascular lymphocytic infiltration and conspicuous giant conjunctival papillae (figure 3b).

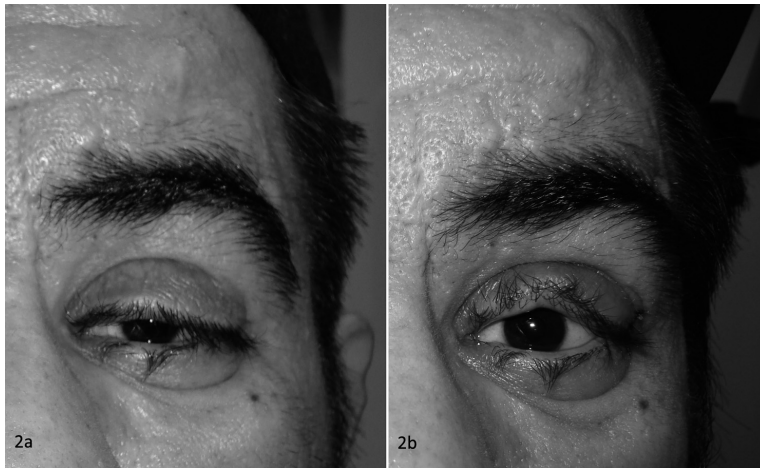


Figure 2 | 2a Preoperative view of left eyelid showing marked ptosis and thickened skin in spite of previous horizontal shortening with a central wedge excision and two previous attempted levator advancements. **2b** 1 week postoperative view of left eyelid demonstrating improvement of ptosis and horizontal laxity. Note the central peak from previous central wedge excision and the lateral canthal suture from his upper lid lateral tarsal strip.

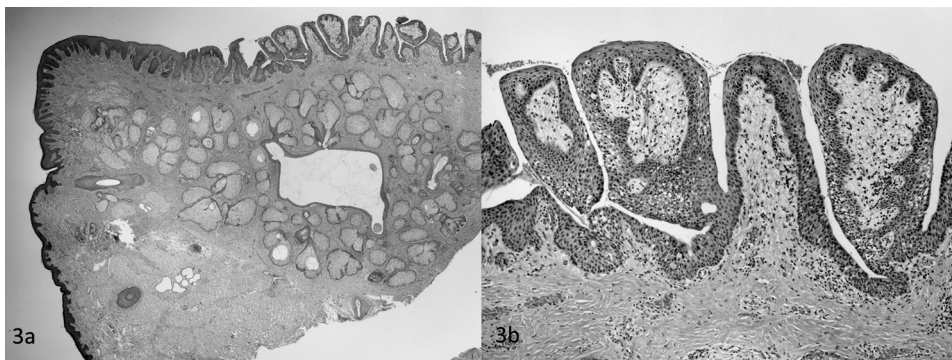


Figure 3 | 3a Low power (x10) photomicrograph demonstrating hypertrophic sebaceous glands and thick interwoven collagen bundles in the dermis, consistent with previous descriptions of PDP. **3b** High power (x100) photomicrograph shows giant papillae in the palpebral conjunctiva with peri-vascular inflammation consistent with previous descriptions of floppy eyelid.

Discussion

Hypertrophic osteoarthropathy has been classified in two forms: primary and secondary.¹ Primary hypertrophic osteoarthropathy (PDP) is an autosomal dominant inherited disorder with no identifiable underlying disease. It was first described by Friedreich in 1868.² Secondary PDP is associated with thoracoabdominal neoplasia or chronic disease. Both have similar clinical features. The skin and skeletal system are primarily affected with coarse facial wrinkles, cutis verticis gyrata, digital clubbing, ‘elephant feet’ and thickening of the long bones caused by periostitis and osteogenesis.¹ Anaemia, as described in our patient, has also been associated. Various conditions such as acromegaly, Paget’s disease, syphilis and leprosy must be excluded.¹ PDP is more common in men and typically develops during puberty and progresses into adulthood. The underlying pathophysiology is unknown although altered peripheral blood flow leading to capillary stasis has been proposed.¹

