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DEDICATION

This Thesis is dedicated to my wife and children.

Nacin Camil Tskla
CONTENTS

ACKNOWLEDGMENT 1
AIM OF THE STUDY 2
SUMMARY 4
INTRODUCTION 10
METHODS AND MATERIALS 99
RESULTS 117
DISCUSSION 143
REFERENCES 153
PERFORMA i
ARABIC SUMMARY iii
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AIMS OF THE STUDY
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This research aims towards investigations, causes and treatment of a common ocular condition affecting the eye.

Epiphora can be caused by congenital, Pathologic of traumatic obstruction to the lacrimal excretory system. Obstruction occurs in all age groups, but is present primarily, in Khartoum Eye Hospital, in both the very young and older age groups.

The main objectives of this work are:

[1] To investigate the patients of epiphora chosen from other causes of watering the eye reporting to Khartoum Eye Hospital.

[2] To investigate the patients of epiphora by several methods of investigation to determine the cause and the level of obstruction.

[3] To review the distribution of patients with epiphora by age and sex.
To study the clinical presentation of epiphora in patients reporting to Khartoum Eye Hospital.

To avoid or at least reduce the complication due to epiphora by early diagnosis and treatment especially those due to congenital factors.

To assess the value of medical treatment in the case of epiphora in patients reporting to Khartoum Eye Hospital.

To assess the value of bacteriological studies with antibiotic sensitivity tests in the treatment of epiphora.

To assess the value of different types of surgical treatment in the case of epiphora of different causes and level of obstruction in patients reporting to Khartoum Eye Hospital.
A study of 120 cases of epiphora in 100 patients, i.e. 80 unilaterally and 20 bilaterally has been done in Khartoum Eye Hospital in the period from February, 1986 to February, 1988.

It has been proved that 76% of those patients, being below the age of 10 years were more exposed to epiphora. This is explained by the congenital causes of the obstruction among these patients. Between the age group 11-30 years (32%) the main cause of epiphora was infections and trauma, and above the age of 30 years it was due to weakness in orbicularis muscle in particularly Horner's muscle.

In this study males and females were equally affected but below the age of 30 years the males were more affected than females (43% to 25%) and above the age of 30 years females were more affected than males (26% to 6%) due to the tendency of anatomic and being present more in females above the age of 30 years.
The results of the study of patient residence and tribe has no significance because most of the patients examined come from Khartoum region.

In this study, 24% of the patients gave a past history of recurrent abscess formation of the sac, 14% gave a past history of trauma, 5% gave a past history of probing, 4% gave a past history of medical treatment, 1% gave a past history of measles, H.C.G. vaccine and nasal polyp operation.

The main presenting symptoms of the patients are watering of the eye (100%), swelling of the sac (89%), discharge (82%) and complaint of pain less common (4%).

The duration of symptoms before the patients came for the treatment varied from one month to 10 years and we found that in 37% of the patients, the duration of starting symptoms varied from after birth till the age of 4 years. The symptoms started in 27% after birth.

Out of 150 patients examined (80%) have unilateral epiphora and (20%) have bilateral epiphora and 85% of the bilateral epiphora occur in the patients below the age of 10 years.
The result of the study of 120 cases of epinora in 100 patients shows that the major signs are swelling of the sac (89.2%), positive regurgitation test (60%), fistula (24.1%), incisional scar of evacuation (13.5%), conjunctival congestion (13.5%), traumatic scar (10%), eczematous skin (5%), corneal signs (3.3%), while lid margin edema was (3.3%).

The result of study of 52 culture swabs from 43 patients shows that the majority of swabs gave no pathological growth in (48%), and isolated organisms Staph. aureus (30.9%), hemophilus (9.7%), Staph. pyogenes (3.8%), Staph. faecales (3.8%) and mixed flora (3.8%).

According to the site of obstruction the result of study shows that the upper segment obstruction (puncta and canaliculi) was (15%) while lower segment obstruction (sac and N.L.D.) was (60%) and combined obstruction was (25%).

According to the causes of obstruction of the lacrimal passages the result of the study shows that the lacrimal sac diseases is the common cause of
obstruction in (79.2%), being in the form of chronic dacryocystitis in (44.2%), acute dacryocystitis in (4.2%), chronic dacryocystitis with fistula in (24.2%), and mucocèle in (6.7%).

The second cause of obstruction is the N.L.D. diseases in (8.8%), being in the form of N.L.D. obstruction in (0.8%), and N.L.D. stenosis in (7.5%).

The third cause of obstruction was a disease at the punctum in (6.6%), being in the form of stenosis of the punctum in (5.8%), and obstruction of the punctum in (0.8%).

The last cause of obstruction of the lacrimal passages was at the canaliculus in (5.8%), being in form of canaliculitis in (0.8%), stenosis of the canaliculus in (2.5%), and obstruction of the canaliculus in (2.5%).

According to the management of 120 cases of epiphora in 100 patients, the result of the study shows a response of (10.8%) by medical treatment and massage, (12.8%) by probing, and (15%) by medical treatment and probing.
The study also shows that all the patients responding to medical treatment and massage were below the age of 16 years. Out of 15 cases responded to probing of which 9 cases were below the age of 10 years. Out of 18 cases responded to medical treatment and probing of which, 12 cases were below the age of 10 years.

Dacryocystectomy was done for (45%) of cases after failure of probing or after surgical evacuation of the abscess of the lacrimal sac.

Dacryocysto-rhinitomy (D.C.R) was done for 10 patients (8.3%) where the N.I.D. were obstructed.

Conjunctivo-dacryocystostomy was done for 2 patients (1.6%) where the lower canaliculus were obstructed.

Three snips operation was done for 6 patients (5%) where the puncta were stenosed and canaliculotomy was done for one patient of actinomycosis (0.8%).

Regarding the failure of surgical treatment of the epiphora in this study (34) cases were treated by
dacryocystectomy operation in which failure comprises only (5.5%), 10 cases were treated by D.C.R. operation failure comprising (20%), and 2 cases were treated by conjunctive-dacryocystectomy operation failure comprising (10%).

The follow up of the patients varied, according to the way and method of treatment, from one day after an operation, to 6 months after treatment.
INTRODUCTION
INTRODUCTION

THE LACRIMAL APPARATUS:

(a) Anatomy:

The lacrimal apparatus consists of three parts: [2]

(i) The secretory system: which comprises all the sources of the tear film ingredients;

(ii) The distributive system: consists of the lids and the tear meniscus along the lid margins in the open eye which is responsible for the proper distribution of the components and the formation of a properly structured tear film;

(iii) The excretory system: which removes excess or deleterious matter from the eye.

The excretory system is the sink of the lacrimal apparatus [3].

Near the medial canthi are the puncta: the superior and inferior openings of the lacrimal canaliculi.

(a) The Punctae: are small round or transversely oval apertures situated on a slight elevation (known as lacrimal papilla) the upper punctum is slightly farther from the nasal side than the lower. Thus when the eye is shut the punctae are not in contact with one another.
Both puncta point backward and for this reason a normal punctum is not visible unless the lid is everted. The puncta lead into the canaliculi.

(b) The Canaliculi: Each canaliculus has a vertical portion 2mm directed upwards and downwards away from their respective lid margins and a horizontal portion 8mm slightly converging to pierce the lacrimal fascia and enter a small lateral diverticulum of the lacrimal sac 2.5mm below the apex of the sac.

(c) The Lacrimal Sac: Measures about 3x6x12 mm. It lies in the lacrimal fossa surrounded by lacrimal fascia. It expands slightly laterally and backward as it descends. It is crossed anteriorly by the inner canthous and the outer end of the medial palpebral ligament. It continues after a slight constriction as the naso-lacrimal duct.

(d) The Naso-Lacrimal Duct: (15mm long) lies in the bony naso-lacrimal canal, irregular transverse mucosal folds (valves) occur, especially at the lower end. It opens into the inferior meatus.

(b) Physiology:

The exposed part of the eye is covered by a thin fluid film, the so-called pre-ocular tear film, which is maintained by Lacrimal apparatus. Such a film is important.

(f) It provides the cornea with a surface of high optical quality.
(ii) It is necessary to ensure the well being of the corneal and conjunctival epithelium.

(iii) It serves as a lubricant for the eye lids.

(iv) It forms a barrier against bacterial invasion by bactericidal properties.

(v) It acts as a medium for gaseous exchanges between air and cornea.

(vi) It protects the eye by a flushing and cleansing action from reflex tearing induced by mechanical or chemical irritation and foreign bodies.

(c) Elimination of Tears:

[1] Evaporation: 25% of tears secreted evaporates when the eyes are opened. No evaporation takes place when the eyes are closed.

[2] Excretion: The remainder of tears secreted are conveyed to the nose through lacrimal pesta, canaliculli, sac, naso-lacrimal duct by two mechanisms:

(a) Passive: By - Gravity.
- Capillary attraction.

(b) Active: By suction pump or lacrimal pump (5)

The pumping action consists of an alternate negative and positive pressure in the lacrimal sac caused by the contraction of the orbicularis muscle in particular the part called Horner’s muscle. Contraction
during blinking causes a dilatation of the sac at the same time the muscular contraction also causes the canaliculi to become shorter and broader.

Finally contraction of the muscle tends to invert the lower lid. Thus ensuring that the punctum dips in the fossa lacrimalis. Negative pressure in the nose during inhalation and gravity are also factors in emptying the sac.

HISTORY: [17]

The history of treatment of obstruction of the lacrimal passages is as follows:

- In 1713 Anel recommended probing of the naso-lacrimal duct followed by irrigation.

- About 1724 Woolhouse was the first to try a short circuit from the lacrimal sac to the nose by excising the sac, piercing the lacrimal bone with a trepan and inserting a drain through this opening.

- In 1735 Monro exposed the lacrimal sac and passed a shoemaker’s awl down the naso-lacrimal duct followed by a seton which was left in place.

- In 1851 Bowman was the first to show that the puncta and canaliculi could be dilated for the passage of the naso-lacrimal duct probes of graduated sizes which bear his name to this day.
- In 1868 Berlin excised the lacrimal sac.

- In 1891 de Wecker performed partial dacryo-adenoectomy for epiphora.

- In 1904 Toti described his method of dacryocystorhinotomy, no sutures were used to unite the edges of the nasal and sac mucosa but the nose was packed in order to press these against each other.

- In 1912 Blascovics excised the sac, removed the bone of the lacrimal fossa and implanted the canaliculi into the nose.

- In 1914 Kuhnt turned the nasal mucosa round the anterior edge of the bony opening and sutured it to the periosteum.

- In 1920 Ohn was the first to suture the nasal mucosa to the sac posteriorly and anteriorly.

- In 1921 Dupay-Dutemps and Bourguet improved Ohn's operation by short horizontal incisions at each end of the vertical incision in the sac and nasal mucosa which facilitated the suturing of the flaps.

Also in 1921 Mosher described a combined intranasal and external approach.

- In 1935 Tikhomirov advised injection of alcohol into the palpebral lobe of the lacrimal gland; in 1937 Jameson described sub-conjunctival division of lacrimal ductules; and in 1958 Whitwell wrote about denervation of the lacrimal gland for intractable epiphora.
**DEFINITION:**

Epiphora: Contradistinction to lacrimation or the excessive secretion of tears; epiphora is the imperfect drainage of tears through the lacrimal passages so that they fall over the lid margin onto the cheek, is a very common condition and forms an almost universal symptom of the lacrimal pathway.

Moreover, it is a very annoying disability particularly to women with cosmetic embarrassments.

Further, apart from discomfort and social inconvenience its perpetuation tends to inaugurate a vicious circle in that, a chronic irritative lacrimal conjunctivitis is produced and sometimes an eczematous condition of the skin of the lid, born of which aggravate the initial condition and make its relief more difficult.

**CAUSES OF EPIPHORA:**

Before describing the methods of clinical investigation employed to elucidate its nature it is convenient here to summarize very briefly the main causes of epiphora.

In general terms weeping in the absence of excessive lacrimation may be due to one of four conditions:

1. The puncta are misplaced or abnormal so that the tears cannot enter.
2. The passages (canaliculi, sac or duct) are blocked by atresia, inflammation, neoplasm, trauma or a foreign body.
METHODS OF INVESTIGATION:

In investigating a case of epiphora the first thing[2] to decide is whether the weeping is due to excessive lacrimation or epiphora.

The symptoms of a watering eye may be caused by one of four mechanisms [14]:

1. Hypersecretion of tears causing lacrimation.
2. Obstruction to the drainage system giving rise to epiphora.
3. Lacrimal pump failure.
4. Dry eye with reflex hypersecretion.
5. Exclude dry eye and hypersecretion of tears [14].

It is very important to be aware of the fact that a dry-eyed patient may show symptoms similar to a wet-eyed
patient. This is caused by stimulation of the reflex secretions by irritation produced by the dry cornea.

Special Clinical Tests:

(a) Rose Bengal 1 percent:

In dry eyes rose bengal will stain the bulbar conjunctiva in the form of two triangles with their bases at the limbus.玫瑰 threads and corneal filaments will be shown up more clearly by the dye.

(b) Schirmer’s Test:

This test measures the rate of lacrimation by measuring the aqueous layer of the precorneal tear film [14]. A strip of filter paper (5mm x 30mm) is folded so that the 5mm of the strip lies within the lower conjunctival sac, and the remaining 25mm projects over the lower lid. The amount of moistening is recorded after 5 minutes. This test is only a rough measurement but is clinically useful as a gross indicator of tear function.

Test II: Measures total reflex and basic secretion. The paper is placed at the outer one third of the lower lid. The patient is placed in a dimly lit room to minimize the tear reflex and is instructed to keep his eyes open while gazing to the front. The amount of wetting is noted after 5 minutes. A value of less than 5 mm indicates impaired secretion (most normals will wet between 10 and 30 mm). If wetting is greater than 30mm, reflex secretion is intact but not controlled, or there is a blockage of the drainage apparatus.
Basic Secretion Test: Is performed after the instillation of a topical anaesthetic. The difference between this and the first reading is the amount of reflex secretion.

Test [2]: Measures reflex tear secretion and is performed by instilling a topical anaesthetic and irritating the anaesthetized nasal mucosa with a cotton swab. The amount of wetting is measured after 2 minutes. Less than 15mm indicates failure of reflex secretion.

In Schirmer's test it is to be remembered that [1]

[1] This test is quantitatively inaccurate.

[2] The excessive lacrimation may be intermittent so that the test may not reveal it at the time.

[3] Epiphora and hypersecretion may be, and frequently are co-existent, epiphora being caused by factors which themselves excite a reflex lacrimation.

[4] The second point to be determined is whether or not the puncta are normally placed so that they can take up fluid by capillarity on opposing the globe.

Such displacement of the puncta is common particularly eversion of the lower lid and is very easily overlooked; normally when the eyes look upwards the puncta should not be visible without slightly everting the lid.
A useful clinical test to decide this question is by the instillation of rose bengal solution which stains selectively the posterior margin of the lid; if the puncta lie without the stained area an eversion exists.

(i) The next point to be investigated is the patency of the lacrimal passage and to determine:

(i) The nature of obstruction, stricture of blockage.

(ii) The site of obstruction. The three most common sites are:

(a) The point of confluence of the canaliculi.
(b) The junction between the sac and naso-lacrimal duct.
(c) The nasal orifice of the duct.

Several Methods are Available:

(i) Regurgitation Test:
Pressure inwards and backwards over the region of the lacrimal sac may elicit tenderness or produce regurgitation of mucus or pus through the canaliculi indicating an inflammatory process as well as revealing the presence of a swelling of the sac.

(ii) The Instillation of a Coloured Fluid into the Conjunctival Sac.
Asking the patient to blow his nose into a swab while he inclines his head forwards or alternatively to spit into the swab after clearing his throat and nasopharynx. The appearance of the fluid in the swab gives the best index of the physiological permeability of the passages.
The Solution Usually Employed are: [11]
- 2% fluorescein.
- 10% protargol (black fluid)
- 1% Methylene blue [7].
- Used 1% sodium salicylate and touched the swab with
  1% ferric chloride which appears violet if the salicylate
  gets through.
- 10% solution of saccharin and the patient detects a
  sweet taste within five minutes. [14].

Moreover, the rate of disappearance of the coloured
fluid from the conjunctival cul-de-sac can be noted. The
patient should be asked not to blink and if one drop of
coloured fluid disappears in less than one minute, per-
meability is good.

(iii) Syringing the Lacrimal Passage:

After local anaesthesia while the patient looks
upward and his lower lid is supported and slightly everted
by the surgeon's thumb, the lower punctum is dilated with
a Ballesthisp's diltor inserted vertically for 1 or 2mm
then pushed horizontally for a short distance with slow
rotatory movement. It is then withdrawn and a syringe
fitted with a lacrimal nozzle and filled with saline is
inserted into the punctum by the same way and the result
observed:

[17] If the fluid appears in the nose at once without
exerting any particular pressure the punctum are
freely patent.
[2] If considerable pressure is required a stricture exists.

[3] If no fluid gets through and an outflow occurs through the upper canaliculus a blockage exists below the common canaliculus.

[4] If the fluid which can be introduced returns through the lower canaliculus, there is a block in this structure; in this last event syringing through the upper canaliculus may indicate that the passages are otherwise patent.

