

## The Surgical Treatment of Xerophthalmia

*M. H. Keswani, M. S.*

Hony. Plastic Surgeon, Tata Dept. of Plastic Surgery, Sir J. J. Group of Hospitals, Bombay-8

**X**EROPHTHLMIA, or dryness of the eye occurs as a result of chronic conjunctivitis usually trachoma, ocular pemphigus, or Vit. A deficiency. It may follow acute ophthalmic involvement in small pox and exfoliative dermatitis. Rarely, it is due to congenital absence of the lacrymal gland.

In the early stages there is decreased moistening of the eye. This is due not only to a reduction of lacrymal gland secretion but also to obliteration of the innumerable conjunctival glands. The lustre of the cornea is lost, progressing to a superficial dryness of the conjunctiva and opacity of the cornea. Scar contracture and adhesions occur in the conjunctiva, producing symblepharon, entropion and trichiasis. Ultimately this may lead to corneal ulceration and perforation of the globe.

Large doses of Vit. A, have been recommended but without success. The intermittent instillation of artificial tears does not keep the eye constantly moist and can be a social handicap. Tarsorrhaphy, may narrow the palpebral fissure, but does not reduce the dryness. Surgical blocking of the lacrymal puncta may be of use when the lacrymal secretion is reduced, but is irrational when lacrymal secretion is absent. Free grafts of the buccal mucosa have been employed but even when they take, the mucoid secretion is too sticky to substitute functionally for

normal tears.

In 1950, Filatov and his associates first reported the use of the parotid secretion for tears. This had been accomplished by transferring the opening of the parotid duct into the conjunctival sac of the ipsilateral eye. A spate of reports followed in the Russian and Chinese medical journals in the next few years. Bennett and Bailey confirmed its feasibility and utility in the American literature in 1957 (Table 1).

A critical appraisal of the physiochemical composition of lacrymal and parotid secretions reveals how little they differ from each other (Table 2). Except that tears are more salty the only relevant difference is in their daily quantitative output. Whereas the parotid gland secretes 300-500 ml. of serous liquid per day, tears are formed at the rate of 13 drops every 16 hours (Chase, 1961). Their flow is constant and uniform in contrast to the intermittent out-pouring of the parotid secretion during the gustatory first phase of digestion.

This paper deals with the details of surgical technique of parotid duct transfer and presents a report on 7 transfers in 5 patients of Xerophthalmia performed over the last 5 years.

### **Anatomy.**

The parotid duct is formed by the union of two main tributaries and emerges from

**Table-1****History of Parotid Duct Transplantation.**

Filatov	1950	Miminoshovich	1955
Katsnelson	1951	Bennett & Bailey	1957
Yen & Lee	1954	Ashley	1959
Lao	1955	Farina	1960

**Table-2.****Similarity of Lacrimal and Parotid Secretion.**

	<b>Lacrimal Secretion</b>	<b>Parotid Secretion</b>
Translucency	Clear	Clear
Lysozyme	Present	Present
Osmotic Conc	Physiological	Physiological
Ph	5.2-8.3	5.3 - 7.8
Total Solids	1.8 %	1.6 %
Protein	0.7 %	0.3 %
Chloride	0.4 %	0.03%
Ash	1.05 %	0.8%

**Table-3****Parotid Duct Transplantation Results.**

	Patients...5.		Transfers ... 7.
Secretion		Within ..... 24 Hrs	..... 6
Stenosis		After ..... 6 Days	..... 1
		Retraction of Duct	..... 2
Cessation of Secretion			..... 1
Excessive Lacrymation			..... 6
Corneal Improvement			..... 3

the middle of the anterior border of the gland. It then crosses the masseter muscle, parallel to and approximately a centimetre and half below the zygomatic arch (Fig 1). It receives a tributary from the accessory parotid gland superiorly, in this part of its course. At the anterior border of the

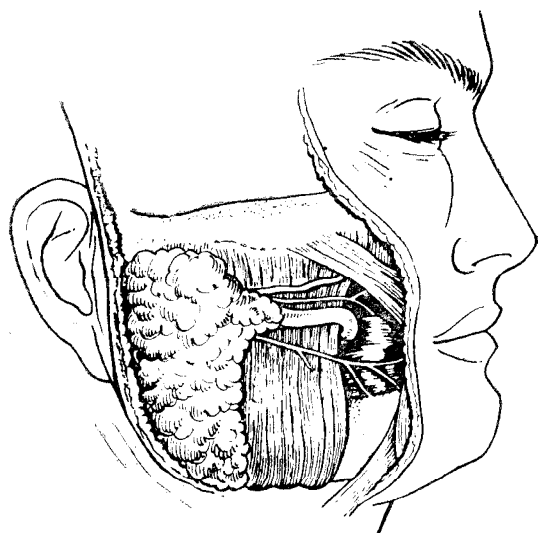


Fig. 1. The surgical anatomy of the parotid duct. muscle, it turns abruptly at a right angle and pierces the buccal fat and buccinator muscle medially. Approaching the oral mucosa it turns forwards and runs in the submucous plane for almost a centimetre, before opening on a papilla opposite the crown of the second upper molar tooth. The diameter of its orifice varies considerably. Its catheterisation makes identification of the duct relatively easy, during operation, but is not recommended as a routine, lest infection be introduced or inadvertent trauma lead to stenosis. Gentle traction on the duct produces a conical depression on the oral mucosa a little posterior to the papilla and is a reliable guide to identification of the duct. On the masseter muscle it is related to the

transverse facial artery and the upper buccal branch of the facial nerve above and the lower buccal branch of the facial nerve below. The duct itself is a glistening white, tough structure, measuring approximately 3-4 millimeters in diameter and has a typical cordlike feel when rolled on the underlying masseter.