Thickened and ptotic upper eyelids are a common feature of PDP and have been previously described.^{3,4} The floppy, easily everted upper eyelids and bilateral papillary conjunctival reaction seen in our case are features typical of floppy eyelid syndrome, first

described by Culberston and Ostler in 1981.⁵ This association has only been previously described by Downes *et al.* in 1989.⁶

Management is essentially surgical. We performed a combined horizontal lid shortening with an upper lid tarsal strip and levator advancement on both upper eyelids with a satisfactory functional and aesthetic result. A lateral tarsal strip procedure for horizontal eyelid shortening in PDP has not been previously described. Although only one group has reported an association with floppy eyelid syndrome,⁶ other surgeons have performed wedge excisions to shorten the upper lid because levator advancement alone caused ectropion of the upper lid margin.^{3,4}

Histopathological findings of the eyelid in PDP include sebaceous gland hyperplasia, enlargement of sweat glands, thickening of the dermis with an increase in collagen content, deposition of mucin, and perivascular lymphocytic infiltration.⁴ Our histopathological findings are consistent with those previously described. Additionally, the conjunctival papillary reaction is consistent with the histopathological findings in floppy eyelid syndrome.

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Chapter 8

Merkel Cell Carcinoma of the Eyelid: a Report of two Cases

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Accepted Canadian Journal of Ophthalmology.

Merkel cell carcinoma (MCC) of the eyelid is a rare cutaneous malignancy that typically affects the elderly and immunocompromised. In this article we present two cases of MCC affecting the eyelid and review the literature.

Case I

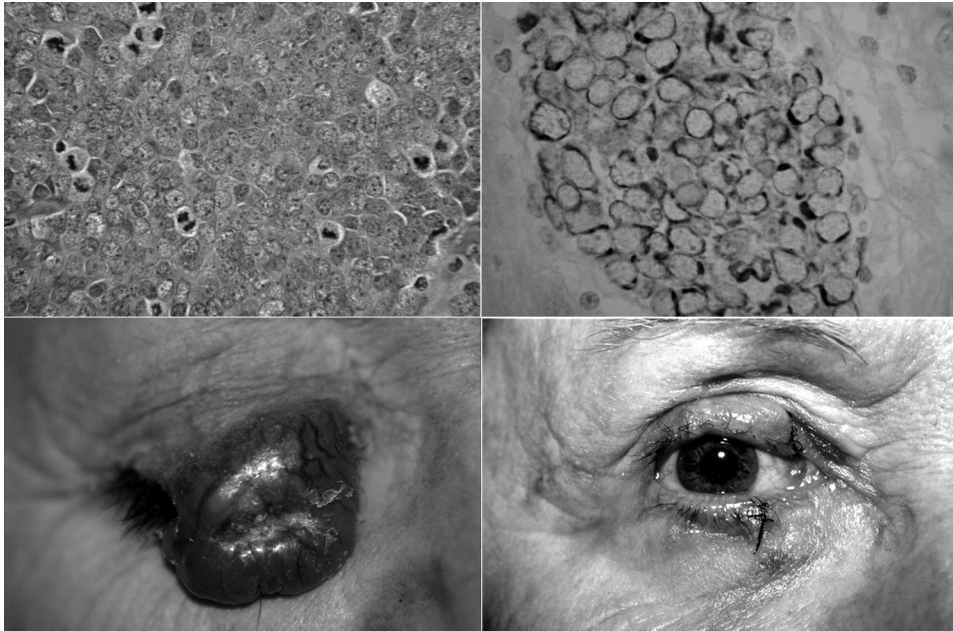


Figure1 | **1a** Small blue cells with scant cytoplasm and round, oval nuclei with vesicular chromatin; high proliferative activity with numerous mitotic figures. **1b** Cytokeratine 20 positivity with dot-like perinuclear staining, characteristic of Merkel cell tumor. **1c** Merkel cell carcinoma of the right upper eyelid of patient I, resembling a chalazion. **1d** Right upper eyelid of patient I post excision of Merkel cell carcinoma and reconstruction using the Abbé-Mustardé flap technique (full thickness switch flap from the right lower eyelid with the pedicle at the lateral end. This flap is partly sutured into the defect and the pedicle is divided at a second stage)