If this does not occur the stricture is probably at the junction of the two canaliculi. In this case the patency of the remainder of the passage is proved by injection of the fluid with a sharp needle through the lower conjunctival cul-de-sac at the lacrimal cul-de-sac downwards inwards into the lacrimal sac with the appearance of fluid in the nose.

(iv) Probing the Lacrimal Passage:

Principle:- to determine the level of blockage in canaliculus obstruction. [4] or - to differentiate between obstruction of the lacrimal sac, the common canaliculus and N.L.D.
Anaesthesia:

- Children should have a short general anaesthetic. In adult the conjunctiva and punctum should be anaesthetised by a few drops of anaesthetic.

Technique of Probing:

(a) The punctum are dilated as before.

(b) Porter's lacrimal probe or Liebrelt's or Bowman's probes are usually introduced into the lower punctum but particularly in children, they are introduced into the upper punctum to avoid the unnecessary trauma that may be inflicted upon the important lower punctum.

(c) The probe is inserted vertically downwards for the first millimetre, then horizontally until the resistance of the bone of the lacrimal fossa is felt.

(d) The probe is slowly swung vertically through an angle of 90° to approximate the direction of the lacrimal canal.

If, however, there were normal, very little resistance is offered. If resistance is encountered its site is indicated whether in the canaliculus, the lower end of the sac or the nasal duct.

A drop of fluorescein is instilled into the conjunctival sac and cotton tipped spuds soaked in cocaine are inserted into the inferior meatus of the nose. The cotton spud will be stained by dye within five minutes in the majority (about 80%) of normal patients.

A negative test, and in order to confirm defective drainage, a second stage to the test is performed by washing any residual fluorescein from the conjunctival sac and irrigating the lacrimal sac with clear saline:

- If no fluid passes into the nose there must be a complete obstruction.

- If fluid recovered from the nose is clear, it suggests blockage at the punctum or canaliculus.

- If fluid entering the nose is heavily stained with fluorescein, the upper part of the system must be functioning normally. The blockage must therefore lie in the sac itself or naso lacrimal duct.

(vi) The air bubble test for Lacrimal System Patency: [8, 9]

This test is based upon the formation of an air-bubble at the external nares where surgical soap has been applied as a result of air leakage around an uncuffed endotracheal tube and the lack of resistance to passage of air through the system.
The importance of endotracheal intubation during pediatric naso-lacrimal system patency investigation under general anesthesia is in order to avoid laryngeal spasm and aspiration during the study.

The main complications occur if an inadvertent false passage is created during the probing and a possibility of injection of air into an open, vascular channel.

(viii) Radiological Examination:

Radiological examination of the lacrimal passages is of great value not only in indicating the site of a stricture but also:

(a) The state of the sac and duct.

(b) The size of the sac, whether contracted, dilated or atonic.

(c) The presence of diverticula, sinus or tracks into the surrounding tissue or fistulae into the nose or the ethmoid air cell.

(d) The presence of polypi or tumours of the sac or pressure upon it or distortion from neighbouring lesions.

Two techniques are applicable:
(1) Radiography of the membranous passages.
(2) Radiography of the bony canal.
(1) Radio-ography of the membranous passages:
These are rendered visible by the injection of some opaque substance such as bismuth subnitrate, thorium, barium or lipiodol [3] or lipiodol with equal parts of olive oil as a diluent to making injection easier. [1]

(2) Air-ography of the bony naso-lacrimal canal:
A dental film is used applied opposite the first molar tooth and a picture taken to show the elliptical contour of the superior and inferior orifices together with the walls of the canal.

The Technique:
The punctum is dilated and 0.5 ml of the contrast material is injected by a lacrimal syringe with a cannula or catheter. Care being taken to exclude air bubbles and if the sac contains mucus or pus this should first be washed out.

A picture of an antero-posterior X-ray view should be taken at 1,5 and 10 minute intervals; a final picture taken after 30 minutes is useful. The picture may show the canaliculi, the sac, the duct and frequently a small collection of the contrast material on the floor of the nose or in the nasopharynx but rarely shows the whole of the passages together.
Necroycystogram:

The picture of the normal lacrimal sac in A.P. view is a slender, gently curving radio-opaque shadow with its concavity directed laterally. The contrast media [1], can be injected by special syringe and cannula bilaterally at the same time.

Macro-Necroycystography:

If the canaliculi are special object of interest, the picture is best taken while the contrast medium is being injected through the cannula.

Cine-Fluorography:

Is done to record the passage of the dye and the rate of drainage by using an instillation into the anaesthetized conjunctival sac of an inorganic iodine preparation like urograin.

The three main items of information to be obtained from a radiological examination are:

[2] Whether it is complete or incomplete.

The site of obstruction may be classified as:

[1] High level in canaliculi or ampulla.
Mid-level at the neck of the sac and many rim of the canal or in the naso-lacrimal duct itself.

Low level obstruction at the nasal end of the naso-lacrimal duct.

Lacrimal Scintigraphy (LS)

Also termed lacrimal scintillography, [47]

nuclear dacrocystography (DGG), nuclear lacrimal scan, microscintigraphy and dacryo-scintigraphy.

An original technique using radio-active tracers [3] was proposed by Rossmann and Carlin and their associates (1972-73) to explore the dynamics of lacrimal drainage. A minute quantity of a radio-active tracer (Sodium Percetonate, 99mTc) is instilled into the eye as a drop and the progression of the radio-active fluid is followed through the drainage system using a gamma camera. By this method no catheterization or discomfort is involved.

Recently by using lacrimal scintigraphy to study the dynamic of lacrimal drainage. [48] It became possible to study the normal and pathological lacrimal drainage and also to measure the rate of tear flow in normals. So the symptomatic and asymptomatic lacrimal drainage systems can be investigated.
The Technique of LS:
The chin and forehead are stabilized on an adjustable stand secured to the 2.5cm pinhole collimator of an Ohio Nuclear series 100 gamma camera which is interfaced to a varian V76 computer. Then 2 MBq of technetium (Tc 99m) Tin colloid in 15 UL isotonic saline are instilled simultaneously into the eyes at the lateral canthous using micropipettes. The flow of the tracer through the lacrimal passages is displayed on an oscilloscope and on colour television with dynamic data being acquired in the form of 100 frames are stored on the magnetic disc of the computer.

Static views are also reproduced simultaneously on black/white polaroids at several intervals.

(ix) Culture and sensitivity:

Culture swabs are taken from the conjunctival sac after pressure on the region of the lacrimal sac and sent to the lab. for sensitivity test.

(x) Finally a nasal examination is essential before an assessment can be given on any case of epiphora indicating the presence of obstruction, neoplasms atrophy, infection, reflex irritability, septum deviation, polypi or granulations.
ARTIOLOGICAL CAUSES OF EPITRACHNA:

[1] Insufficiency of the Lacrimal Passages.[1]

A failure in the conduction of tears in the absence of organic obstruction of the drainage passages.

It is diagnosed by persistent weeping in the absence of disease and can be demonstrated by the failure or delay of a coloured fluid to find its way from the conjunctival sac to the nose even although the passages themselves can be syringed through freely or by dacrocystography.

In general such a condition can be grouped as occurring at the upper or lower end of the passages or in the sac itself.

[1] Insufficiency of the Lacrimal Puncta:

Elevation of the lacrimal puncta even although they themselves are anatomically correct, is the commonest cause of their insufficiency; usually the more important is the lower punctum which must appose the globe in the region of the lacus lacrimalis. Such a misplaced is very common and frequently overlooked. It can be diagnosed:

(a) if the punctum is visible when the eye looks upwards,

(b) or if it lies outside the coloured rim when rose bengal is instilled into the conjunctival sac.

The causes of eversion are various:

(i) Congenital anomaly. [15]
(ii) Acquired in ectropion of the lids (whether senile, cerebral, parietal, apneic or mechanical).

(iii) Swelling of the lid margins (chronic blepharitis, myxoma).

(iv) Hypertrophy of the conjunctiva or corneal.

(v) The most common aetiological condition in old age [10] is the slight laxity and atony of the lower lid due to orbicularis weakness, zygoal elongation and laxity of the medial and lateral canthal tendons.

(vi) Minor degrees of weakness of the facial muscles [10].

Treatment:

Should first be directed to the cause:

(a) Enlarged corneal or a conjunctival hyperplasia may require surgical removal or reduction by electro coagulation. [11]

(b) Retraction cautery: [7]

A slight persistent degree of eversion of the lower punctum may be remedied by inducing fibrous tissue contracture at multiple points in the palpebral conjunctiva by electrosurgery.

The number of applications necessary depends on the degree of eversion of the punctum.
(c) **Conjunctivoplasty** [10]
Almond-shaped excision of palpebral conjunctiva and subconjunctival tissue down to the orbicularis muscle up to 5mm in vertical height and 8mm in horizontal length. The centre of the upper incision is 3mm below the lower punctum. Then the edges of the incision are brought together with two interrupted sutures.

(d) **Surgical correction of punctal malposition** [16]
If punctal erosion is severe and the patient complains of tearing, surgical correction is necessary and to avoid the frequent complications of a simple closure of the ellipse such as inadequate punctal inversion and recurrent punctal eversion.

A common approach is excision of Larasus, conjunctiva, and eye lid retractors in a horizontal tarsus forms wedge at the lower margin of the tarsal plate; the conjunctiva is closed with three or four 7/0 absorbable sutures. The basic principle is to invert the lower punctum by vertically shortening the posterior lamella of the eye lid. The key to success in this method is to unite the lower eye lid retractors, not just the conjunctiva, to the tarsal plate as the retractors are responsible for the inversion effect.

(c) **Reconstructive Operations** [7]
The severe degrees of erosion of the lower punctum with atomic (senile) eversion require correction by a plastic operation.
The aetiology of tearing was therefore functional and was due to a punctum-lid dysfunction (a lacrimal pump abnormality) [10].

The reconstructive operations are designed to correct the deformity by shortening the lax tissue of the eye lid by:

(i.) The V-Y Operation:
In this operation a V shaped incision is made in the lower lid, and the edges are sutured in the form of a V to form a V for slight degrees of senile ectropion.

(ii.) Kloehnig's Z Plasty:
In a moderate degree of ectropion, a transposition of skin-flaps such as the Z plasty in the centre of one or both ends of the lid with an angle of 60° between the arms of the Z.

(iii.) Modified Kuhn's Operation [12]
A piece of conjunctiva and tarsus is excised in the form of a triangle, the apex of the triangle being towards the fornix and the lid split along the grey line from the triangle to the outer canthus. A triangle area of the skin is removed at the outer canthus and the skin is slid outwards so that the gap in the tarsal plate is closed.
The canaliculus is slit, the object being to convert it into a groove the inner part of which comes into apposition with the globe.

The operation is so called because the first snip is made from the punctum to the ampulla, the second from the ampulla for about 3mm along the canaliculus and the third joins the end of the second with the beginning of the first.

Finally, if all other measures fail, [11], resort may be had to the operation of conjunctivo-dacryocystostomy whereby a direct and wide communication is opened between the most dependent part of the conjunctival cul-de-sac and the lacrimal sac.

2) Insufficiency of the Lacrimal Sac:

We have seen when dealing with the physiology of elimination of tears that the orbicularis muscle plays an important part in the conduction of tears by contraction of this muscle (or by closure of the lids) and on relaxing the muscle for opening the lids.

A failure in this mechanism explains the tendency for epiphora and its occurrence in:

1) Facial palsy.

2) Weakness of the orbicularis muscle.
13. Cleared of contraction or atomic dilatation of
the sac (a tonic episclera).

14. Follows a rigidity of the walls of the sac due
either to inflammatory or neoplastic thickening.

Such cases can best be diagnosed by radiological
examination with a contrast medium after the patency of
the passage has been demonstrated by syringing.

Treatmen:

By dacrocystocystostomy drainage after this
operation however occurs largely by gravity, partly
owing to the pumping action of the canaliculi and
partly by aspiration, the tears being sucked down by
changes of pressure in breathing.

15. Valvar insufficiency (Pneumotrocle):

Of the valves in the lacrimal duct, the most
important is the valve of Hasner at the lower end of
the canal guarding the duct from the cavity of the nose.

The phenomenon of Ocular Whistling: If the
nose is blown a hissing sound may be heard due to
air escaping from the puncta and that the current
may even be felt by the finger.

Insufficiency of the valve occurs as a result
of:

(a) Congenital smallness of the valve. [15]
(b) May follow its pathological disappearance in atrophic rhinitis or after catheterization of the nano-lacrimal duct from the nasal end.

(c) Occasionally in affected persons particularly in pathological cases in old age, repeated distension of the sac by air distates it.

Complications:

May arise in that epiphora is common owing to insufficiency of the dilated sac, while the easy access from the nose encourage ascending infection and tends to result in dacryocystitis.

Treatment:

Is necessary only if a chronic distension of the sac is feared. Otherwise one nostril at a time should be blown, gentle pressure being applied at the same time with the finger over the lacrimal region. When a permanent distension appears (pneumatoccele) the treatment of choice is by dacryocystorhinostomy.

(III). INFLAMMATIONS OF THE LACRIMAL PASSAGES:

[a] Canaliculitis

Inflammation of the canaliculi is a rare disease which has not excited much attention. The lacrimal canaliculi, because of the narrowness of the duct only 0.3mm are easily subject to stenosis if they become inflamed.
The source of infection:

1. Downward spread of conjunctival infection to
take the form of a follicular canaliculitis is
characterized by the presence of a massive sub-
epithelial infiltration of lymphocytes with
plasma cells massed in follicles around the
canaliculi particularly at their junction with
the sac. The only symptom is weeping and the
diagnosis may be difficult.

The clinical importance of the condition lies in
its potentiality for causing post-operative intra-
ocular infections despite irreplaceable antiseptic
precautions.

2. A second source of infection is from the sac upwards.
Such a direction of spread undoubtedly occurs in
cases of dacryocystitis either chronic or acute.

Suppurative Canaliculitis:

Wherein the ductule suffers a cystic dilatation
to form a mucocoele or an encysted abscess usually
affecting the upper canaliculus.

Clinical picture:

1. Small fluctuant swelling appears in the region
of the canaliculus.
(iii) The skin over it is stretched.
(iv) The conjunctiva under it is thick and inflamed.
(v) Opposite it the palpebral margin is rounded and tumescent with a swollen and widely pouting punctum.
(vi) Sometimes secretion can be squeezed out by pressure with a glass rod.

**Treatment:**
The canaliculus is drained freely by slitting if necessary and instilling an antibiotic.

**Specific Canaliculitis:**
Cases of specific infections are more numerous, these include trachoma, tuberculosis, syphilis, vaccinia, zoster and most commonly actinomycosis and mycotic infections.

**Trachomal Canaliculus:**
- Trachoma is a disease caused by Chlamydia trachomatis presumably which causes tear flow obstruction from the repeated infection of the mucous surfaces of the canaliculi [19], lacrimal sac and nasolacrimal duct.
- Approximately 60% of patients with severe inactive trachoma have either distal nasolacrimal duct or canalicular obstruction.
Another clinical study of the lacrimal complications of trachoma showed, canalicular obstruction was the most frequent complication than punctal phimosis, punctal occlusion and naso-lacrimal duct obstruction. [18]

Trachoma can cause chronic inflammation of the mucosal surfaces of the lacrimal passage and this may lead to cicatrization of any site in the lacrimal system.

Treatment consists in freely slitting the canaliculus and combating the trachomatous process with suitable antibiotics.

In cases of canicular obstruction [18], the decision was to perform either a standard dacryocystorhinostomy or a conjunctivo-dacryocystorhinostomy with insertion of a Jones tube was considered.

Tuberculosis:

Tuberculosis affecting the walls of the canaliculus is associated with tuberculosis of the lacrimal sac; it would appear, however that disease restricted to the canaliculi does not occur. [11]

Viral Infections:

Stenosis and obstruction of the lacrimal drainage system was observed in cases of ocular vaccinia, herpes zoster ophthalmicus, ocular herpes simplex, chickenpox and virus conjunctivitis. Many cases of lacrimation
due to stenosis or obstruction of the lacrimal puncta and canaliculi which are generally regarded as of unknown etiology, may be explained by the presence of virus infection. [19]

(a) Ocular involvement in Vaccinia
The following sequelae were noted:
Minor scars of the conjunctiva and skin of the eyelids; permanent loss of the eyelashes at irregular intervals and particularly permanent lacrimation due to stenosis or obstruction of the lacrimal passage.

(b) Herpes Zoster Ophthalmicus:
After herpes zoster ophthalmicus had been cured, scars of the eyelids, permanent loss of some eyelashes and irregular tangling of others as well as permanent lacrimation showed.

(c) Herpes Simplex Ophthalmicus:
Primary herpes simplex infection may involve the lining of the lacrimal canaliculi and result in permanent strictures and epiphora [20].

Lacrimal occlusion has been reported as an infrequent sequela of idoxuridine (I.D.U.) or trifluridine treatment of herpetic keratitis. The cases reported involved only the lacrimal puncta and not the more distal canaliculi.
(d) Chickenpox:

The history of epiphora is following immediately after an attack of chickenpox. During the illness vesicles were present on the eyelids, the eyes were "red and irritable" with coughing and considerable tearing [21].