#### Surface Anatomy.

The surface anatomy of the duct is the middle third of a straight line joining the root of the lobule of the ear with a point midway between the lower border of the nasal ala and the mucocutaneous junction of the lip (Fig 2).

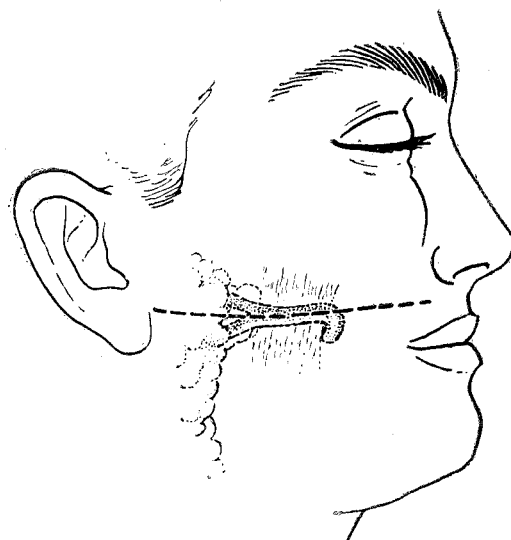


Fig. 2. The surface marking of the parotid duct.

#### Technique of Operation.

Under naso-tracheal general anaesthesia an oblique incision 3 cm. long is made at the midpoint of the surface marking as described above. The parotid duct is identified and mobilised by blunt dissection. A soft rubber catheter is passed underneath the duct for traction. A Doyen's mouth gag is

used to open the jaws. An elliptical incision 3 cm x 1 cm. is made around the papilla of the parotid duct opening, the long axis of the incision running anteroposteriorly (Fig 3) The buccinator muscle is incised too, and

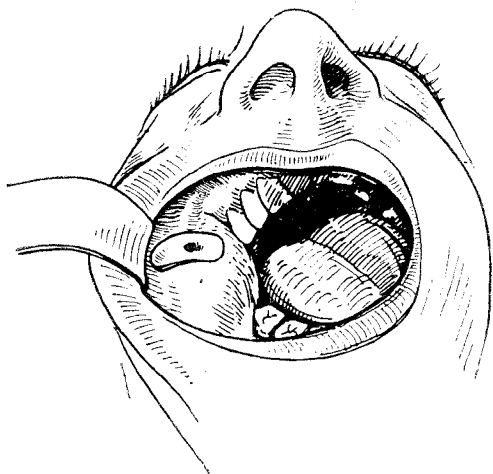


Fig 3. An elliptical incision 3 cm. x 1 cm. is made around the papilla of the duct opening in the mouth, the long axis of the ellipse running antero posteriorly.

by a combination of sharp and blunt dissection the entire length of the duct is freed and delivered out of the cheek incision. Traction is applied to the lower eyelid, and an incision is made in the inferior fornix at the junction of its middle and outer thirds. With a fine ophthalmic haemostat, a passage is tunnelled from the cheek incision to the fornicial incision. Fine silk traction sutures are inserted at the ends of the elliptical mucosal cuff. These are held with the fine ophthalmic forceps and negotiated through the tunnel, pulling the duct with them (Fig 4). The mucosal ends are sutured to the conjunctiva; if the duct is adequate in length, the mucosal cuff is trimmed, otherwise it is not. No attempt is made to tube the mucosa.

All the incisions are closed in layers, without drainage. A light dressing is applied to the cheek (Fig 5).

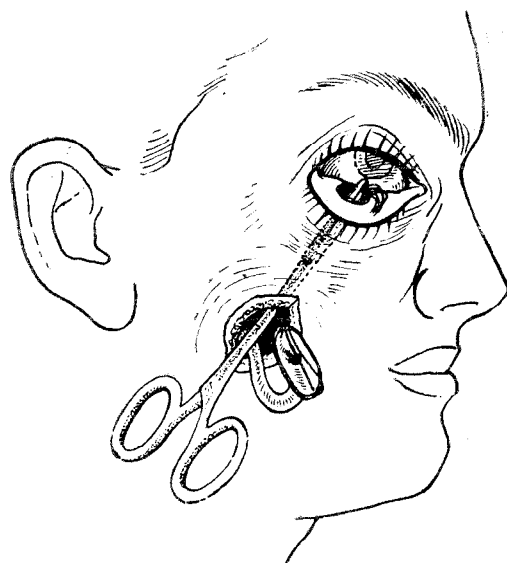


Fig. 4. The dissected duct and the mucosal cuff around its opening are guided through a tunnel to the inferior fornix of the conjunctiva at this junction of the middle with the outer thirds.