A 71-year-old woman presented with a rapidly growing mass on her right upper eyelid. A biopsy showed MCC (figure 1a-b). On examination, a large multi lobulated lesion of 2.5 by 2.0 cm, resembling a chalazion was seen (figure 1c). There were no enlarged lymph

nodes. Systemic work up excluded metastatic spread. An excision of the tumor was performed with frozen section control and sentinel lymph node assessment. The eyelid was reconstructed using the Abbé-Mustardé flap technique (figure 1d). Postoperatively, the patient received prophylactic local radiotherapy (40 Gy in 10 sessions). Four months post surgery, she presented with an enlarged preauricular lymph node. MRI scan showed two parotid gland lesions. A partial parotidectomy was performed. Histopathology confirmed the presence of MCC. Postoperatively, the patient received radiotherapy on the parotid gland region (42.4 Gy in 16 sessions). Thirty-six months after initial diagnosis, the patient has no evidence of further metastasis.

Case II

An 82-year-old woman presented with a violaceous mass on the left lower eyelid, increasing in volume for two months (figure 2a). On examination, a nodular vascular lesion, with desquamation on the surface was seen. No lymph nodes were enlarged. The patient was known to have chronic lymphoid leukaemia (CLL). A biopsy confirmed MCC. Systemic work up excluded distant metastasis. Two weeks post biopsy the tumor was excised using Moh's micrographic surgery (figure 2b). After reconstruction with a Hughes flap, the patient received local radiotherapy (50 Gy in 20 fractions). Forty-two months after initial diagnosis, there is no evidence of metastasis.

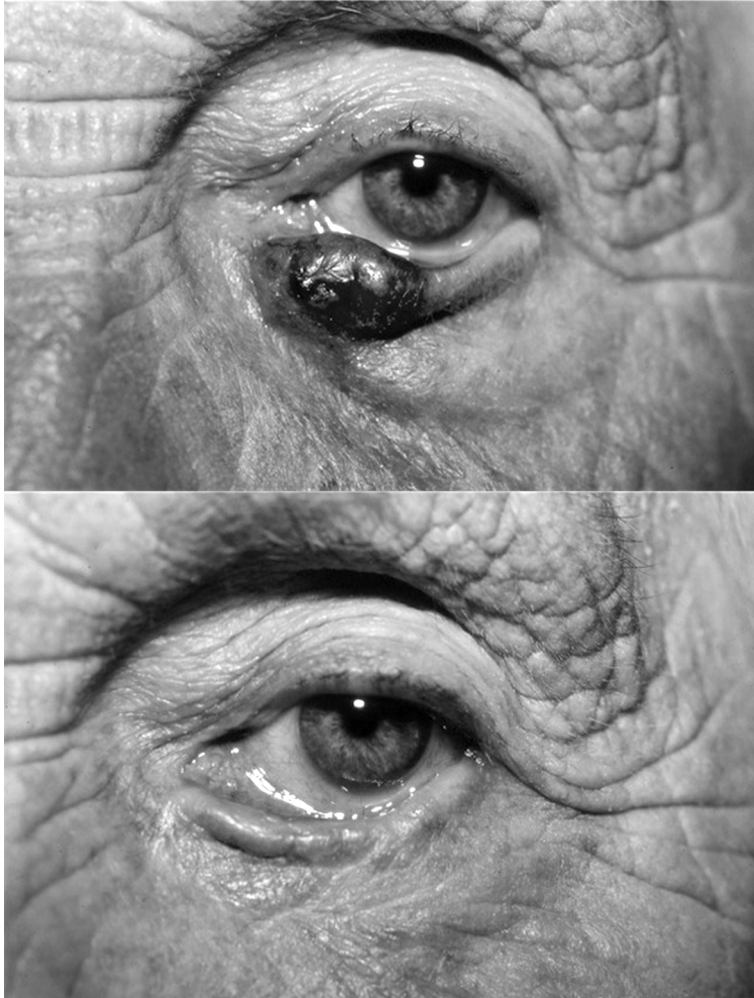


Figure 2 | 2a Merkel cell carcinoma of the left lower eyelid of patient II, covering the inferior punctum. **2b** Left lower eyelid of patient II post Moh's surgery and reconstruction with a Hughes flap (tarsconjunctival flap of the left upper eyelid to reconstruct the posterior lamella with a skin graft from the right upper eyelid for the anterior lamella; the flap is reopened at a second stage)