Clinical examination and dacryocystogram (D.C.G.) showed a mild stenosis or obstruction of the canaliculi.

(e) Conjunctivitis due to "Viruses"

In patients presenting with clinical signs of conjunctivitis because of virus infection and sometimes with elements of sub-epithelial keratitis, progressive stenosis or obstruction with subsequent permanent lacrimation were observed.

Treatment:

The formation of fibrous scar tissue is a characteristic result of inflammation in mucous membranes caused by viruses is the most common cause of lacrimal canaliculius obstruction. The surgical management is either dacryocystorhinostomy (D.C.R.) or canaliculo-dacryocystorhinostomy (C.D.C.R.) with polyethylene tube intubation for 3 months in the only treatment.

Actinomycosis:

Canaliculitis is most commonly caused by Actinomyces israelii (Streptothrix). This is a Gram-positive
Branching organism. It is a strict anaerobe and is best isolated with brain-heart infusion media in a completely oxygen free environment such as a gas pack jar. [22, 23]

The clinical picture of actinomycosis affecting the canaliculi is very characteristic: [1]

(i) One canaliculus only affected.

(ii) The first symptom which may persist alone is epiphora. This is accompanied by a persistent conjunctivitis around the inner canthus. If the infection is confined to the upper canaliculus, symptoms may only consist of an indolent unilateral conjunctivitis.

(iii) The punctum itself appears congested and prominent with pouting open lips and sometimes the whole region becomes swollen (may be simulated to a tumour of the lid margin, a sty or a chalazion).

(iv) Yellowish discharge in the surrounding area and on pressure a creamy or purulent discharge may be extruded from the dilated orifice. These concretions (Large cheesy, dirty yellow in colour and consisting of branching filaments of the fungus) may block the flow of tears and yet deceptively, the canaliculus often remains patent to syringing.

Occasionally filaments are found in a routine conjunctival swab.
Treatment:

Is simple: the canaliculus is slit up curetted carefully when a white friable mass of concretions is removed, penicillin is applied and the symptoms disappear in the course of a few days.

**MYCOSE INFECTIONS:**

**Sporotrichosis:**

Sporotrichosis of the canaliculus, is associated with a painless swelling of the pre-auricular nodes. There is ulceration of the wall from which granular masses and debris extrude.

**Aspergillosis:**

Causing a brownish-black swelling containing a mucous-like fluid associated with the canaliculus.

**Candidiasis:**

Species of candida have been found to be the invading agents.

**Favus:**

Affecting the lids may invade the canaliculi.

(h) **Daerrocystitis:**

Daerrocystitis - inflammation of the lacrimal sac and duct, is a common and unpleasant disease, partly because of the troublesome and conspicuous symptoms it may cause, partly because it has little tendency to resolve and its adequate treatment presents considerable problems.
The inflammation may be acute or chronic [4]: both types may be the sequel to obstruction of the naso-lacrimal duct or in the sac itself.

Incidence:
Several features in the incidence of inflammation of the lacrimal sac are of importance.

1. Age:
A part from the special case of dacryocystitis in the new-born which depends upon developmental anomalies, the disease affects preferentially adults over middle age being rare in children and adolescents; the highest incidence is in the fifth decade.

2. The Sex Incidence:
While the disease in the new-born affects both sexes equally, its occurrence among adults is in the ratio of 75 to 80% females to 25 to 20% males.

The suggestion that women are more prone to the disease is due to:

(a) a narrower lumen of the bony lacrimal canal
(b) or because they weep more often than men,
(c) or because they blow their noses less heartily.

both of b and c tendencies might be construed to favour the stagnation of tears.
[3] Racial and Geographical Incidence:
These appear to be of some significance.

Thus the disease is rarer among Negroes than whites, a circumstance which may be associated with the sex incidence since radiological examination shows that in the former the canal is shorter, wider, less sinuous and is provided with a larger ostium.

[4] A Social Incidence:
A feature not seen in the congenital condition, for the majority of adult cases is found among those to whom cleanliness is not important.

[5] A Hereditary and Familial Tendency:
It is usually transmitted as a dominant characteristic by both males and females to children of either sex. The probable clue to the hereditary tendency is structural configuration.

Aetiology:
In a proportion of cases of dacryocystitis the aetiology is obvious: These arise secondarily from the spread of such local conditions as gross infections of the nose and sinuses, and from conunctival diseases. In the vast majority of cases, however, the cause of the inflammation is less clear for clinically it appears to start primarily in the lacrimal system. There is no doubt that the healthy lacrimal passages when functioning normally are more than usually resistant to infective organisms due to the resistance of the
ears. It is probable, however, that the essential pre-requisite for the development of infection is the occurrence of stasis of the contents of the sac, and a vicious circle is set up wherein infection follows stasis resulting in a quiet inflammation which may eventually lead to obstruction.

There are probably many factors that can be ascribed a primary role in the aetiology of the disease:

[II] Anatomical Factors:

- A lack of complete canalization particularly at the lower end of the N.L.D. is the common cause of congenital dacryocystitis. [15, 24]

- Congenital formation of folds in the mucous membrane or small ill-functioning inferior opening tends to produce a condition of chronic stasis, even if any degree of stasis is induced, leading to a complete obstruction.

- Narrowing of the mucous canal tends to occur with a flat nose and a narrow face leading to narrowing of the naso-lacrimal duct and with the slightest insufficiency leading to its occlusion.

- Trauma of especially fractures of the nose or maxilla will readily lead to deformities and complete obstruction.
Neighbouring Infections:

(a) Nasal Disease:

Inflammatory Conditions: Whether chronic nasal catarrh or the more acute and supplicative infections may spread into the lower part of the duct particularly if the ostium is freely open.

Mechanical Obstruction:
- An enlargement or flattening of the inferior turbinate or a deflection of the septum may obliterate the anterior part of the meatus and may cause a local rhinitis implicating the opening of the duct.
- Also nasal polyp or neoplasm acts in a similar manner.
- Congestive hypertrophic cronic condition of the mucosa whether vasomotor or inflammatory cause a various degree of obstruction at the lower end of the canal.

Atrophic Conditions: in the nose leaving a patulous ostium allowing the direct entrance of infective secretion into the duct on blowing the nose.

(b) Sinus Diseases:

The infection spreads either by venous or lymphatic pathways by contiguity or by continuity between the ethmoid and the max.
(c) Conunctival Infections:

A third method of direct spread, but all the evidence points to its rarity. Excepting infiltrating diseases, such as trachoma, there is little evidence that infection of the conjunctiva contribute to the etiology of inflammations below the canaliculi. [17]

[3] General Infections:

General infections and general diseases are occasionally responsible for the onset of dacryocystitis, as is indicated by the occurrence of inflammation during the course of influenza, scarlet fever, diphtheria, chickenpox or smallpox.

We shall see also that infections such as tuberculosis may become established through blood infection.

[4] The Factor of Excessive Lacrimation:

An increased secretion of tears leading to stagnation with a tendency to atony of the sac, thus resulting eventually in chronic irritation, inflammation and a weakening of resistance to organismsal attack.

[5] A Foreign Body:

As a rarity a dacryocystitis may be excited by a foreign body in the sac such as cilia entering through the canaliculus or a body introduced through the nose.
CLINICAL PICTURE:

Dacryocystitis of non-specific origin may be described generally under two headings: Chronic and Acute.

The Chronic is the more common and usually assumes one of three clinical types:
1. Catarhal.
2. Encysted mucocoele.
3. Chronic suppurative form.

Acute dacryocystitis can best be studied under three clinical types:
1. Acute suppurative dacryocystitis.
2. Acute suppurative pericystitis.

Chronic Dacryocystitis:

1. Catarhal dacryocystitis:
   Characterized by two symptoms:
   (a) Constant and persistent epiphora.
   (b) An intractable unilateral angular conjunctivitis.

In the more marked degrees however, there are signs of conjunctival hyperemia and irritation at the internal angle while lavage of the sac shows shreds of fibrinous or mucous material in the reflux.
[2] Lacrimal Mucocele:

- In many cases however secretion tends to stagnate and the walls of the sac become stonic, so that the inflammatory exudate collects to form a fluctuant swelling in the lacrimal region, bulging out just below the inner canthus under the medial palpebral ligament.

- The overlying skin is always free and normal.

- Little or no tenderness is elicited on pressure, such pressure may empty the content of the mucocele being discharged into the nose or into the conjunctival sac.

- The discharge is clear or milky, fluid or gelatinous, may be fibrinous and flocculent and is usually sterile.

- After a lapse of time, both exits become sealed and an encysted mucocele is formed.

[3] Chronic Suppurative Dacryocystitis:

- Suppuration may become evident at any stage of development or may occur from the beginning.

- The clinical picture is as in the non-suppurative form except for the presence of a slight and diffuse overlying erythema, while the epiphora and conjunctivitis are more pronounced.
- On syringing the sac or on exerting pressure over it, however, the material which escapes from the punctum is purulent.

- The sac may be thickened and inflamed being distended with pus to form a pyocele which may displace the globe and impair the vision.

- Sometimes however in pyoceles or in the purulent types an INTERNAL LACRIMAL (ETHMOIDAL-LACRIMAL) FISTULA opens into the ethmoid cells and discharge takes place into the nose with sudden diminution or even abolition of the clinical symptoms.

Such a development may relieve the symptoms considerably, acting in a sense as a nasal-drainage operation.

ACUTE DACRYOCYSTITIS:

[1] Acute Suppurative Dacryocystitis:

- May arise as a sudden exacerbation of a chronic inflammation or it may seem to commence spontaneously without a history of epistaxis.

- The usual symptoms of inflammation appear:

  (i) Sensation of heat.
  (ii) Redness.
  (iii) Swelling with oedema in the lacrimal region, spreading along the lower lid, over the side of the nose and down the cheek.
(iv) Local pain radiating over the frontal region and towards the teeth.

Resolution occasionally occurs before pus is formed or if the pus finds exit into the conjunctival sac or the nose, perhaps by bursting into the ethmoid cell to form an internal lacrimal fistula; but the more usual evolution in the absence of treatment is the development of a pericystitis owing to a spread of the inflammation into the surrounding tissues. The symptoms are accentuated, the conjunctival reaction is increased to the stage of chemosis; the eye is closed by the palpebral oedema and the submaxillary and sometimes the pre-auricular lymph nodes become swollen.

In the course of a few days fluctuation appears and the abscess discharges spontaneously leaving an external lacrimal fistula. This appears typically underneath the medial palpebral ligament.

[2] Acute Peridacrystocystitis:

This results when infection reaches the periacrimal tissues directly from some neighbouring structure such as a paranasal sinus, usually the ethmoid, occasionally the maxillary and exceptionally the frontal, without the prior involvement of the sac itself.

The clinical picture is much the same as that of a pericystitis secondary to an acute dacryocystitis except if myriology is practicable. No regurgitation of
pus occurs but the passages may be to some extent permeable. If discharge through the skin occurs, the fistula is usually under the medial palpebral ligament but it may appear some distance away particularly along the inferior orbital margin and tends less frequently to be permanent than when the sac itself is primarily involved.

In all these cases surgical opening of the sac itself reveals no pus although epiphora tends to follow the disease.

[3] Acute Gangrenous Periocularcystitis:

This is a rare disease. It occurs in sufferers from lacrimal atresia on the development of a virulent infection.

It appears as a very acute supplicative periocularcystitis with, however, unusually marked general symptoms and evidence of profound intoxication. A hard swelling appears in the lacrimal region, the skin becomes violaceous and rapidly breaks down leaving a cavity with firm edges and a floor covered by an adherent false membrane.

Finally, however, the oedema lessens and healing slowly results with complete cicatrization of the entire lacrimal region.
COMPLICATIONS:

(a) Chronic dacryocystitis:
Is associated with few local complications;

(i) Stenosis of the lacrimal passages with permanent epiphora.

(ii) The characteristic and intractable conjunctivitis
is associated with constant infection and reinfection of the conjunctival sac.

(iii) Dacryocystitis with virulent organisms such as
pneumococci and streptococci makes minor corneal lesions liable to assume a more serious aspect
and renders any intra-ocular operation unjustifiably dangerous.

(b) Acute dacryocystitis:

In which the complications are more dramatic:

(i) The conjunctivitis tends to be acute with
intense redness and chemosis.

(ii) Corneal complications sometimes taking the
form of marginal superficial punctiform ulcerations may be associated with an iritis and
synechiae.

(iii) In pneumococcal infections and probably in infec-
tions by trauma it takes the picture of a
hypopyon ulcer.
In streptococcal infections a pericystitis may develop or as a rare even an orbital cellulitis, panophthalmitis, orbital thrombophlebitis, optic atrophy, or meningitis and death. However, complications are now rare since the advent of antibiotic drugs.

DIAGNOSIS and Differential Diagnosis:

(a) Chronic dacryocystitis:

Usually depends on:

(i) Symptom of epiphora.

(ii) Regurgitation fluid by pressure or on syringing is seen to contain shreds of mucus or pus.

(iii) An investigation of epiphora shows an obstruction in the lacrimal passages.

(iv) In the latent forms, particularly when epiphora is not marked, it may be more easily missed; in these cases the presence of unilateral chronic and intractable conjunctivitis should always arouse suspicion.

(v) A mucocele may require to be differentiated from a tumor or a cold abscess tuberculous or syphilitic by radiological examination or by exploratory operation and biopsy.
(vi) Dermoid and sebaceous cysts are more superficial and leave the lacrimal passages patent.

(vii) A mucocoele of the paranasal sinuses is usually present above the medial palpebral ligament. In these cases even in the presence of persistent weeping the lacrimal passages remain permeable while the diagnosis is made clear by the radiological and rhinological examination.

(b) Acute Dacryocystitis:

The differential diagnosis concerns:

(i) Inflamed sebaceous cyst.

(ii) Furuncles near the medial canthus.

(iii) Erysipelas of the face.

(iv) Acute periodontitis.

(v) Acute sinusitis.

(vi) Dental abscess particularly of the canine tooth.

(vii) Maxillary periostitis.

In these cases the maximal swelling and pain are usually above or below the region of the sac and the lacrimal passages are permeable.

The diagnosis can be confirmed only by radiography of the skull and if necessary of the sac and a clinical rhinological examination is carried out.
PATHOLOGY:

(a) In Chronic Inflammations:

(i) The walls of the sac are frequently twice or thrice the normal thickness.

(ii) The mucosa is roughened sometimes showing granulomatous masses or polypi, while the goblet cells may be markedly increased in number.

(iii) Valves and folds are thickened and exaggerated.

(iv) Sometimes the lumen is completely obliterated and at other times one or more strictures appear, the favourite sites of obliteration being at the lower end of the sac and the lower part of the duct.

(b) In Acute Inflammations:

(i) The sac is full of pus.

(ii) The wall of the sac may be three or four times its normal thickness and its inner aspect is usually roughened and the epithelium has frequently been largely destroyed.

(iii) The submucous tissue is always infiltrated by cells. The type of cell varies with the acuteness and duration of the disease (Polymorphs and small lymphocytes in the acute stage, and
large mononuclears, eosinophils and endothelial cells in the more chronic, while fibroblasts appear in long standing cases).

(iv) A fistula usually becomes lined by stratified epithelium continuous with the skin. It tends to discharge pus until the mu cosa has been entirely destroyed or cast off; thereafter the discharge tends to become serous.

**Bacteriology:**

The bacteriology of the inflamed sac has stimulated a considerable amount of investigation. In general the organisms are of the nasal rather than the conjunctival type. But the conjunctiva often shares the same flora.

In general, in nonspecific dacryocystitis chronic inflammation is usually due to pneumococci frequently pure but sometimes to the staphylococcus, E. Coli, Moraxella and exceptionally to the gonococcus, Ps. Pyocyanea. [25][1]. Dacryocystitis is commonly due to pneumococci or Moraxella. In acute suppurative dacryocystitis streptococci are common. A suppurative peri- dacryocystitis is frequently due to streptococci usually of nasal or peranasal origin. The encysted mucocle is usually sterile.

**Treatment:**

[1] Probing and Syringing:

In adult and chronic dacryocystitis [26], repeated syringing of the naso-lacrimal duct may first be attempted
particularly in recent cases with a view to reducing
the swelling of the inflamed mucosa and restoring
patency.[12]

The objections to this method of treatment are: [12]

(1) It is impossible to probe the swollen and inflamed
duct without injuring the walls.

(ii) Such injury (or false passage) may lead to infec-
tion of the surrounding tissues and an acute cysitis.

(iii) Healing of the abrasions by the formation of
connective tissue leads to a fibrous stricture.

(iv) Probing is always painful, and when once begun
has to be continued for a prolonged period.
The probing is contra-indicated in acute dacryo-
cystitis.

[2] Dacryocystectomy (excision of the lacrimal sac
INDICATIONS:

(i) Long-standing chronic dacryocystitis in elderly
persons where the sac is shrunken, scarred or
fistulous [7].

(ii) Tuberculosis of the lacrimal sac.

(iii) The rare case of a primary neoplasm.
ANAESTHESIA:

(a) General anaesthetic is preferred; modern technique can greatly reduce vascular congestion.

(b) Local anaesthetic is instilled into the conjunctival sac and is injected at the following sites:

(i) At the junction of the inferior orbital margin with the beginning of the anterior lacrimal crest.

(ii) At a point 3 mm above the centre of the medial palpebral tendon.