Discussion

MCC is a rare but aggressive cutaneous neoplasm of neuroendocrine origin, increasing in incidence.¹ It occurs predominantly in the elderly and immunocompromised (eg CLL as in our second case). Polyomavirus infection as well as sun exposure may play a role.^{2,3} The female/male ratio is 2/1.^{2,3}

Clinically, MCC of the eyelid usually presents as a solitary, rapidly growing, purple-red, painless nodule near the eyelid margin, with minimal loss of eyelashes.² Its surface is smooth and often shows dilated teleangiectatic blood vessels. The overlying epidermis is usually intact.⁴ Local recurrences occur in about one third of patients, usually within one year. Two-thirds have regional lymph node metastases, mostly within 18 months. Up to one half of patients develop distant metastases, most frequently within two years.⁴

Sentinel lymph node biopsy could allow for early detection of occult regional lymph node metastasis, but this remains controversial.² Interestingly in case 1, four months post surgery, MCC was present in two intra parotid lymph nodes, despite a negative sentinel lymph node biopsy.

The current primary treatment of the tumor consists of excision with 5-mm margins with histopathologic confirmation of tumor-free margins. Frozen section assessment, including Moh's surgery is appropriate.¹ Adjuvant prophylactic irradiation of the tissues between the tumor and first regional lymphatic nodes (50 to 60 Gy in 20 to 25 fractions) is recommended.⁵

Acknowledgements/disclosure

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Chapter 9

Acute Angle Closure Glaucoma after Oculoplastic Surgery

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Orbit 2008; 27: 49-50.

Abstract

Purpose: To describe 2 patients with acute angle-closure glaucoma after oculoplastic surgery

Design: Interventional case reports

Methods: Review of clinical findings and treatment

Results: A 61-year-old female developed a painful eye with decreased visual acuity a few days after bilateral blepharoplasty. A 69-year-old male developed a painful red eye with decreased visual acuity a few days after ptosis correction. In both cases the intraocular pressure increased to more than 50 mmHg. Both patients were diagnosed with acute angle closure glaucoma and treated appropriately.

Conclusion: Acute angle closure glaucoma is a possible complication of oculoplastic surgery.

Oculoplastic surgery is frequently performed with few serious complications. We present 2 cases of acute angle-closure glaucoma after oculoplastic surgery, one of which results in permanently reduced visual acuity. As far as we are aware, this complication has only been reported on 3 previous occasions,^{1,2,3} none of which was in a primary ophthalmologic journal.

Case 1

A 61-year-old female underwent bilateral blepharoplasty under local infiltration anaesthesia with xylocaine 1%/ epinephrine 1:100 000. A few days later she presented to the eye department with continuous ocular pain and decreased vision of the left eye. On examination the visual acuity was 20/200 in the left eye and the intraocular pressure was 50 mmHg. Slitlamp examination showed a hazy cornea, a shallow anterior chamber, a moderately dilated pupil and 'glaukomflecken' on the anterior lens surface. The patient was + 4 dioptres hypermetropic and had an axial eye length of 21.67 mm. Acute angle-closure glaucoma was diagnosed and the patient was treated with pilocarpine gtt 4%, oral acetazolamide, intravenous mannitol and a peripheral Yag laser iridotomy. Because of insufficient reduction of intraocular pressure, a combined cataract extraction with trabeculectomy was performed. A few weeks later the intraocular pressure was normalized and visual acuity of the left eye was 20/25. A Humphrey visual field test showed no glaucomatous defects.

Case 2

A 69-year-old male underwent ptosis correction (levator resection) of the left upper eyelid under local infiltration anaesthesia with xylocaine 1%/ epinephrine 1:100 000. He presented to the eye department a few days later with continuous pain, redness and decreased vision of the left eye. On examination the visual acuity was 20/60 in the left eye and the intraocular pressure was 70 mm Hg. The left cornea was hazy with iris pigment deposited on both the cornea and anterior lens surface, and the anterior chamber was very shallow in both eyes. The patient's ophthalmologic history showed a hypermetropia of +2.5 dioptres and an anterior uveitis at the age of 18. Acute angle-closure glaucoma was diagnosed and the patient was treated with pilocarpine gtt 4%, oral acetazolamide

and a peripheral Yag laser iridotomy after which the intraocular pressure normalized. Visual acuity remained reduced at 20/60 because of cornea guttata, corneal opacification, iris pigment deposits and mild cataract. Because of the mild cataract, the risk of corneal decompensation and the possible anterior uveitis in the past, a cataract extraction was not performed.

Discussion

Oculoplastic surgery is frequently performed and ocular complications are rare.⁴ Decreased visual acuity after oculoplastic surgery may have a few causes: a retrobulbar haemorrhage can compress the optic nerve and lead to decreased visual acuity, eyelid swelling can obstruct the optical axis.¹

Acute angle-closure glaucoma after oculoplastic surgery can be explained by the addition of epinephrine in the infiltration anaesthetics. Absorption into the eye of a small amount might induce mydriasis, caused by sympathetic activation of the α_1 -receptor (adrenaline) of the dilator pupillae muscle. Other causes of pupillary dilatation, such as dilatation of a dark-adapted eye under the postoperative bandaging and a heightened anxiety state, could also have contributed.³ Both our patients had axial hypermetropia, which is another risk factor for angle-closure (refractive errors were + 4 and + 2.5 dioptres).

The Rotterdam Study showed that acute angle-closure glaucoma after diagnostic mydriasis in unselected subjects with tropicamide 0.5 % and phenylephrine 5 % gtt had an incidence of 3/10000. The Baltimore Eye Survey showed no acute angle-closure glaucoma after mydriasis.^{5,6}

This case report shows the rare possibility of acute angle-closure glaucoma after oculoplastic surgery. Patients with axial hypermetropia might have an increased risk. Therefore acute angle-closure glaucoma must be included in the differential diagnosis as a cause for postoperative pain after oculoplastic surgery, especially when the patient complains of reduced visual acuity.

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Chapter 10

Summary/Samenvatting

Summary

Ocular adnexal surgery comprises both lacrimal and eyelid surgery. The traditional surgical treatment of a nasolacrimal duct obstruction remains a dacryocystorhinostomy. However, alternative treatments, such as silicone intubation and dacryocystoplasty, have been described. These alternative techniques are discussed in the first part of this thesis. The second part of this thesis comprises updates in eyelid surgery, including possible serious complications.

Chapter 1 is a general introduction of the subjects outlined in this thesis. The essentials of the anatomy and physiology of the lacrimal drainage system are summarized. Primary acquired nasolacrimal duct obstruction is defined and different treatment options are discussed. The normal upper eyelid anatomy is briefly described and different eyelid abnormalities together with their treatment possibilities are discussed. These eyelid abnormalities include congenital and aponeurogenic ptosis, cicatricial entropion and trichiasis, floppy eyelid syndrome and finally Merkel cell carcinoma.

In **Chapter 2**, we examine if the addition of (antegrade) balloon dacryocystoplasty to bicanalicular silicone intubation affects the success rate in adults with incomplete nasolacrimal duct obstruction. We randomly treated 70 eyes of 70 patients with incomplete nasolacrimal duct obstruction and severe epiphora (Munk score grade 3 or 4) with dacryocystoplasty and silicone intubation (group 1) or silicone intubation alone (group 2). Mean follow up is 43.4 months in group 1 and 34.9 months in group 2. Complete success, partial success and failure are defined using the Munk score. Differences in success rate between the two groups prove not to be significant.