(iii) Into the skin 3 mm above and below the centre of the upper and lower lid margins respectively.

The operation is performed through the curved incision conforming with the anterior lacrimal crest and it is deepened through the orbicularis muscle. It is unnecessary to divide the medial palpebral tendon. Then the sac is exposed and is cut free from it's bony bed starting with the dome and dissecting downwards as far as practicable into the bony naso-lacrimal canal where the duct is then divided; moreover the duct must be destroyed by thorough curettage or by the cautery (diathermy or chemical) down the length of the naso-lacrimal canal.

COMPLICATIONS:

(i) Injection of local anaesthetic into the anterior facial vein.
(i) Orbital haemorrhage or orbital cellulitis [2]

(ii) Excessive corneal ulceration may follow
probably owing to unintentional trauma at the
time of operation.

(iii) A recurrence of mucopurulent regurgitation and
epiphora is due to the proliferation of epithelial
cells from retained remnants of the lacrimal sac
or growing up from the naso-lacrimal duct or from
the epithelium lining the canaliculi.[7].

It is to be remembered, however, that after some
weeks the epiphora becomes much less and rarely gives
rise to real discomfort unless lacrimation is stimulated.

[3] Nasal drainage:

In general the classical methods of treating
dacyrocystitis were, therefore, the probing technique
in those cases wherein little structural damage had
occurred. Excision of the sac in the vast majority of
cases was followed by the persistence of epiphora,
although not in distressing degree, after dacyrocysto-
tomy always excited aspiration to return to the original
 technique of the ancients wherein hope was offered of
a total cure of the disease with a perfect restoration
of function by re-establishing a connection between the
sac and the nose.
[1] DACRYOCYSTORHINOTOMY (O.C.R.)

Principle:
The operation is designed to effect the drainage of tears and infected secretion from the lacrimal sac into the middle meatus of the nose through a short circuit made in the lacrimal bone and nasal mucosa.

Indications:

(i) Occlusion of the naso lacrimal duct in young and middle-aged persons.

(ii) Favourable cases of mucoceles and those patients in whom dacryocystitis and obstruction are recent.

(iii) Long-standing cases of chronic dacryocystitis with fibrosis and adhesions around the sac wall.

Anaesthesia:
As for dacryocystotomy.

The Operation:
After exposure of the lacrimal sac as for dacryocystotomy, the lacrimal sac and adjacent periosteum are dissected away from the bony fossa. A periosteal elevator is inserted into the vertical suture in the lacrimal fossa separating the underlying nasal mucosa from bone and by the use of a bone-nibbling forceps the window is enlarged until it is at least half an inch in diameter.
The medial wall of the lacrimal sac is incised vertically and a corresponding vertical incision is made in the nasal mucous membrane. Two anterior and two posterior flaps are fashioned from nasal mucosa and sac wall and are then sutured together.

Several methods have been attempted to maintain patency in the opening by the temporary introduction of such agents as rubber catheters, polythene tubes, gauze or silk sutures.

Complication After D.C.R.

(i) Haemorrhage from the skin or infra-nasal bleeding.

(ii) Closure of the anastomosis.

(iii) Corneal abrasion and its infection should not occur if the eye is protected by contact lens or temporary lid suture.

(iv) Scarring and keloid formation.

Modification of D.C.R.

There is a number of technical modifications of D.C.R. for which success is claimed. The majority have no advantage over the operation by the external route described above, are of doubtful value and in some the incidence of failure is high [7]. Among these is West's operation dacryocystorhinostomy performed by nasal route.
The modifications generally pertain to the creation of the bony ostium through the lacrimal sac fossa and/or the anastomosis of mucosal flaps between the nasal cavity and the lacrimal sac and the use of packing or stents to maintain patency of the drainage tract during healing.

An example is a modification of D.C.R. (27), in which a simplified method of ostium formation was utilized and no mucosal flaps were formed and anterior lacrimal crest is left intact.

[2] Transplantation (Implantation) of the Lacrimal sac:

Is possible only when the upper lacrimal passageways are open and fully patent.

The lower part of the sac is cut off and its proximal end is introduced through a hole obligated through the lacrimal bone into the nose.

The operation has not become popular [1].


In some patients with long standing chronic dacryocystitis, little or nothing remains of the lacrimal sac but a sheet of matted scar tissue in which the canaliculi end blindly, a technique available when the sac is absent [1]. The stages of the operation are the same as those for D.C.R. with the following changes: An oval area of the nasal mucous membrane is excised with its long axis
vertical where the centre of the opening is placed opposite to the ends of the canaliculi.

A vertical incision is made in the lacrimal sac remnants about 2mm in vertical length. A silicone rod 7.5mm in diameter is passed along each canaliculus after dilation by the probe until its ends appear at the opening into the sac remnants. The two intranasal ends are threaded through a closely fitting silicone sleeve 1 cm long; the silicone rod is left in place for 3 months.

The effect of this operation is often as good as D.C.R. and is indicated as a first procedure when epiphora is troublesome after dacryocystectomy.

**Medicinal Treatment:**

Medical treatment can be given systematically or locally in the latter case being introduced either in solution or as a liquid cream. When a stricture is present they are used to control the infection as a pre-operative measure but the improvement is only transitory if the passages are not patent; in early cases wherein permeability is maintained, however, they may effect a cure. The medical treatment of the lacrimal condition must be associated with the treatment of the nasal and paranasal disease.

We shall now proceed to examine the applicability of these various methods of treatment to the various clinical types of dacryocystitis.
(a) Chronic Dacryocystitis in the Catarrhal stage:

If it is seen early, frequently resolves with relatively conservative measures. Adequate treatment to the nose with vasoconstrictor applications in the region of the external of the lacrimal duct combined with simple syringing of the lacrimal passages with antibiotic drugs perhaps after a preliminary instillation of procaine and adrenaline to shrink the mucosa may be effective.

(b) In Established Chronic Disease:

Conservative measures have much less hope of success and should not be attempted unless clinical and radiological exploration indicates no organic stricture. However, syringing and careful probing and controlling the infection by lavage with antibiotic drugs may bring about a cure in a small number of cases without surgical intervention. Probes should be used with the utmost care and gentleness in the inflamed mucosa to avoid the spread of infection and sequel of subsequent cicatrization and stenosis.

In infants the probing will usually rupture a congenital membrane causing obstruction. In cases where organic stricture is present, operation should be considered at once. The operation in such cases involves a choice between dacryocystectomy and D.C.R. In the vast majority of cases the latter is the method of choice. If the sac is very distended and much pus can be expressed, a transplantation may be indicated.
The contra-indications to any form of nasal-drainage operation in preference to excision are:

(i) A markedly cicatrized and shrunken sac [1]
(ii) The presence of gross nasal disease or of widespread paranasal suppuration.
(iii) The complications of trachoma, syphilis, tuberculosis or other systemic diseases of the lacrimal passages.
(iv) Wide spread periocystitis inflammation

(c) A mucocelle:

Is always an indication for operation; a nasal-drainage operation is usually the treatment of choice.

In infants digital massage is used when ever the swellings could be reduced by massaging over the lacrimal sac [29]. When mucocelle cannot be decompressed in this manner the lacrimal system is probed and irrigated and the contents are aspirated and sent for culture and sensitivity studies.

(d) Acute Dacryocystitis:

Sometimes in the earliest stages the application of hot compresses and the systemic administration of antibiotic drugs may abort the acute attack.
If pus appears, two methods may be tried for its evacuation.

(a) **Aspiration of the Lacrimal Sac** [7]
In some cases it may be possible to pass a cannula through the valve-like obstruction at the site of common canaliculus to aspirate the infected contents of the lacrimal sac and after this to inject an antibiotic into the sac through the same cannula. The infected contents should be cultured to establish the sensitivity to antibiotics.

(b) **Dacryocystotomy (Incision of the Lacrimal Sac)** [7]
Incision of the lacrimal sac is indicated for acute dacryocystitis with abscess formation and if pointing under the skin below the medial canthus, it's interior is packed with dressing such as sulphathiazole and penicillin powder and at a later date final operative procedures are undertaken, the choice of which whether D.C.R. or dacryocystotomy will depend on the condition of the tissues. Dacryocystotomy is contra-indicated in the presence of acute inflammation, partly because near or accurate technique is impossible and partly for fear of a spreading cellulitis onto the cheek or into the orbit, but excision by surgical diathermy is the method of choice to prevent further extension. [7]

(c) **A Fistula**
This usually closes if drainage is re-established and is not a contra-indication to a nasal drainage operation.
If it does not close spontaneously it can be excised after radiological examination of its extent.

In long standing cases, however, where there is much cicatrization and peri-cystic inflammation, excision of the fistula with the sac is usually preferable.

**DACRYOCYSTITIS NEONATORUM:**

It is due to a failure in the canalization of the duct so that its lumen is blocked near the lower ostium by epithelial debris or by a membrane or by a stricture in the bony canal. The clinical evidences of dacryocystitis appear within the first 3 days of life or at various times up to 6 months. Dacryocystitis and epiphora in the pediatric age group are usually cured either spontaneously up to the age of twelve months or by medical treatment in the form of massage, hot compresses and topical antibiotics. [15, 30, 31].

It will also be remembered that in the average case treatment by gentle probing is usually effective provided that it is done between the age of 6 and 12 months, a process which may sometimes require repetition [11].

The probing and silicone intubation are usually effective particularly in children in whom naso-lacrimal duct probing and medical therapy had failed. D.C.R. is a successful therapeutic modality in childhood dacryostenosis with chronic dacryocystitis when medical therapy, probing and silicone intubation have been unsuccessful.
If it does not close spontaneously it can be excised after radiological examination of its extent.

In long standing cases, however, where there is much cicatrization and periocular inflammation, excision of the fistula with the sac is usually preferable.

DACRYOCYSTITIS NEONATORUM:

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If it does not close spontaneously it can be excised after radiological examination of its extent.

In long standing cases, however, where there is much cicatrization and periostal inflammation, excision of the fistula with the sac is usually preferable.

**DACRYOCYSTITIS VOMATORUM:**

It is due to a failure in the canalization of the duct so that its lumen is blocked near the lower ostium by epithelial debris or by a membrane or by a stricture in the bony canal. The clinical evidences of dacryocystitis appear within the first 3 days of life or at various times up to 6 months. Dacryocystitis and epiphora in the pediatric age group are usually cured either spontaneously up to the age of twelve months or by medical treatment in the form of massage, hot compresses and topical antibiotics. (15, 30, 31).

It will also be remembered that in the average case treatment by gentle probing is usually effective provided that it is done between the age of 8 and 12 months, a process which may sometimes require repetition (11).

The probing and silicone intubation are usually effective particularly in children in whom naso-lacrimal duct probing and medical therapy had failed. D.C.R. is a successful therapeutic modality in childhood dacryostenosis with chronic dacryocystitis when medical therapy, probing and silicone intubation have been unsuccessful.
Tuberculous Dacryocystitis:

It is not a common disease but used to be a relatively frequent type of dacryocystitis in young people under 20 years of age.

Aetiology:

Aetologically tuberculosis dacryocystitis may be primary or secondary:

(a) **Primary infection of the lacrimal sac:**

The disease has developed in the absence of any other discoverable tuberculous lesion throughout the body and the infection can be airborne or carried by the fingers or a handkerchief to the conjunctival sac or the nose where it may find its way to the lacrimal canal.

(b) **Secondary Tuberculosis:** Affecting the sac from the nose or from conjunctiva or the skin and the adjacent bones. Nasal infection is much the most common origin.

The Clinical Manifestations:

The important common symptoms are a chronic lacrimal inflammation associated with a derangement of the pre-auricular and submaxillary lymph nodes:

(a) In primary infections four types of dacryocystitis have been defined:

1. **Purging tuberculous dacryocystitis:** painless, indolent and semi-fluid; swelling unaccompanied by discharge.
(ii) Atrophic tuberculous dacryocystitis: no active inflammatory signs.

(iii) Purulent tuberculous dacryocystitis: profuse discharge which may be expressed into the conjunctival sac or may be banked up to form a cold abscess.

(iv) Fibrous tuberculous dacryocystitis wherein fibrosis leads to the formation of a hard tumour of cartilaginous consistency

(b) In secondary tuberculosis: The disease of the sac may be overshadowed by widespread infection of the skin or destructive lesions involving the nose and sinuses and the surrounding areas in various or mutilating deformities or discharging fistula.

Treatment:
The first step should be the administration of anti-tuberculous drugs (Streptomycin, PAS and Isoniazid) if these drugs allay the inflammation a B.C.R. may be practicable. Associated lesions in the nose, sinuses, skin or elsewhere must of course, receive appropriate treatment at the same time.

Sometimes the treatment is by excision of the sac and of any surrounding diseased tissue and a fistula if it has formed.
Leprotic Dacryocystitis:
The lacrimal involvement can occur both by direct infection of the sac in common with other tissues or from the nasal mucosa; atresia may develop owing to destruction and deformities in the surrounding structures.

Syphilitic Dacryocystitis:

A primary change. Of the lacrimal sac itself is an extreme rarity. It appears as a hard, painless swelling which may eventually ulcerate associated with weeping and involvement of the submaxillary lymph nodes.

In Secondary Syphilis lacrimal infection is also rare, mucous patches near the inner canthus may affect the sac secondarily by obliterating the puncta or dissecting the lid margins.

In Tertiary Syphilis lacrimal affections are more common, create form the typical manifestation of the disease. The clinical picture of a quinsy of the sac is that of a soft fluctuant tumor with weeping and impermeability of the passages. Sometimes the inflammation takes on an acute form, simulating an ordinary acute inflammation which on incision exhibits blood and a little yellow viscid fluid instead of pus.

In Hereditary Syphilis the usual feature is chronic dacryocystitis consequent on atresia, it is usually bilateral and is associated with a syphilitic coryza an atrophic exopha and the bony deformities typically in the saddle-shaped nose characteristic of these children.
Treatment:
Of all these lesions is by general antisyphilitic measures which are rapidly effective if taken in time. Surgical treatment is as for non specific cases.

Diphtheria:

Nasal diphtheria may spread up the lacrimal passages to cause a diphtheritic dacryocystitis.

Treatment: by antitoxin combined with such antibiotics as penicillin or erythromycin should keep the inflammation under control.

Rhinoscleroma:

The dacryocystitis which is chronic in type may be caused by obstruction or direct invasion of the sac by the organism. Secondary involvement of the lacrimal passages by upward spread from the nose is more common.

Actinomycosis:

The infection of the lacrimal sac without prior infection of the canaliculi is very rare indeed. The appearance is that of suppurative dacryocystitis progressing to fistula formation. The characteristic yellow grains of the organism being recovered in the pus.

Treatment: is by wide excision of all diseased tissue followed by penicillin or a broad spectrum antibiotic drug.
Viral Dacyrcystitis:

Viral infection is rare.

In vaccinia: A dacryocystitis occurring as a spread from a conjunctival infection leading to stenosis was reported.

Infectious mononucleosis: has been associated with an acute dacryocystitis.

Mycotic Dacryocystitis:

Sporotrichosis: of the lacrimal sac is a rarity. The infection is characterized by weeping, a purulent dacryocystitis and involvement of the pre-auricular and submaxillary nodes and may be associated with infection of the ethmoid sinuses. Diagnosis is by recognition of the fungus; treatment by iodine or amphotericin B is rapidly effective.

Candidiasis: The obstruction of the lacrimal duct caused by candida albicans; cure follows washing out of a cast containing these organisms. An abscess of the lacrimal sac due to the same organism is treated with nystatin or amphotericin B.

Aspergillosis: Granulomatous dacryocystitis secondary to infection of the orbit or nasal region.
Cysts and Diverticula:

Cysts of the Canaliculus:

These are extremely rare. They become evident clinically by projecting on the lid-margin as cystic tumour and the most frequent symptom is epiphora; They become infected and their content purulent.

Cysts and Cystic Diverticula of the Lacrimal Sac:

These are also rare and may be of congenital inflammatory or traumatic origin. [33].

They may be: indirect and free communication with the sac itself (a cystic diverticulum or bilocation of the sac) or the two structures may be separate (a true cyst). The cyst may contain a mucous fluid but if it is in communication with the sac, its contents may be purulent.

Clinically: The cyst appears as a tense fluctuant swelling, fixed to the deep tissues but not to the skin that increases as a rule very slowly over periods of years. It lies in the region of the sac, sometimes runs along the lower lid and the inferior orbital margin.

If it is directly connected with the sac pressure will empty its contents through the punctum or into the nose. Air may become trapped in a cystic diverticulum with the result that a pneumocystule is formed, enlarging on blowing the nose.
In the case of an isolated cyst, however, the swelling is not reducible on pressure.

In either case weeping is a frequent symptom due if not to an associated chronic dacryocystitis, to pressure on the sac.

At any time an acute inflammation may supervene (Acute lacrimal diverticulitis) which may rarely lead to pericystitis and the formation of a fistula.

The diagnosis: May be suggested by the ready patency of the lacrimal passages to syringing and confirmed by radiography after the injection of a contrast media. The conditions which require differentiation are:

(i) enucleated myococle of the sac itself,
(ii) tumour of the sac,
(iii) cyst of the overlying skin (Sebaceous or dermoid),
(iv) ethmoid mucocele.