In **Chapter 3**, we evaluate the results of 72 tear ducts from 53 patients with acquired partial nasolacrimal duct obstruction and severe epiphora treated with bicanalicular silicone intubation. Mean follow up is 29.3 months. The results are assessed using the Munk score. We find a low success rate for bicanalicular silicone intubation in patients with acquired partial nasolacrimal duct obstruction. Although this procedure may be considered in patients who refuse dacryocystorhinostomy surgery, the relatively poor outcome compared to dacryocystorhinostomy does not justify its systematic use for this indication.

In **Chapter 4**, we study the long-term results at the donor-site in 30 children who underwent harvesting of autogenous fascia lata for frontalis suspension in ptosis correction. Muscle prolapse is graded, measurement of the width and length of the leg scar is recorded and discomfort at the donor-site is noted. Mean follow up is 27 months. Following fascia lata harvesting, most patients have no cosmetic or functional complications. The technique of harvesting fascia lata using a Crawford stripper appears to be safe and satisfactory and does not appear to cause longstanding significant complications on most patients. Leg muscle bulging should be discussed with patients or parents when this option is considered.

In **Chapter 5**, we attempt to establish a relation between prolonged soft contact lens wear and upper eyelid ptosis. In the consecutive series of 35 young to middle-aged adults with aponeurogenic ptosis, meeting the inclusion and exclusion criteria, 9 patients had been wearing soft contact lenses for – on average – 9 years. No other risk factors for aponeurogenic ptosis could be identified. This study suggests that not only hard contact lens wear, but also soft contact lens wear may induce ptosis of the upper eyelid through levator disinsertion. Compared to soft contact lenses, the prolonged wear of hard contact lenses most likely carries a much higher risk of developing this disorder.

The efficacy of the Wies procedure (transverse blepharotomy and marginal rotation) in the management of trichiasis or cicatricial entropion of the upper or lower eyelid is discussed in **Chapter 6**. One hundred and twenty-six eyelids in 89 patients that underwent a Wies procedure with a minimum follow up period of 6 months are identified. The mean follow up period is 67 months. The Wies procedure appears to be reasonably successful (overall success rate of 85%) in managing trichiasis and cicatricial entropion of either upper or lower eyelids. The procedure can easily be repeated in case of failure.

A patient with the rare condition of pachydermoperiostosis with secondary ptosis and floppy eyelid is described in **Chapter 7**. Thickened and ptotic upper eyelids are a common feature of pachydermoperiostosis. The floppy, easily everted upper eyelids and bilateral papillary conjunctival reaction seen in our case are features typical of floppy eyelid syndrome, first described by Culbertson and Ostler in 1981. The patient was successfully treated with a combination of levator advancement and upper lid tarsal strip. Histopathological findings are discussed.

In **Chapter 8**, we present two patients with Merkel cell carcinoma affecting the eyelid. In the first patient, an excision of the tumor was performed with frozen section control and sentinel lymph node assessment. The eyelid was reconstructed using the Abbé-Mustardé flap technique. The second patient underwent wide tumor excision using Moh's micrographic surgery and reconstruction with a Hughes flap. Postoperatively, radiotherapy was given to both patients. Both patients are tumor-free, thirty-six and forty-two months respectively after initial diagnosis.

In **Chapter 9**, an unusual complication of oculoplastic surgery, namely acute angle-closure glaucoma, is described. Oculoplastic surgery is frequently performed with few serious complications. We present two cases of acute angle closure glaucoma after oculoplastic surgery, one of which resulted in permanently reduced visual acuity.

Samenvatting

Chirurgie van de oculaire adnexen omvat zowel traanwegchirurgie als ooglidchirurgie. De traditionele chirurgische behandeling van een traanwegstenose blijft een dacryocystorhinostomie. Alternatieve behandelingsmogelijkheden, zoals siliconeslangintubatie en ballondilatatie zijn al beschreven. Deze alternatieve technieken komen aan bod in het eerste deel van dit proefschrift. Het tweede deel van deze thesis omvat updates in ooglidchirurgie, inclusief mogelijke ernstige complicaties.

Hoofdstuk 1 is een algemene inleiding over de onderwerpen van dit proefschrift. De hoofdpunten van de anatomie en fysiologie van het traanwegsysteem zijn samengevat. Primair verworven traanwegobstructie wordt gedefinieerd en verschillende behandelingsopties worden besproken. De normale bovenooglidanatomie wordt kort weergegeven en verschillende ooglidafwijkingen samen met hun behandelingsmogelijkheden komen aan bod. Deze ooglidafwijkingen omvatten congenitale en aponeurogene ptosis, cicatricieel entropion en trichiasis, floppy eyelid syndroom en tot slot Merkel cell carcinoom.

In **Hoofdstuk 2** onderzoeken we of de toevoeging van (anterograde) ballondilatatie aan bicanaliculaire siliconeslangintubatie bij de behandeling van volwassenen met een partiële traanwegobstructie het succespercentage beïnvloedt. We behandelden, prospectief gerandomiseerd, 70 ogen van 70 patiënten met een onvolledige traanwegstenose en ernstige epiphora (Munk score 3 of 4) met ballondilatatie en siliconeslangintubatie (groep 1) of siliconeslangintubatie alleen (groep 2). De mediane follow up is 43.4 maanden in groep 1 en 34.9 maanden in groep 2. Volledig succes, gedeeltelijk succes en falen worden gedefinieerd met behulp van de Munk score. Het verschil in succes percentage tussen de twee groepen blijkt niet significant.

In **Hoofdstuk 3** evalueren we de resultaten van de behandeling van 53 patiënten met verworven partiële traanwegobstructie en ernstige epiphora. Deze patiënten werden behandeld met bicanaliculaire siliconeslangintubatie. De mediane follow up is 29.3 maanden. De resultaten worden geëvalueerd met behulp van de Munk score. We vinden een laag succes percentage voor bicanaliculaire siliconeslangintubatie in patiënten met verworven partiële traanwegstenose. Hoewel deze procedure kan worden overwogen in patiënten die een dacryocystorhinostomie weigeren, kan het systematisch gebruik

van deze ingreep niet gerechtvaardigd worden vanwege de relatief slechte resultaten in vergelijking met een dacryocystorhinostomie.

In **Hoofdstuk 4** bestuderen we de lange termijn resultaten van de donorplaats bij 30 kinderen die excisie van autogene fascia lata ondergingen voor frontalis suspensie voor de behandeling van ptosis. Een eventuele spierprolaps wordt gegradeerd. De breedte en lengte van het litteken worden opgemeten en eventuele klachten worden genoteerd. De mediane follow up is 27 maanden. Na excisie van fascia lata, hebben de meeste patiënten geen cosmetische of functionele klachten. De techniek van excisie van fascia lata door middel van een Crawford stripper blijkt een veilige en bevredigende techniek en blijkt geen langdurige significante bijwerkingen te veroorzaken bij de meeste patiënten. De mogelijkheid van een beenspierprolaps moet besproken worden met de patiënten of hun ouders wanneer deze optie wordt overwogen.

In **Hoofdstuk 5** proberen we een verband aan te tonen tussen het langdurig dragen van zachte contactlenzen en bovenooglid ptosis. In een opeenvolgende reeks van 35 volwassenen van jonge tot middelbare leeftijd met aponeurogene ptosis, die aan de inclusie en exclusie criteria voldeden, kwamen 9 zachte contactlensdragers (gemiddeld 9 jaar) voor. Er konden geen andere risicofactoren voor aponeurogene ptosis worden aangetoond. Deze studie suggereert dat niet alleen harde contactlenzen, maar ook zachte contactlenzen ptosis van het bovenooglid kunnen veroorzaken door levator desinsertie. Vergeleken met zachte contactlenzen, houdt het langdurig dragen van harde contactlenzen hoogstwaarschijnlijk een veel hoger risico in voor het ontwikkelen van deze afwijking.