The treatment is surgical removal. If the cyst is separate from the lacrimal sac the latter can be left alone, while if they are connected excision of the diverticulum combined with a D.C.R. is the method of choice, or failing that an excision of both cyst and sac.
(a) Tumours of the Canaliculi:

Tumours of the canaliculi are by no means common. The most usual is an inflammatory pseudo-tumour (a Granuloma) associated with a canaliculitis of some standing.

Non-specific granulomatous pseudo-tumours:

- These may occur when irritation has been present for some time as in the presence of myotic infections or foreign bodies or after trauma such as passing a probe.

- In such cases granulomatous polypi may sometimes protrude outside the punctum and pressure over the canaliculus extrudes pus from the swollen punctum.

Pathologically: They are not true epithelial polypi but aggregations of chronic inflammatory tissue infiltrated with lymphocytes and plasma cells and covered by irregular epithelium.

Papillomas: Papillomata forming true polypi are more rare than inflammatory type. In this case there is no history of antecedent inflammation, no pus can be expressed from the punctum but only a history of epithora followed by a swelling over the canaliculus and a pouring of punctum through which the small, firm red tumour eventually points.
Pathologically: They represent true neoplasms consisting of a core of highly vascularized connective tissue covered with proliferated, stratified epithelium.

The treatment: for all polypi is excision after slitting the canaliculus (Canaliculectomy); thereafter the channel should be made good again either by suturing or reconstruction. Cryotherapy to the base after excision may be considered in lacrimal canicular papillomata. [34]

Naevus:

In a naevus of the lower punctum the lips of which were swollen and eroded, the papilla is of a deep brown colour and the canaliculus is buried in dense connective tissue invaded by a mass of naevus cells.

Malignant tumours: of the canaliculi are exceedingly rare.

Secondary tumours: Commonly invade the canaliculus by extension from the lid; of these the most usual are epitheliomata.

Irradiation therapy for medial located basal cell epitheliomas of the eyelid leads to punctal and canalicular stenosis or obstruction. The management of patients with post-irradiation epiphora is surgical. [34]
(a) Pseudo-tumours or inflammatory granulomata.

(b) True neoplasia (benign or malignant) include:

(i) epithelial tumours (the most common)
(ii) mesenchymal tumours.
(iii) pigmented tumours.

Clinical picture:
From the clinical point of view the majority of tumours are so alike that differential diagnosis is impossible until biopsy. We shall therefore describe the general picture presented by such tumours as they appear clinically and then discuss the details peculiar to each.

(a) Simple tumours: These are typified in lacrimal polypi; they go through two clinical phases: that simulating dacryocystitis and that of obvious tumour formation. To these in rare instances may be added a third, that of visible extension.

Lacrimal polypi usually appear after a chronic inflammation of the sac and may relapse into a stage of chronic suppuration when pus or muco-pus can be expressed from the punctum. Later a swelling appears in the lacrimal area either solid or fluctuant but is never fully reducible. Pain is absent and
tenderness is not marked and the overlying skin may be slightly red, which is usually normal. Thus the tumour slowly increases in size. Papillomata have a tendency to relapse into malignancy in which event the aspect completely changes.

(b) Malignant tumours:
Clinically go through three stages of apparently simple dactylocystitis with effusion, tumour formation and expansion. The phase simulating dactylocystitis may be prolonged over a considerable time. Although the passages are frequently patent, weeping is constant possibly because of insufficiency of the sac owing to the loss of elasticity of its walls due to their infiltration. Pain although occasionally present with blood stained discharge from the punctum on pressure should always be regarded as significant. A swelling appears which may be tardy in development. Finally extension begins to betray the malignant nature of the condition. A pericystic spread leading to a local fluctuant, oedematous swelling, the skin becomes involved and ulceration may ensue; a regional adenopathy develops (preauricular, submaxillary and cervical nodes) and metastases may appear although these are rare. More commonly if the condition is untreated local spread is the more prominent, ulcerative destruction of the face, the nose, the ethmoid and maxillary sinuses, the palate, the orbit, and finally intracranial extension. The permeability of the lacrimal passages in early stages and the radiography after lipiodol injection should clear up the diagnosis.
Treatment:

The treatment of tumours of the lacrimal sac is surgical. In some cases of polypi, local excision with conservation of the lacrimal passages has been possible. However, as a general rule, excision of the part of the sac involved or the whole of it is preferably followed by the establishment of nasal drainage, if that is possible: (D.C.R. or Conjunctivo rhinostomy is the method of choice.

If any suspicion of malignancy exists complete excision is imperative and this should be followed by irradiation. Extension to the nose, paranasal sinuses or orbit will of course necessitate more extensively mutilating surgical procedures.

Non-Specific Granuloma; Pseudo-Tumours:

Chronic inflammatory condition of the lacrimal uncus is characterized by the formation of hyperplastic vegetations. In such cases the epithelial lining of the sac may become completely disorganized and replaced by proliferating granulation tissue or the reaction may remain circumscribed in the formation of polypi.

The development of similar granulomatous masses may appear without a preceding history or may follow injury from a wound, or from probing or constitute the reaction to a retained foreign body such as a style or a plastic tube or to powder introduced at operation.
The polypi are sterile and are composed of inflammatory tissue usually of a myxomatous nature infiltrated with lymphocytes or plasma cells over which is stretched an epithelial layer showing no signs of neoplastic over growth.

TRUE NEOPLASMS OF THE LACRIMAL SAC:

1) EPITHELIAL TUMOURS:

Transitional-cell Epithelial Tumours:

The two common epithelial tumours of the lacrimal sac are Papillomata and Carcinomata - the former are liable to assume malignant characteristics at any time in their evolution.

These tumours have shown a broad spectrum of behaviour varying from benign to malignant. This classification we shall follow, and divide these tumours into three classes:

(i) Transitional cell papillomata,
(ii) Transitional cell carcinomata,
(iii) and an intermediate type lying between the two.

(i) Transitional-cell Papillomata:

Papillomata although rare, are the most common of the epithelial neoplasms affecting the lacrimal sac. In addition to the usual local symptoms. They may give rise to recurrent bleeding through the punctum into the conjunctival sac. They may be single pedunculated tumours or composed of multiple papillomata.
processes; these polypi form true neoplasms with a central fibro-vascular axis covered by a pseudo-stratified columnar epithelium which usually proliferates into 20 or 30 layers in which the columnar cells may become tuform. A large papilloma may protrude beyond the punctum or dislodging the bony canal invade and block the nasal cavity.

**Histopathologically:** The tumours show true stratification with uniformity of the type of cell but with marked epithelial infolding; the basement membrane remains intact.

The possibility of degeneration into malignancy should always be remembered.

(ii) Intermediate Transitional-Cell Epithelial Tumours:
These show a more irregular epithelium than the benign papillomatous variety, some cellular pleomorphism with conspicuous squamous metaplasia and prominent mitotic figures; there is, however, no infiltration of the subepithelial tissues and the basement membrane remains intact.

(iii) Transitional-cell carcinoma:
These are rare simple papillomata may eventually show malignant degeneration but malignancy may be apparent from the start. In all cases there is a history of epithora. In the second stage of local swelling the irreducible hard mass which usually allows fluid to pass through on syringing is indicative of a tumour. This is sometimes followed by the development of an acute swelling with marked extension.
into the surrounding tissue of the lids and orbit. Only at this stage does pain become apparent. Sanguineous discharge from the punctum and bleeding associated with probing and lymphatic involvement, and it is finally followed by ulcerative breakdown whereupon the diagnosis becomes obvious. Invasion of the nasal fossa and sinuses should always be noted.


diagnosisically:
The tumour shows marked cellular pleomorphism with conspicuous mitotic figures and there may be invasion through the basement membrane into the underlying stroma.

Treatment:
If at the time of surgery the neoplasm appears localized and benign, complete excision of the sac and duct is essential and probably adequate, but where extension has occurred this may have to be supplemented by exenteration of the orbit and radical surgery to the nose, the nasal sinuses and any affected lymph nodes. Post operative irradiation is usually advisable and always when extension has occurred beyond the lacrimal fossa.

[2] Tumours of Lympho-recticular Tissue:

Lymphomas of the lacrimal sac are usually associated with leucemia. The usual clinical picture in lymphatic leukaemia resembles dacryocystitis, occasionally with a fistula.
Lymphosarcoma: These are more common; they may occur in young people but at the same time may appear in adult life. The tumours may be polypoid or may infiltrate a large part of the wall of the sac. The clinical picture at this stage resembles that of dacryocystitis, eventually simulating a chronic pericystitis; it involves the surrounding tissue; spreads into the nose, sinuses and orbit and gives rise to general dissemination.

The prognosis is bad even after treatment by wide excision and irradiation.

A Giant P follicular Lymphoma: In this the infiltration affects the subconjunctival and subcutaneous tissues, the lacrimal gland and the sac, which presents the clinical picture of a dacryocystitis.

A reticulum-cell Sarcoma: This has been found as a rarity in the region of the sac, the neoplasia forming part of a generalized disease affecting the lymph nodes, tonsils, spleen and other tissues.

Involvement of the lacrimal sac in Hodgkin's Disease is uncommon.

Melanomatous Tumours:

Primary Malignant Melanoma: of the lacrimal sac are not common.
In a benign Melanoma: There is usually a swelling of the sac without obstruction, but persistent bleeding after syringing. Exenteration of the orbit may be required in addition to wide excision of the neighbouring bones.

Secondary Tumours of the Lacrimal Sac:

Secondary tumours of the lacrimal sac may be due either to direct spread or to metastatic deposition.

(a) Direct Spread: This may involve four main possibilities:

(i) Skin tumours - epithelium of the lower lid or of the palpebral conjunctiva are the most common.

(ii) Nasal epithelial tumours - papillomata, particularly of a malignant variety tend to spread from the nasal mucosa to the lacrimal sac. Similarly conjunctival papilomata may be associated with or precede lacrimal papilomata.

(iii) Tumours of the nasal sinuses, particularly of the frontal and ethmoid sinuses, less readily of the maxillary antrum, tend to spread to the lacrimal region. The most common type is a carcinoma.

(iv) Nasopharyngeal tumours invade the lacrimal sac exceptionally.
(b) **Metastatic Tumours:** In the lacrimal sac are exceedingly rare.

[v] **Dacryostenosis:**

Stenosis of the lacrimal passages occurs preferentially at four sites: [3]

(a) The punctum,
(b) The canaliculi at their common junction with the sac,
(c) In the sac and duct particularly at the junction of the two,
(d) At the lower ostium.

The etiology of the obstruction and the clinical methods of diagnosis of the site of atresia has been discussed in the various sections; the constant single symptom of simple blockage (that is, stenosis without inflammatory evidences) is weeping.

(a) **Stenosis of the Punctum**

This may be present as:
(i) Usually a congenital malformation [15].
(ii) In anhidrotic ectodermal dysplasia. [26]

(iii) Inflammatory or traumatic lesions affecting the conjunctiva or skin at the lid-margin which have been of sufficient severity to cause cicatrization [18,19].

(iv) After the use of drugs such as strong miotics

methane (1.0U) or systemic flurouracil therapy [1,17]
(iv) Stenosis of punctum has been reported in pemphigus and erythema multiforme.

The diagnosis is obvious and the patency of the remainder of the lacrimal passages can be verified by injecting fluid into the lacrimal sac from the inner angle of the conjunctival sac, this fluid should readily enter the nose.

Treatment:

- Repeated dilatation with Nettleship's dilator may be successful in the treatment of lesser degrees of stenosis.

- Alternatively, if this proves insufficient and if the orifice can be entered, the punctum should be enlarged in the operation of canaliculotomy by slitting it up for a very short distance opacified to the vertical part of the canaliculus by the "One-snip" or "Three-snips" operation or by punch forceps or trichina. (7)

- If the punctum cannot be entered and is completely closed or cannot perhaps, be found it may be reconstructed surgically. It's site may be evident as a slight whitish elevation usually at the nasal termination of the cilia 6.5mm lateral to the medial canthus. A 1mm vertical incision through this on the conjunctival side may reveal the ampulla of the lower canaliculus. If this has been successful, it should be followed by a punctum dilator, the opening being increased by a three-snips or a one-snip procedure.
If this fails, the lacrimal sac is opened and retrograde probing is made through the opening of the common canaliculus into the sac. A conjunctival incision is made over the tip of the probe in the lower canaliculus. Through this opening a canaliculus knife is passed and the lower canaliculus is slit medially for 3 mm. The opening being kept patent by the retention of a strand of silk or horse-hair or polythene tubing for three weeks until epithelialization is complete. [39]

Laser punctoplasty is most useful in elderly persons with occluded puncta resulting from an overgrowth of the conjunctival epithelium across the punctal opening or a scarification of this area from the low-grade chronic inflammation. [39]

A complete new passage can be constituted by:

(a) Conjunctivo-sacryocystostomy (Stallard’s operation) [7]

This operation is indicated when both upper and lower punctae or canaliculi are occluded between the medial canthus and the lacrimal sac and when it is believed that the lacrimal sac and naso-lacrimal duct are patent. It consists in mobilizing the fundus of the lacrimal sac, then bringing it into the lacus lacrimalis where it is stitched to the edge of the conjunctival incision through which it is brought. The fundus is then slit 2 mm above the line of nature and an artificial opening is thus made from the lacus lacrimalis into the lacrimal sac. A silicone tube 2 mm in internal diameter is
passed through the opening in the fundus of the sac, down the naso-lacrimal duct to enter the inferior nasal meatus. The upper end of the tube is transfixed.

(b) Conjunctivo-rhinoctomy:
- When both the canaliculi and the naso-lacrimal duct are so obstructed and when in addition the lacrimal sac is either absent or destroyed or has become extensively enveloped in dense fibrous tissue, it is necessary to attempt a communication between the conjunctiva at the lacus lacrimalis and the nasal mucosa. The techniques for doing this are called "Lacrino-rhinoctomy", "Uoculorhinoctomy" or "Conjunctivo- rhinoctomy". (71 30).

- A rectangular pedicle flap is made 10x5 mm of conjunctiva from the lower fornix based at the medial canthus and reflected towards the nose. Another rectangular nasal mucosal flap is made also 10x5 mm with its base above and reflected towards the eye. These flaps are stitched together with (6/0) chronic catgut around a 3 mm diameter 10mm long silicone tube, the lateral end of which is fixed by four (7/0) black braided silk sutures which pass through the silicone tube, the mucous membrane and thence through the edge of the conjunctival opening in the lacus lacrimalis.

Lester T. Jones recommend replacement of the silicone tube with glass tubes 3-4 weeks after operation. The outside diameter of the glass tubes is 2.25mm there
is a 6mm collet at the conjunctival end to prevent it passing through the tunnel into the nose. [7]

There is a number of variations in which the newly formed passageway is maintained by insertions of skin, mucosa, vein or artery or by tubes of polyethylene or pyrex.

A new method of conjunctivorrhinostomy came into use that eliminated the necessity of perforating the bone. It consists of connecting the internal canthus of the eye with the inferior part of the nasal atrium by means of a plastic tube running almost vertically over the facial skeleton just beneath the muscles and soft tissues of the face. [40]

(b) Stenosis of the Canaliculus:

Is relatively common particularly at its medial end. Many cases are secondary to dacryocystitis, but the etiology of a considerable proportion is obscure. The known causes may be:

(i) A congenital anomaly.

(ii) Inflammatory either a congestive swelling of the mucosa or a cicatrical sequel to canaliculitis. It has also been observed with certain viral infections. [18, 19, 20 & 21].

(iii) Traumatic including the effects of injudicious probing or therapeutic irradiation for neoplastic diseases [15].
(iv) Lacrimal concretions or a foreign body.

(v) A polyp.

(vi) Pericanalicu lar scarring due to a deep inflammatory lesion in the lid or conjunctiva.

(vii) After prolonged use of a miotic drug (e.g., methedrine).

In all cases the diagnosis is made by the demonstration of impermeability and the verification that the sac and the canal are patent.

**Treatment:**
- Treatment by conservative measures is always indicated if the etiology suggests that the mucous membrane remains intact. [1]
- In acute inflammation syringing with ephedrine may be effective, followed if necessary by graduated probing.
- It has been suggested that the canaliculus be slit but the functional disability of a completely slit canaliculus is as great as that of atresia. Similarly, the operation of stricturotomy using a narrow knife with a probe-point the stricture is incised in several directions and subsequently probes are passed.

This is rarely successful. More recently silk, nylon, polythene tubing or silicone-treated polyester fibre have been employed. Unlike other materials silicone is non-irritating, flexible and easy to knot. [41]
- If the obstruction is narrow, the stricture is resected and the stumps of the canaliculus are anastomosed over a polythene tube passed through the canaliculus. For wider stricture, after excising it freely, the canaliculus is reconstructed by a rectangular flap of the conjunctiva rolled around a nylon thread inserted through the cut ends of the canaliculus with its epithelium inwards. Similarly transplantation of the patent upper canaliculus with its punctum into the lower lid is carried out. [7].

- If the obstruction is in the medial part of the canaliculus or in the common canaliculus leaving at least 4mm intact, the best results are obtained with a Canaliculo-daerycystorhinostomy. This is a micro-surgical technique wherein after the stricture has been excised, the cut ends of the canaliculi are sutured into the lateral wall of the sac with a fine polyethylene or silicone tube passed through the punctum and canaliculus and the sac and nose left in place as a splint for a period of about 12 weeks. [42].