De doeltreffendheid van de Wies procedure (transverse blepharotomie en lidrand rotatie) bij de behandeling van trichiasis en cicatricieel entropion van het boven- of onderooglid wordt besproken in **Hoofdstuk 6**. Honderdzesentwintig oogleden van 89 patiënten die een Wies procedure ondergingen met een minimale follow up periode van 6 maanden, zijn geïnccludeerd. De mediane follow up periode is 67 maanden. De Wies procedure blijkt redelijk succesvol (succes percentage van 85%) in de behandeling van trichiasis en cicatricieel entropion van zowel boven- als onderooglid. De procedure kan gemakkelijk worden herhaald indien de eerste operatie niet succesvol is.

Een patiënt met een zeldzame aandoening, pachydermoperiostosis, met een secundaire ptosis en een floppy eyelid syndroom wordt beschreven in **Hoofdstuk 7**. Verdikte en afhangende bovenoogleden zijn een vaak voorkomende afwijking bij pachydermoperiostosis. De floppy, gemakkelijk omklapbare bovenoogleden en de bilaterale papillaire conjunctivale reactie, zoals in onze casus, zijn typische kenmerken van het floppy eyelid syndroom, eerst beschreven door Culbertson en Ostler in 1981. De patiënt werd succesvol behandeld met een combinatie van levator reïnsertie en tarsale strip van het bovenooglid. De histopathologie wordt besproken.

In **Hoofdstuk 8** stellen we twee patiënten voor met een Merkel cell carcinoom van het ooglid. In de eerste patiënt, werd tumor excisie verricht met vriescoupe controle en sentinel lymfeklier techniek. De ooglidreconstructie werd door middel van een Abbé-Mustardé flap uitgevoerd. De tweede patiënt onderging wijde tumor excisie met Moh's micrografische chirurgie en reconstructie door middel van een Hughes flap. Postoperatief werd radiotherapie gegeven aan beide patiënten. Beide patiënten zijn tumorvrij, respectievelijk zesendertig en tweeënveertig maanden na diagnose.

In **Hoofdstuk 9** wordt een zeldzame complicatie van oculoplastische chirurgie, namelijk acuut gesloten kamerhoek glaucoom, beschreven. Oculoplastische chirurgie wordt vaak verricht met weinig ernstige complicaties. Wij stellen twee patiënten voor met acuut gesloten kamerhoek glaucoom na een oculoplastische ingreep, waarbij een patiënt een blijvend verminderde gezichtsscherpte heeft verkregen.

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Curriculum Vitae

Isabel Bleyen was born in Lommel, Belgium on the 22nd of October 1976. She graduated from the "Sint Jozef College" Secondary School in Turnhout in 1994 and started her medical studies at the Catholic University of Leuven, the same year. In her sixth year she spent four months at the general hospital of Curico, Chile, as an intern in gynaecology, obstetrics and paediatrics.

After obtaining her medical degree in June 2001, Isabel started her residency in Ophthalmology. She trained one year in Ahaus, Germany, two years in Mülheim, Germany and another year and a half in Hastings, United Kingdom. She received her ophthalmology degree at the Ärztekammer Nordrhein in Düsseldorf, Germany in December 2005.

In 2006, Isabel pursued a six-month fellowship in oculoplastics at the Eye Hospital of Rotterdam in The Netherlands, under Dr. Paridaens and Dr. van den Bosch. This was followed by a four-month fellowship in oculoplastics with Dr. Dolman at the University of British Columbia in Vancouver, Canada in 2007, and a one year fellowship at the University of Montreal in Montreal, Canada under Dr. Codère and Dr. Hardy in 2008.

Since her fellowships, Isabel presented at several national and international conferences. She was an instructor for lacrimal surgery at the AAO conference in Atlanta, USA, 2008 and San Francisco, USA, 2009.

As of February 2009, Isabel has been working as a member of staff at the Department of Ophthalmology Erasmus University Medical Center Rotterdam in The Netherlands (Chief of department Prof. dr. G. van Rij). She lives in Antwerp, Belgium, with her Canadian husband, Christopher Forbes, whom she married on May 26th 2007.