- If the obstruction is in the lateral half of the canaliculus or both canaliculi are obstructed, a new channel must be made from the conjunctival fornix. Of the two possibilities available a Conjunctivo-daerycystostomy whereby a connection is made between the conjunctival sac and the lacrimal sac by a tube of buccal mucosa or the conjunctival mucosa sutured directly to the fundus of the lacrimal sac.
A Conunctivo-daeryocystorhinostomy or in the absence of a sac a conjunctivo-rhinostomy held patent by a tube of polythene or silicone tube is a more satisfactory procedure. [40, 41].

c) Stenosis of the Lacrimal Sac and Duct:

This may be catarrhal, fibrous or bony, occurring usually at the point of junction of the two and less frequently at the lower ostium. However, the constriction may be widespread and involve the whole of the duct in multiple strictures or the entire passage may suffer atresia. It is rare, however, to find a stenosis in the middle of the duct without one or other of these points of election being also involved.

Aetio logically the Stenosis may be:

(i) Congenital in which case the lower ostium is usually involved.

(ii) Traumatic.

(iii) Post-inflammatory, a dacryocystitis being much the commonest cause, when the function of the sac and the duct is the usual site of stenosis.

(iv) Tumours of the lacrimal sac.

(v) Pericystic inflammation.

(vi) Foreign bodies.
(vii) Pericystic pressure by tumour.

(viii) Sanguineous discharge due to malignancy or ulceration of the tumour's surface.

(ix) Bone erosion or destruction of the surrounding bone structures.

(x) An increase in the size of the tumour as it grows and spreads.

Treatment:

The treatment of such a tumour depends on its type and stage. However, it is best to consult a specialist, such as a urologist or oncologist, for a proper diagnosis and treatment plan.

Temporary intubation may be necessary to maintain patency and permit epithelialization in patients with congenital blockage of the nasolacrimal duct. Congenital blockage occurs when the duct is not properly formed during fetal development. In this case, temporary intubation may be necessary to prevent infection and maintain the patency of the duct.

Should probing fail, the best alternative is a dacryocystorhinostomy, which involves creating a new channel for drainage of tears. This is generally a successful operation provided the new channel is sufficiently long.
If the ostium into the nose is not sufficiently wide, a second operation is indicated, enlarging the ostium to at least 9mm.

A simple technique without special equipment which opens the lacrimal system in congenital naso-lacrimal duct obstruction suggest that use of the hemostat to fracture the inferior turbinate will clear a naso-lacrimal duct obstruction.[46]

[VI] FOREIGN BODIES IN THE LACRIMAL PASSAGES DROPSYOLITHS:

Occasionally foreign bodies are washed by the tears from the conjunctival sac into the canaliculus where they are retained causing irritative or inflammatory symptoms.

- The component is an eyelash and it is not a very unusual occurrence for the cilium to protrude from either the upper or lower punctum.

- Other foreign bodies: hair, the bristle of a brush, pieces of grass and other vegetable debris as even around worn.

Symptoms:

(1) The foreign body irritates the cornea and conjunctiva producing abrasions or opacities with considerable photophobia and lacrimation.

(1) The punctum in such cases becomes dilated and the canaliculus may suffer a suppurative inflammation which may develop into an encysted purulent dacryo-canaliculitis.
Alternatively a less acute inflammation may lead to the formation of granulomatous tissue in the canaliculus which may become polyoid.

**Treatment:**

This consists of removing the foreign body, dilating and curetting the canaliculus if necessary; recovery is usually rapid.

More rarely the foreign body finds its way downwards into the sac and the naso-lacrimal duct where it may set up inflammatory changes.

More usually, however, foreign bodies in the lower passage are introduced from the nose and becoming calcified remain as rhinoliths near the lower ostium.

**Dacryoliths:**

Calculi (dacryoliths) have been reported in the canaliculus; they were referred to as tear stones. Occasionally a deposit of calcium carbonate and phosphate may surround a foreign body in the canaliculus. It is probable that the majority of reported calculi have been in reality of actinomycotic origin but cases have occurred without any obvious explanation.

A dacryolith should always be suspected when the patient is a middle aged female who complains of intermittent tearing with discharge. However, the dacryolith usually forms due to a narrowing of the naso lacrimal duct.
Concretions in the sac:

These are much rarer and are usually doughy and putty-like associated with a mycotic infection, often accompanied by similar concretions in the canaliculi. Such concretions show a laminated structure after the manner of a sea-shell, the whole being heavily impregnated with calcium salts although traces of many elements may be present [1].

Such concretion occurs only in the presence of a chronic dacryocystitis and has been noted in a diverticulum of the sac. It is usually not diagnosed until operation reveals its presence. An interesting sign is that an intermittent patency may exist, syringing the passage sometimes giving a positive and at other times a negative result.

Radiologically:

In the absence of calcification they are radiolucent but can be outlined by contrast material in a dacroycystogram; the demonstration of a dilated sac is outlined by contrast material, a central clear area being suggestive of the presence of a stone.

Treatment:

Some patients respond to irrigation with dislodgement of the dacryolith through the naso-lacrimal duct. The definitive treatment, therefore, is a D.C.R. to eliminate the pathology in the lacrimal excretory system which causes the dacryolith formation.
METHODS

AND

MATERIALS
METHODS AND MATERIALS

PATIENTS

This study was carried out in Khartoum Eye Hospital during a period of two years from February, 1986 to February, 1988.

The study included 100 patients, 51 females and 49 males whose ages ranged from two months to 65 years. The patients were treated either by medical treatment or surgical procedures or by both.

All the patients, who came to Khartoum Eye Hospital with watering of the eyes, were examined. There was no age or sex discrimination. The duration of the symptoms was not considered in selecting the patients. Most of the patients selected were living in a place within easy reach of the hospital.

The patients were selected as follows:

(1) A group were referred from other colleagues in Khartoum Eye Hospital and they comprised the majority of cases. I appointed a fixed day which
was the day on which I worked in the outpatient clinic.

(i) A number of patients were seen by me from the start usually in the outpatient clinic.

(iii) Some patients were referred by medical assistants in this hospital.

METHOD:

- 100 patients with 120 eyes involved (80 were unilateral, 20 patients were bilateral).

- The diagnosis of the epiphora was based on clinical history, findings and investigation.

- A complete and accurate history of the disease was taken including the duration of the symptoms, past history of previous attacks, medical treatment, surgical management and the present history of the disease.
The examination of the eyes performed included: examination of the bony orbit and orbicularis function; examination of the eyelids, lid margin especially at the medial canthous and the skin of the eyelids; examination of the punctum, region of the lacrimal sac and regurgitation test; examination of the lacrimal gland, conjunctiva and cornea; finally nasal examination. A slit lamp examination was also performed of the position of the lower lid and puncta, size of the punctal orifices and the presence or absence of a foreign body.

In investigating a case of epiphora the first thing to decide was whether the weeping was due to excessive lacrimation or epiphora, by Schirmer's test and fluorescein test. Then the patency of the lacrimal passages was investigated by:

2. Occlusion of the lacrimal puncta.

3. Occlusion of the lacrimal canaliculus.

4. Obstruction of the naso-lacrimal duct or persistent imperforation of the lower end [valve of Hasner's].

The majority of the probing were done in the minor theatre and the remaining cases were operated in the major theatre especially for the children because they were done under general anaesthesia, while adults were done under local anaesthesia.

Technique of Probing:

(i) The punctum and canaliculus were dilated with nitrous acid dilator.

(ii) A fine probe was used. (Foster's lacrimal probes) It is inserted vertically for 2 mm then its direction was changed to become horizontal and it was pushed till it struck the bone of the lacrimal fossa.
(iii) The probe was then rotated upwards and towards the midline and pushed down the nasal duct until it touched the floor of the nose. Little force was required when rightly applied on the line of the duct.

The passage of the probe once cured most congenital canals but in adults it had to be repeated.

(3) The Three-Snips Operation:

(i) This was indicated when epiphora was due to a small spastically closed lower punctum which did not function properly after repeated dilatation but closed again.

(ii) The posterior wall of the canaliculi and the punctum was removed.

Anaesthesia:

This was local anaesthesia by surface anaesthesia into the conjunctival sac and infiltration by 0.5 ml. was injected around the lower punctum, ampulla and canaliculus.
Steps:

(i) The lower punctum was diluted by Nettleship dilator.

(ii) The first snip about 1.5 mm was made through the vertical part of the canaliculus by fine-pointed spring scissors.

(iii) The second snip about 6 mm was made through the horizontal part of the canaliculus by canaliculus knife.

(iv) The third cut was made with fine-pointed scissors across the base of this flap, thus joining the beginning of the first incision with the end of the second.

(v) Firm pressure was applied for 2 minutes to stop the bleeding and then antibiotic ointment was applied to the medial canthus.

Post-Operative Treatment:

A punctum dilator was introduced into the lower canaliculus on alternate days for 2 weeks.

Indications:
This was indicated for acute dacryocystitis with abscess formation.

Operation:
Skin incision was made at point below the medial palpebral ligament, and the content was evacuated through it and packed with dressing and antibiotic drops or ointment.

[5] Dacryocystectomy:

Indications:
(i) In long standing chronic dacryocystitis especially when the sac was shrunken, scarred or fistulous or where the patient was too old.

(ii) For cases of encysted mucocle.

(iii) For traumatic dacryocystitis with scarred and fibrous sac.
(iv) For recurrent abscess formation of acute dacryo-cystitis.

Anaesthesia:

The majority of the operations were undertaken with local analgesia, especially for the adult, and the remaining cases were done under general anaesthesia especially for the children.

The conjunctival sac was anaesthetized by surface anesthesia and the area surrounding the sac by infiltration with procaine and adrenaline.

The nasal mucosa was sprayed with cocaine and adrenaline and packing with ribbon gauge soaked in an oily solution of the same drugs was often necessary.

Steps of Operation:

111 The puncti and canaliculi were dilated and the lacrimal sac irrigated with saline to remove the content and to help identification of the sac during dissection.
The lids were temporarily closed with mattress sutures in order to avoid the danger of an infected abrasion.

The skin was stretched by moderate traction at the outer canthus, a curved incision was made beginning 2 mm above the medial palpebral ligament, and 4 mm to the nasal side of the inner canthus along the line of the anterior lacrimal crest to a spot 2 mm below the inferior orbital margin. The skin of the temporal edge of the incision was undermined.

The orbicularis was split in the line of the incision and retracted with the skin by a lacrimal retractor.

The lacrimal fascia was exposed and incised along the anterior lacrimal crest. The sac was then exposed.

Dissection of the sac started nasally where it was separated from the lacrimal fossa by a blunt dissector and from its other connections by careful
dissection until it remained attached only below
to the nasal duct.

[7] The sac was drawn forwards and twisted two or
three times in passage forceps until it tore
away from the duct.

[8] The upper end of the duct was curetted by curette
and its epithelium was destroyed by carbolic acid
and the epithelium lining the canalicular crushed
by artery forceps.

[9] The lids were then released.

[10] The orbicularis was sutured with catgut and the
skin incision by a continuous subcuticular suture
of black silk.

[11] The eye was irrigated and an antibiotic instilled.

[12] A pressure bandage was applied.

[13] Skin stitches were removed after 7 days.

Principle:
To make an anastomosis between the mucous membrane of the sac and the nasal mucosa after removing the floor of the lacrimal bony fossa.

Indications:
[1] It was indicated in all cases where the walls of the sac and the condition of the nose make it possible.

Anæsthesia:
As for dacryocystectomy.

Operation:
[1] The early steps were the same as for dacryocystectomy (from 1 to 5).
The lacrimal sac and adjacent periosseum were dissected away from the bony fossa.

The edge of the periosteal elevator was inserted into the vertical sulcus in the lacrimal fossa and swept round to separating the underlying nasal mucous free from the bone. The edge of the elevator was then levered towards the orbit and the fragments of bone were picked up in strong plain forceps.

The window of bone removed was roughly oval, it was limited anteriorly and posteriorly by the anterior and posterior lacrimal crests respectively; it extended upwards to the upper margin of of medial palpebral tendon and downward to the opening of the naso-lacrimal duct.

These windows were enlarged by means of bone-nibbling forceps by removing bits of thick bone around the base of the anterior lacrimal crest.

The medial wall of the lacrimal sac was incised vertically and a corresponding vertical incision was made in the nasal mucous membrane.
The posterior flaps were left without suturing.

The small finger of a surgical glove was removed from the glove and a small piece of gauze was introduced inside it. Then it was inserted through the nose until it separated the posterior and anterior flaps to maintain the patency in the opening during healing.

The anterior flaps were united by four interrupted sutures of (6/0) chromic catgut.

The orbicularis muscle was closed with three interrupted sutures of catgut and the skin incision was closed by interrupted sutures of (7/0) black silk.

The eye was irriagated and an antibiotic was instilled.

The packing (the finger of the glove) was removed after 5 days and the skin stitches after 7 days.
Post-Operative Treatment:

On the sixth day very gentle irrigation with warm, sterile physiological solution through the lower canaliculus was done and carried out every other day for ten days and then once a week for a month.

[7] **Conjunctivo-Dacryocystostomy**

**Principle:**

The operation consisted of mobilizing the fundus of the lacrimal sac, then bringing it into the lacus lacrimalis, where it was stitched to the edge of the conjunctival incision through which it was brought.

**Indication:**

It is indicated when both upper and lower canaliculi are occluded between the medial canthous and the lacrimal sac and when it is believed that the lacrimal sac and naso-lacrimal duct are patent.

**Anaesthesia:**

As for dacryocystectomy.
Operation:

1. **Conjunctival incision:**
   The lower lid was drawn away from the globe by a fine hook in the margin. An oblique incision 6mm long was made through the conjunctiva from the region of the ampulla of the canaliculus downwards and medially to the bottom of the lacus lacrimalis. Four (7/0) black silk sutures were inserted into the lateral and medial ends and midway along the anterior and posterior lips of this incision respectively.

2. **Exposure of the lacrimal sac:**
   These were the same as for dacryocystiectomy until the fundus and the medial wall of the sac was freed by dissection from the adjacent tissues. An incision about 1mm long was made in the fundus of the lacrimal sac.

3. **Intubation of the lacrimal passages:**
   A polythin tube small in diameter was passed through the opening in the fundus of the sac down the nasolacrimal duct to enter the inferior nasal meatus. The upper end of the tube was transfixed by (6/0) black silk suture which passed through the fundus of the sac.
Anastomosis of the lacrimal sac and conjunctiva

When the sac was freed by dissection from the adjacent tissues it was drawn laterally and slightly forwards to ascertain whether it would come into the lacus lacrimalis without tension, the sac was then reflected forwards and downwards.

An oblique stab incision 6 mm long was made through the conjunctival incision in the lacus lacrimalis by a double edged knife; the knife was withdrawn and a small artery forceps was passed between the lips of the incision to draw the stich in the fundus of the sac into the lacus lacrimalis.

The sac was drawn upwards and laterally through the incision until 2-3 mm of the fundus was projecting into the lacus lacrimalis taking care that it was not under tension or kinked.

The four sutures (7/0) of black silk in the lips of the conjunctival incision were inserted through the wall of the lacrimal sac and the tube.
Closure of incision:

The orbital septum behind the sac was incised vertically so as to allow orbital fat to herniate into the lacrimal fossa and form a soft pad occupying the space between the new oblique position of the sac and the bony wall of the lacrimal fossa.

The incision was then closed as for dacryocystectomy.

Post-operative Treatment:

- Antibiotic drops were instilled for 3 weeks.
- The skin sutures were removed after 7 days.
- The stitches uniting the conjunctiva to the lacrimal sac wall and the tube were left in, when tolerated, for 6 weeks.
RESULTS
RESULTS

120 cases of epiphora in 100 patients were examined and treated. Below are the results according to different factors:

[1] Age Group:

The ages of the patients seen ranged from 2 months to 65 years as in Table [1]. (36%) of whom was the majority of patients with epiphora and these were below the age of 10 years, (18%) between ages 11-20 years, (14%) between 21-30 years, (11%) between 41-50 years and 61-70 years, between 31-40 years (6%) and only 4 cases (4%) of ages 51-60 years.

Below the age of 30 years males were found to be affected more than females, while above the age of 30 years females were affected more. The incidence of females was increased from the age of 30 years.

[2] Sex Ratio:

Both sexes were seen in this study female to a male ratio as seen in Table [1] was very near being 51% females and 49% males.

[3] Residence:

Most of the patients examined came from Khartoum region and were living in a place within easy reach of the hospital.
The result of the study of the 120 cases of epiphora in the 100 patients showed that (80%) of the cases were unilateral, while (20%) were bilateral as seen in Table [VII].

Table [VIII] shows that (85%) of bilateral epiphora occurred below the age of 30 years, (5%) between ages 11-20 years, (5%) between 31-40 years and (5%) between 41-50 years.

Regarding the signs as they are shown in Table [IX], Swelling of the sac (89.1%), Regurgitation test (84.1%), Discharge (60%), Fistula (24.1%), Incisional scar of abscess evacuation (13.3%), conjunctival congestion (13.3%), scar tissue of trauma (10%), Eczematous skin (5%), Corneal signs (3.3%) and lastly lid margin oedema (3.3%).

Out of 43 patients 52 swabs from the lacrimal sac were collected and examined bacteriologically. (In 9 patients swabs were collected from both eyes). As shown in Table [XI]. It was found that the majority of swabs gave no pathological growth (48%), Staph. aureus (30.9%) Hemoaphilus (9.7%) Staph. pyogenes (3.8%), Staph. faecales (3.8%) and mixed flora (3.8%).
Site of Obstruction:

The result of the study of 120 cases of epiphora in 100 patients shows that the upper segment obstruction (puncti and canaliculi) was (15%) while lower segment obstruction (nose and naso-lacrimal duct) (60%) and combined obstruction (25%) as shown in Table [XI].

Diagnosis:

As far as diagnosis is concerned, 120 cases of epiphora of 100 patients were diagnosed with different methods of investigation; punctum stenosis (5.8%), punctum obstruction (0.8%), Canaliculitis (0.8%), Canalicular stenosis (2.3%), Canalicular obstruction (2.5%), Chronic dacryocystitis (44.2%), Acute dacryocystitis (4.2%), Chronic dacryocystitis with fistula (24.2%), Mirabole (6.7%), Naso-lacrimal duct obstruction (0.8%) and Naso-lacrimal duct stenosis (7.5%).

Management:

As far as treatment is concerned, 120 cases of epiphora of 100 patients were treated with different methods of treatment depending on the cause and location of the obstruction as shown in Table [XIII], (11.8%) by medical treatment, (12.8%) by probing, (15%) by medical treatment and probing, (10%) by probing, ephal dacryocystectomy, (3.3%) by medical treatment then dacryocystectomy, (2.5%) by medical treatment and probing then dacryocystectomy, (26.6%) by dacryocystectomy operation, (10.8%) by medical treatment and surgical evacuation of the abscess, and...
(2.5%) by medical treatment and evacuation then dacryocystectomy, (5.8%) by probing and D.C.R., (2.8%) by medical treatment and probing when D.C.R., (1.6%) by probing and conjunctivo-dacryocystostomy, (5%) by three snips operation and (0.8%) by canaliculotomy.

It is very interesting to find that as shown in Table [XIV] the patients were treated by medical treatment or probing or by medical and probing (28.3%) of whom were below the age of 10 years, (5.8%) between ages 11-20 years, (1.6%) between 21-30 years, (1.6%) between 31-50 years, and only one case (0.8%) above 60 years.

[12] Failure of Treatment:

Regarding failure of treatment. When the failure follows treatment by medical or probing or medical and probing the patient shifts to treatment by other methods. As shown in Table [XV] only 3 cases following dacryocystectomy operation (2.5%) were reported.

Table [XVI] shows 2 cases (1.6%) of failure after D.C.R. out of 10 cases of this operation (20%).

Table [XVII] shows 2 cases (1.6%) following conjunctivo-dacryocystostomy operation out of 2 cases treated by conjunctivo-dacryocystostomy operation (100%) were reported with failure of operation.

Table [XVIII] shows the number of patients treated by three snips operation and canaliculotomy without failure of operation.
Follow up of patients who were treated varied according to the method of treatment done and ranged from one day after some operation till 9 months after treatment.
# TABLE III

SMOKING SEX DISTRIBUTION IN ACCORDANCE TO AG. OF PATIENTS IN EACH AGE GROUP

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 10</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>36%</td>
</tr>
<tr>
<td>11 - 20</td>
<td>8</td>
<td>19</td>
<td>27</td>
<td>19%</td>
</tr>
<tr>
<td>21 - 30</td>
<td>5</td>
<td>9</td>
<td>14</td>
<td>14%</td>
</tr>
<tr>
<td>31 - 40</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td>41 - 50</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>11%</td>
</tr>
<tr>
<td>51 - 60</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>4%</td>
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<td>61 - 70</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>11%</td>
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<tr>
<td><strong>Total</strong></td>
<td>51</td>
<td>47</td>
<td>98</td>
<td>100%</td>
</tr>
</tbody>
</table>

## GRAPH [1]

SEX DISTRIBUTION

![Graph showing sex distribution by age group](image)

- **Female**
- **Male**

AGE GROUP

- 0-10
- 11-20
- 21-30
- 31-40
- 41-50
- 51-60
- 61-70
### Table II

**Showing Sex Distribution**

<table>
<thead>
<tr>
<th>No. of Sexes</th>
<th>No. of Males</th>
<th>Total</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>51</td>
<td>49</td>
<td>100</td>
<td>100%</td>
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</table>

#### Graph II

**Sex Distribution**

- Male: 49%
- Female: 51%
TABLE [III]

SHOWING NO. OF CASES WITH PAST HISTORY

<table>
<thead>
<tr>
<th>Past History</th>
<th>No. of Female</th>
<th>No. of Male</th>
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<th>Percentage</th>
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<td>Trauma</td>
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<td>2%</td>
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<td>Rabid Rolya Operation</td>
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<td>1</td>
<td>2</td>
<td>2%</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>25</strong></td>
<td><strong>27</strong></td>
<td><strong>52</strong></td>
<td><strong>52%</strong></td>
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GRAPH [III]
PAST HISTORY

NUMBER OF PATIENTS

<table>
<thead>
<tr>
<th>NUMBER</th>
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PAST HISTORY

#### FEMALE

#### MALE
### TABLE LV

**SHOWING COMPLAINT IN 100 PATIENTS EXAMINED**

<table>
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<tr>
<th>Symptoms</th>
<th>No. of Female</th>
<th>No. of Male</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watering</td>
<td>51</td>
<td>49</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Swelling of the Sac</td>
<td>49</td>
<td>40</td>
<td>89</td>
<td>69%</td>
</tr>
<tr>
<td>Discharge</td>
<td>43</td>
<td>39</td>
<td>82</td>
<td>82%</td>
</tr>
<tr>
<td>Pain</td>
<td>26</td>
<td>25</td>
<td>51</td>
<td>49%</td>
</tr>
</tbody>
</table>

### GRAPH [V]

**COMPLAINT IN 100 PATIENT EXAMINED**

Number of Patients

---

**SYMPTOMS**

- **FEMALE**
- **MALE**
<table>
<thead>
<tr>
<th>Duration of Symptoms</th>
<th>No. of Female</th>
<th>No. of Male</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Since Birth</td>
<td>10</td>
<td>17</td>
<td>27</td>
<td>27%</td>
</tr>
<tr>
<td>1 - 12 Month</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>13 - 24 Month</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>25 - 36 Month</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>37 - 48 Month</td>
<td>-</td>
<td>4</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>25</td>
<td>37</td>
<td>37%</td>
</tr>
</tbody>
</table>

**Graph [VI]**

**Duration of Symptoms**

<table>
<thead>
<tr>
<th>Duration in Months</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Since Birth</td>
<td>15</td>
</tr>
<tr>
<td>1-12 M</td>
<td>3</td>
</tr>
<tr>
<td>13-24 M</td>
<td>10</td>
</tr>
<tr>
<td>25-36 M</td>
<td>2</td>
</tr>
<tr>
<td>37-48 M</td>
<td>4</td>
</tr>
</tbody>
</table>

- FEMALE
- MALE
<table>
<thead>
<tr>
<th>Eye Involved</th>
<th>No. of Eye Involved</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE</td>
<td>36</td>
<td>36%</td>
</tr>
<tr>
<td>LE</td>
<td>44</td>
<td>44%</td>
</tr>
<tr>
<td>RE</td>
<td>20</td>
<td>20%</td>
</tr>
</tbody>
</table>

36% \(--\) 60% Unilateral
44% \(--\)
20% \(--\) 20% Bilateral
### TABLE [VIII]
**SHOWING BILATERAL EPIPHORA IN ACCORDING TO AGE GROUP OF PATIENTS IN EACH AGE GROUP**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No. of Male</th>
<th>No. of Female</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 - 10</td>
<td>11</td>
<td>6</td>
<td>17</td>
<td>85%</td>
</tr>
<tr>
<td>11 - 20</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>21 - 30</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>31 - 40</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>41 - 50</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11</strong></td>
<td><strong>9</strong></td>
<td><strong>20</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### GRAPH [VIII]
**BILATERAL EPIPHORA**

**NUMBER OF PATIENTS**

**AGE GROUP**

- **FEMALE**
- **MALE**
## TABLE XII

Showing signs in 120 eyes out of 100 patient examined

<table>
<thead>
<tr>
<th>Sign</th>
<th>No. of Female</th>
<th>No. of Male</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swelling of the Sac</td>
<td>55</td>
<td>52</td>
<td>107</td>
<td>89.1%</td>
</tr>
<tr>
<td>Positive Regulation Test</td>
<td>50</td>
<td>51</td>
<td>101</td>
<td>84.1%</td>
</tr>
<tr>
<td>Discharge</td>
<td>57</td>
<td>55</td>
<td>112</td>
<td>60%</td>
</tr>
<tr>
<td>Fistula</td>
<td>13</td>
<td>10</td>
<td>29</td>
<td>24.1%</td>
</tr>
<tr>
<td>Incisional Scar of Evacuation</td>
<td>11</td>
<td>3</td>
<td>14</td>
<td>11.7%</td>
</tr>
<tr>
<td>Conjunctival Congestion</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>11.7%</td>
</tr>
<tr>
<td>Traumatic Scar</td>
<td>2</td>
<td>10</td>
<td>12</td>
<td>14%</td>
</tr>
<tr>
<td>Ecchymotic Skin</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>7%</td>
</tr>
<tr>
<td>Corneal Sign</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>5.8%</td>
</tr>
<tr>
<td>Limb Margin Desema</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>3.3%</td>
</tr>
</tbody>
</table>
TABLE [XI]
SHOWING RESULTS OF 52 CULTURE SWABS TAKEN FROM 43 PATIENTS

<table>
<thead>
<tr>
<th>Organisms</th>
<th>No. of Female</th>
<th>No. of Male</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Growth</td>
<td>11</td>
<td>14</td>
<td>25</td>
<td>48%</td>
</tr>
<tr>
<td>Staph. Aureus</td>
<td>7</td>
<td>6</td>
<td>13</td>
<td>25.0%</td>
</tr>
<tr>
<td>Haemorrhitis</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>9.6%</td>
</tr>
<tr>
<td>Staph. Pyogenes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5.8%</td>
</tr>
<tr>
<td>Strep. Families</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3.8%</td>
</tr>
<tr>
<td>Mixed Flora</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>11.5%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>28</strong></td>
<td><strong>24</strong></td>
<td><strong>52</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

GRAPH [X]
RESULTS OF 52 CULTURE SWABS FROM 43 PATIENTS

NUMBER OF CASES

<table>
<thead>
<tr>
<th>ORGANISM</th>
<th>FEMALE</th>
<th>MALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO GRP</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>STAU</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>HME</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>STPK</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>STFA</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>MOXD</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
TABLE XI
SHOWING THE SITE OF OBSTRUCTION OF THE LOCALTAL PASSAGES
IN 120 EYES OF 100 PATIENTS EXAMINED

<table>
<thead>
<tr>
<th>Site of Obstr.</th>
<th>No. of Female</th>
<th>No. of Male</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Segment</td>
<td>56</td>
<td>56</td>
<td>72</td>
<td>60%</td>
</tr>
<tr>
<td>Upper Segment</td>
<td>9</td>
<td>0</td>
<td>18</td>
<td>15%</td>
</tr>
<tr>
<td>Combined</td>
<td>13</td>
<td>17</td>
<td>30</td>
<td>20%</td>
</tr>
</tbody>
</table>

GRAPH [XII]
SITE OF OBSTRUCTION

NUMBER OF PATIENTS

FEMALE

MALE
### TABLE XXI

**SHOWING AETIOLOGICAL CASES OF 120 CASES OF EPIDIDYMIS IN 100 PATIENT EXAMINATED**

<table>
<thead>
<tr>
<th></th>
<th>No. of Female</th>
<th>No. of Male</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I.</strong> Function:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stenosis</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.8%</td>
</tr>
<tr>
<td>Obstruction</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1.6%</td>
</tr>
<tr>
<td><strong>II.</strong> CANDICULUS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyclitis</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0.4%</td>
</tr>
<tr>
<td>Stenosis</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2.5%</td>
</tr>
<tr>
<td>Obstruction</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2.5%</td>
</tr>
<tr>
<td><strong>III. SAC:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On. Decrystallitis</td>
<td>29</td>
<td>66</td>
<td>95</td>
<td>44.2%</td>
</tr>
<tr>
<td>Acute Decrystallitis</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>4.2%</td>
</tr>
<tr>
<td>On. Dairy, with Fistula</td>
<td>14</td>
<td></td>
<td>14</td>
<td>34.2%</td>
</tr>
<tr>
<td>Mucocoele</td>
<td>5</td>
<td>3</td>
<td>8</td>
<td>6.7%</td>
</tr>
<tr>
<td><strong>IV.</strong> A.L.H.:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstruction</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.8%</td>
</tr>
<tr>
<td>Stenosis</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>7.5%</td>
</tr>
</tbody>
</table>
GRAPH [XII]
DIGNOSIS

SAC 79.3%
NLD 8.0%
PUNCTAT 6.6%
CANCULUM 5.8%
<table>
<thead>
<tr>
<th>Management</th>
<th>No. of Female</th>
<th>No. of Male</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Treatment</td>
<td>4</td>
<td>9</td>
<td>13</td>
<td>10.8%</td>
</tr>
<tr>
<td>Probing</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>12.0%</td>
</tr>
<tr>
<td>Medical &amp; Probing</td>
<td>10</td>
<td>9</td>
<td>19</td>
<td>15.7%</td>
</tr>
<tr>
<td>Probing &amp; Dacryocystectomy</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>10.0%</td>
</tr>
<tr>
<td>Medical &amp; Dacryocystectomy</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>3.3%</td>
</tr>
<tr>
<td>Medical &amp; Probing &amp; Dacryoc.</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td>2.4%</td>
</tr>
<tr>
<td>Dacryocystectomy</td>
<td>15</td>
<td>17</td>
<td>32</td>
<td>26.7%</td>
</tr>
<tr>
<td>Medical &amp; Evacuation</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>0.8%</td>
</tr>
<tr>
<td>Medical &amp; Evacuation &amp; Dacryoc.</td>
<td>3</td>
<td>-</td>
<td>3</td>
<td>2.5%</td>
</tr>
<tr>
<td>Probing &amp; D.C.R.</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>5.8%</td>
</tr>
<tr>
<td>Medical &amp; Probing &amp; D.C.R.</td>
<td>3</td>
<td>-</td>
<td>3</td>
<td>1.4%</td>
</tr>
<tr>
<td>Probing &amp; Conjuctive-dacryoc.</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1.6%</td>
</tr>
<tr>
<td>Three Stage Operation</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>5.0%</td>
</tr>
<tr>
<td>Dacryocystectomy</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>60</strong></td>
<td><strong>120</strong></td>
<td><strong>100%</strong></td>
</tr>
<tr>
<td>Age Group</td>
<td>Medical</td>
<td>Probing</td>
<td>Med. % Prev.</td>
<td>Total</td>
</tr>
<tr>
<td>-----------</td>
<td>---------</td>
<td>---------</td>
<td>--------------</td>
<td>-------</td>
</tr>
<tr>
<td>6 - 10</td>
<td>13</td>
<td>9</td>
<td>12</td>
<td>54</td>
</tr>
<tr>
<td>11 - 20</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>21 - 30</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>31 - 40</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>41 - 50</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>51 - 60</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>13</td>
<td>15</td>
<td>18</td>
<td>46</td>
</tr>
<tr>
<td>Operation</td>
<td>No. of Operation</td>
<td>No. of Failure</td>
<td>Percent</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>------------------</td>
<td>----------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>Rectal &amp; Decryocystotomy</td>
<td>4</td>
<td>0</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Prostate &amp; Decryocystotomy</td>
<td>12</td>
<td>1</td>
<td>0.8%</td>
<td></td>
</tr>
<tr>
<td>Pelvic &amp; Prostate &amp; Decryocystotomy</td>
<td>3</td>
<td>0</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Excrecystotomy</td>
<td>52</td>
<td>2</td>
<td>1.7%</td>
<td></td>
</tr>
<tr>
<td>Rectal &amp; Excarceration &amp; Decryocystomy</td>
<td>3</td>
<td>0</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54</strong></td>
<td><strong>3</strong></td>
<td><strong>2.5%</strong></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>No. of Operation</td>
<td>No. of Failure</td>
<td>Percent</td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------</td>
<td>----------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>Probing &amp; D.C.R</td>
<td>7</td>
<td>2</td>
<td>1.6%</td>
<td></td>
</tr>
<tr>
<td>Dental &amp; Probing &amp; D.C.R</td>
<td>2</td>
<td>0</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
<td><strong>2</strong></td>
<td><strong>1.6%</strong></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>No. of Operation</td>
<td>No. of Failure</td>
<td>Percent</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>------------------</td>
<td>----------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>Pruning &amp; Conjunctive- \nDorsycystostomy</td>
<td>2</td>
<td>2</td>
<td>1.6%</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>No. of Operation</td>
<td>No. of Failure Operation</td>
<td>Percent</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------</td>
<td>--------------------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>Thoracic Operation</td>
<td>4</td>
<td>0</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Canaliculectomy</td>
<td>1</td>
<td>0</td>
<td>0.0%</td>
<td></td>
</tr>
</tbody>
</table>
apart from rare cases of hyperecretion, it generally occurs as a result of disturbance in the drainage of tears from the conjunctival sac. When the watering is such that tears actually fall on to the cheek then the term epiphora is applied.

This study discusses the investigation, causes and treatment of epiphora. It shows the majority of 100 patients examined below the age of 10 years, followed by the age group 11-20 years, followed by the age group 21-30 years, followed by the age group 41-50 years, and then those in the age group 61-70 years followed by the age group 31-40 years. The least cases were of the age group 51-60 years.

From the age group study it was found that the majority of the patients below the age of 30 years the complaint was due to congenital obstruction mainly. Young patients were also liable to exposure to infectious diseases and mostly to trauma. Above the age of 30 years the complaint was due to weakness of the orbicularis muscle and atonic dilatation of the sac.

This study also shows that below the age of 30 years more males were affected than females (43% : 25%). This is explained by the fact that males moved more and were thus more exposed to trauma and infectious diseases. However, above the age of 30 years females
were more affected than males (21.6% : 5%) because they weep more often than men and they blow their nose less heartily, both of which tendencies may favour the stagnation of the tears.

In this study the majority of the patients examined came from Khartoum region and were living in a place within easy reach to the hospital.

(24%) of patients gave a past history of recurrent abscess formation of the sac with surgical evacuation. This emphasizes the fact that the common cause of epiphora is the inflammation of the lacrimal sac either acute from the start or on top of a chronic inflammation, (14%) of patients gave a past history of trauma which may detract or obstruct part of the lacrimal passage and often leads to inflammation, (18%) of patients gave a past history of measles followed by bilateral chronic dacryocystitis and (18%) after vaccination with the S.C.G. vaccine, where the patient was diagnosed and responded to antituberculous treatment. This could explain the role of the systemic disease in inflammation of the lacrimal passages especially the lacrimal sac.

Moreover, the inflammation of the lacrimal passage might be associated with nasal disease where (18%) of patients with chronic dacryocystitis gave past history of nasal polyp operation in the same side. (5%) gave past history of probing and (4%) past history of medical treatment.
- The main presenting symptoms in this study were watering, swelling of the sac, discharge and pain. Watering of the eye is the main complaint in all patients (103%). This explains that there's obstruction in the lacrimal passages. Swelling of the sac, discharge and pain are the symptoms of inflammation of the lacrimal passage, e.g. acute or chronic dacryocystitis in regard to the duration of the symptoms.

This study shows that in (37%) of the patients examined the duration of starting symptoms varied from birth till the age of 4 years. Out of this (27%) started after birth which explains that the major causes of epiphora is a congenital obstruction.

- (20%) of patients examined have a bilateral epiphora and (85%) of it occurs in patients below the age of 10 years which can also support congenital obstruction in young patients.

- Swelling of the lacrimal sac, positive regurgitation test and discharge were the commonest signs found in this study of 120 cases of epiphora of 100 patients. However these signs are not found in some cases such as excysted mucocle and common canaliculus obstruction. Fistula and incisional scar of evacuation were explained as signs of acute dacryocystitis. Traumatic scar either from direct trauma or due to stitches was explained as the cause of destruction or obstruction of the passage and can indicate the site of obstruction. Conjunctival congestion and lid margin oedema were explained as signs of acute inflammation either
of the sac or canaliculi. Eczematous skin at the medial canthus was explained as the sign of chronicity.

- Regarding the culture swabs the majority of cases have no pathological growth (48%) due to excessive use of systemic and local antibiotic before swab was taken. The most frequently isolated organisms were Staph. aureus, haemolyticus, Staph. pyogenes, Staph. faecalis and lastly mixed flora. Therefore antibiotic sensitivity tests would serve as a useful guide in the treatment of the patient. The bacteriological study was also done in Sudan in 1971 and shows that the most frequent organisms were Ineumococcus, Haemophilus aegyptius followed by Staph aureus and group A haemolytic streptococci, E. Coli, Strept vivdus and diphtheroids, the frequency of which is in descending order. [25].

- Regarding the size and cause of obstruction of the lacrimal passage this study shows that the majority of 120 cases of epiphora in 100 patients examined was at the lacrimal sac (79.3%). It was either due to acute dacrocystitis or Chronic dacrocystitis or Mucocele of the sac, and was explained by:

(i) The sac is the main site of the lacrimal passage exposed to trauma.

(ii) The obstruction is the N.L.D. especially at the lower end leads to stagnation of the tears with a tendency to infection, and develops dacrocystitis.
(iii) Dacryocystitis is secondary to general infections and general diseases as seen in this study e.g. measles.

(iv) Dacryocystitis is secondary to nasal disease e.g. nasal poly and chronic sinusitis.

(v) The females above the age of 10 years had a tendency to incline of the sac leading to stagnation of the tears.

(vi) In old patients weakness of the orbicularis muscle, particularly norar's muscle, leads to loss of pumping action of the sac and stagnation of the tears.

- The Nasso-Lacrimal duct is the next site in the lacrimal passages which is affected by obstruction or stenosis leading to epiphora. It must be remembered that there are many cases with obstruction at the N.L.D. presented with dacryocystitis or milocele and sive included under the lacrimal sac diseases as seen above. In this study were found that the incidence of the N.L.D. the next most common cause of epiphora is explained by:

(i) The course of epiphora is intermittent.

(ii) It occurs most commonly among children and infants.

(iii) It responds to probing and massage.
The punctum is the third site where stenosis or obstruction leads to epiphora as has been found in this study. There was one case of congenital obstruction and six of stenosis due to such infections as trachoma, or congenital.

The canaliculi is the last site of obstruction and in this study it has been found that:

1. One case of canaliculitis was due to actinomycosis.
2. Three cases of congenital stenosis were in children and responded to probing.
3. In a number of cases the cause of obstruction was due to direct trauma.

It should be remembered that some cases with obstruction of the common canaliculus are included in mucomele of the sac and chronic dacryocystitis with fistula as seen above.

The management for epiphora started by medical treatment especially where the culture swabs and sensitivity test were done and massage of the tear sac was done daily for several weeks. Probing was the next line of treatment and in some cases it needed to be repeated several times. Surgical treatment followed failure of probing. There was a different surgical way of treatment according to the site of obstruction.

In this study it was found that 13 cases (10.8%) of epiphora below the age of 18 years responded well to medical treatment and -age (mainly after culture and sensitivity), the failure of medical
treatment among the other age groups was not regis-
tered because the patients shifted to the other way
of treatment.

- Probing was the next line of treatment and in
some patients the need arose for it to be repeated
several times. In this study it was found that
out of 15 cases of epiphora treated by probing, 9
cases (7.5%) were below the age of 10 years. The
older the patients were the less response there was
to probing.

- The combined way of treatment in the form of medical
treatment and probing succeeded in 18 cases of epiphora
where 12 cases (10%) were below the age of 10 years
and 4 cases (3.3%) were of age group 11-20 years. The
response to it decreased the older the patients
became.

In conclusion response to medical treatment, probing
or to both showed the following:

(i) 34 cases (26.3%) were below the age of 10
years.

(ii) 7 cases (5.8%) were in the age group of 11-20
years.

Both (i) and (ii) were a total of 41 cases.

This explained that probing of the lacrimal passages
is a highly effective means of relieving congenital
obstruction in those patients who do not experience
early spontaneous resolution of the blockage.
After the failure of the above way of treatment, the patients required further treatment. Intubations with silicone tubing was recommended for lacrimal passages obstruction in cases where probing had failed. Unfortunately, the tube was not available in the Sudan but it is hoped that it can be found somehow and brought and used for such cases. Dacryocystorhinostomy (D.C.R.) has been a useful secondary procedure for those patients not cured by probing. The site of obstruction could be identified at the time of the probing by the difficulty of passing the probe into the nose.

In this study 10 operations of D.C.R. were performed on the patients with naso-lacrimal duct obstruction. Therefore, (6.6%) cases out of 120 cases were operated upon as above. Only 2 cases were reported with failure of operation and this was explained by the difficulty of operation on Sudanese people who have a flat root of the nose which makes the operation field narrow and very deep. This led to difficulties in suturing the nasal mucosa with the mucus membrane of the lacrimal sac.

Conjunctivo-dacryocystostomy has been a useful operation for the patients with lower canaliculus obstruction not cured by probing. In this study 2 cases with obstruction at lower canaliculus and patent naso-lacrimal duct were done but the operation failed in both cases (100% failure). This was explained by early removal of the tube (6 weeks) and obstruction of the upper opening at the conjunctiva.
The three snips operation and Canaliculotomy has been a useful operation for the patients with stenosis of the lower punctum or obstruction by a foreign body (e.g. Actinomycosis). The operation is simple and easily performed. The procedure is short, it is an out-patient procedure, and the result is excellent.

Dacryocystectomy is the last resort to the treatment of epiphora. In this study 54 cases (45%) out of 120 cases of epiphora were treated by dacryocystectomy. This high number of operations is explained by:

(i) The high incidence of recurrent abscess formation (24%), and trauma (14%) which make other procedures very difficult due to the unfavourable condition of the sac and surrounding structures.

(ii) The high incidence of chronic dacryocystitis with fistula (24%) and encysted mucocele (6.6%).

(iii) The absence of the silicon tube at the Khartoum Eye Hospital. Had it been available, it would have helped a lot of patients.

(iv) Many patients came at a late stage, especially in cases of chronic dacryocystitis.
and cuts off the vicious circle of recurrent infection and epiphora.Cosmetically, it improves the condition of the face. 3 cases out of 54 cases were reported with recurrent mucopurulent regurgitation and epiphora after a dacryocystectomy operation.

The follow-up in our country is difficult to be carried out due to the difficulty of public transport and most of the patients are poor. Moreover, those patients reporting to the hospital during the period of investigation and treatment, having reported many times, feel improved so they stop coming for follow up, finding the effort of the journey too much.
The writer thinks that dacryocystectomy is suitable for our country firstly due to the high atmospheric temperature which helps in the evaporation of tears and decreases the excess watering of the eye. Secondly, it stops the continuous discharge from the sac either through the punctum or the fistula and cuts off the vicious circle of recurrent infection and epiphora. Cosmetically, it improves the condition of the face. 3 cases out of 54 cases were reported with recurrent mucous purulent regurgitation and epiphora after a dacryocystectomy operation.

The follow-up in our country is difficult to be carried out due to the difficulty of public transport and most of the patients are poor. Moreover, those patients reporting to the hospital during the period of investigation and treatment, having reported many times, feel improved so they stop coming for follow up, finding the efforts of the journey too much.
REFERENCES


Investigation

(a) Fluorescein test

(b) Jones dye tests

(c) Syringing the lacrimal passage
  - Fluid comes from the nose
  - Fluid comes from other Canaliculi
  - Returns throw the same Canaliculus

(d) Probing of the lacrimal passage

(e) Radio logical studies

(f) Culture Stab

Photography

Treatment

- Medical

- Surgical

Remarks
كثرة إدمان العين سبب الكثير من المصري المتمردين على
المصريين الذين يعانون منه. ومن خلال هذا الحث تزداد دراسة الفُرْع
ال_marks
تقوية الطرق المثلى لدراسة مراكز إدمان العين المعتمدة. في إصدار
المحرر المعتمد. وبسبب متعددة العيون بالأيام، واستخدام النفايات
بمحة رائعة مسماة الأخرى كثيرة إدمان العين سبب ذلك براءة أفراح
النساء العائدة، كذلك ابتكارات الحفاظ على مكافحة مكافحة
والأغاني والطريقة المناسبة لعلاج كل حالة على حدٍ ونوعق لعلاج نفع
كل حالة ي yOffset:558.4317064705882

إحدى الأمثلة على ذلك.

1986

ثاني جريمة 1986 بمساءلة العيون المبكرة بالخروج تحت أطراف بولندا،
المحترن أحمد الشامي.

تجلل الحفظ على منحة مرض يعانون من 120 حالة كثرة إدمان العين
من المتمردين على مختلف العيون ومن خلال الدراسة تم الدوس على
ان غالبية المرضى من مرضى باب الخروج والمنشأة المبكر، فيما
1
وتبّعت الدراسة بناءً على الجبال من الأطفال (2367) دون من المبكر.

2
بدلاً من كثرة الخروج المختلطة بالخروج الدامي أو من الدماء.

1
تقول عن الطلاب ذات نتيجة مفعمة في جودة كم المدعو والعناية
التدريسية للذين من دخول الدماء.
3) كذلك توجب النظر عام (28٪) في طفليت كلاً والدتي، وكان من المحتملين أن يكون القتيلين من الأطفال، أو من الاستمرار لстра من قرب الطفولة، مما يجوز أن يكون الأطفال، صحة الأطفال بفترة الولدات
4) كذلك من خلال الدراسة انخفض ٪ (24) من الأطفال من ٪ (3) أصابوا
بـ 3٪ الدخون و (14) ٪ من ٪ (28٪) انخفضوا بسبب الإصابة المحسوبة لسحري
الخوجة
5) أضافت الدراسة كذلك لأهمية اكتشاف هذا السرطان وكيفية تدفقه،
بـ 3٪ الدخون - إفرازات واحماج بالألقاب
6) كذلك أوضح الدراسة ان (37٪) من الأطفال كانت بداية إفرازات
المرض، على فرق ضعيف، حيث واجهت البالغة ولأ و cambiونا بـ 3٪ سنوات و (27٪) ٪ 7) من الأم يفعلن بدأ في إفرازات المرض، بعد الولادة صاحبة
ما يقدر الضرر بالفعالية، بسبب في السرطان، تقدم في نهج الإفرازات
الخوجة
7) أما أضداد الدراسة ان الفيروسات أنposing المضاعفات عند الدّاخية العظمي.
على الانتهاج في كيس الدخون والضغط على النكير المضر، نجح في منع
الضغوط أو الأدمن من النصيب المضر، مما يوجب السماحية للأنواع
المنشئة لـ (1) و (2) نواب بين كيس الدخون والاضمتد الجرثوم - ٪ 8) إخراج كيس الدخون بالسرد يحتوي على الدماء، لذلك إذا كان ذلك، ففي حالة الإصابة
بـ 3٪ الإصابة أو اثار خفيفة للخرج بعد الإصابة أو بحمر في حالة الخفيف
أ. نجح في العطش الجلدي للجنسين
8)
10

- كلاً

- A(34٪) من المصابين معروضون عن أمراض كبس الدموع وتمت

- في الشعيب كبس الدموع الخلفي والمسار أو الأ تشوب الدموي

- كلش بعشيء خارجي أو اختلال في الكبس كما تشمل

- هذه النسبة المتصادين بامراض كبس الدموع نتيجة انسداد

- بمشيرات أخرى وحيدة الاشهية:

- B(48٪) نتيجة أمراض الشعيب الخلفية، وتشمل في

- انسداد أو قبوب ونهاية ما يكون

- T(51٪) نتيجة أمراض الشعيب الخلفية (أو المخزنة الخلفية)

- وتشمل في dünya أو انسداد نتيجة الشعيب الخلفية، أو نتيجة

- مخزنة خلفية.

- ج(49٪) نتيجة أمراض الشعيب الخلفية، وتشمل في الشعيب

- الخلفية، وعندما يكون انسداد أو انسداد في الأدبا المنهاة

- المشتركة.

- وفيما قبل دراسة الأثارات من 50 حالة بعد 42 يوماً، ونلاحظ

- دراسة الكسرما وخصوصاً لنتيجة انسداد النقود كان هناك (61٪)

- صحيحة لوجود انسداد يسير نتيجة انسداد اللحوم في

- إزالة مباشرة، وبعد ذلك كان ميكروب الاستحاث كيراني والكيروتيس،
اذا سالفة للعلاج فقد ابتينت الظروف القائمة بحيث في حالة
فشلعلاج بطريقة ما خجز المرتين لعلاج بطريقة أخرى وكانت كالآتي:

- (10%): تم تلقيم بواسطة المراضات الجراحية والدالة
للعديد المسمى لمساعدة في تقليل وكم مصطلح المستجيبين
للعلاج تحت عشر سنوات.

- (20%): استجابة للعلاج بواسطة المراضات الجراحية مع
عمليات توضيع العضل بعدد مسمى لمساعدة المرضى.

- (6%): تم تلقيم بواسطة إزالة كيس الدموع جراحيا وهذه
السحابة الممحافظة بدون تأكد من وجود آفة خطيرة ومتطلب
ككلاذ لوجود نسيب أو غير بخضارة الكيس ثم تكرار
العالة بالأنغلبريه المزمن.

- (20%): تم تلقيم بواسطة توصيل كيس الدموع بالڅنف
خاضعة بعد عملية تغطية في نظام اللقاح الفراهي: أجريت العملية
بإلى 10 مصابين وكم اينقاذ جانبي في التفريضة.

- (10%): تم تلقيم بواسطة توصيل فحص الجسم.
 بواسطة
كيس الدموع والآفة العضلية في 4 مصابين: ولم نستخدم
نسبة فحص العائلة للاحتفال.
لا يوجد محتوى يمكن قراءته بشكل طبيعي من الصورة المقدمة.