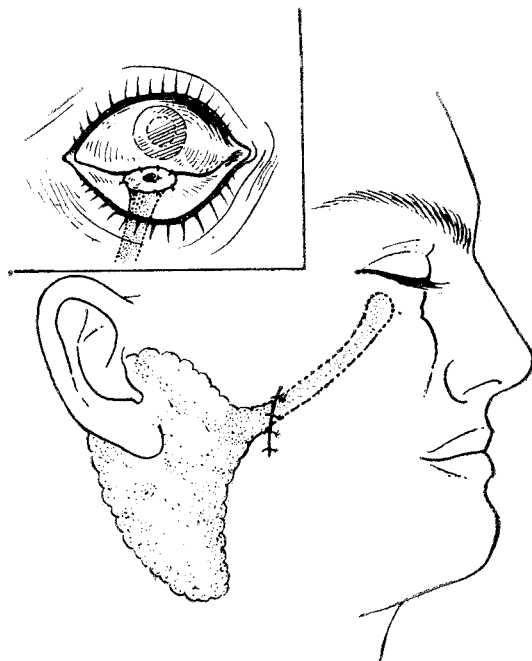


Fig. 5. A diagrammatic representation of the course of the transplanted parotid duct. Note the site and direction of the external cheek incision.

### Post Operative Care.

A light day gauze dressing is applied to the cheek wound. The head end of the bed is elevated on high blocks (30 cms). Atropine eye drops are instilled twice on the first day and then once a day. An antibiotic-corticosteroid eye ointment is applied twice a day. Analgesics are administered for 24 hours. Liquid feeds commence after the patient is out of anaesthesia and continue for 5 days. The cheek sutures are removed on the fourth day.



Fig. 6. A Male, 27 years old, Xerophthalmia left eye following trachoma. Parotid duct transfer operation 5 years ago, but excessive lacrymation at meal time persists.

### Results

7 transfers have been performed in 5 patients during the last 5 years (Table 3).

In 6 cases, parotid secretion has been observed in the eye within 24 hours. In

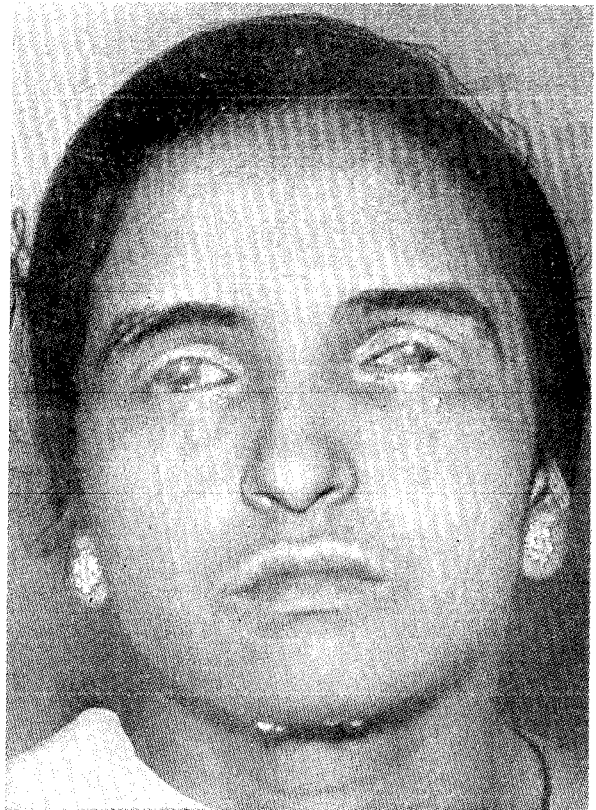


Fig. 6 B. Female, 18 years old, Bilateral Xerophthalmia following trachoma in childhood. Bilateral parotid duct transfer operation performed two years ago. Decreased corneal opacity with considerable improvement of vision.

one patient, where Prostigmin was injected at the end of the operation, watering of the eye was seen immediately. In the seventh patient, watering of the eye was noticed 6 days after operation. In two transfers, retraction of the duct occurred, with stenosis of the conjunctival incision. Attempts at dilatation have failed and a false sac has formed in the lower eyelid from which clear fluid oozes into the eye. The sac can be temporarily emptied manually. In one of

these patients, the secretion ceased abruptly after a month of surgical tinkering. The lesson learnt is, not to tinker. In the six functioning transfers, there is excessive lacrymation at meal times, with epiphora. The flow gradually reduces with the passage of time, but never sufficiently to pass unnoticed (Fig 6 A).

The cornea has become less opaque in 3 cases, with dramatic improvement of vision in a young girl who had bilateral parotid duct transfers. She was almost totally blind, but after operation she can read, has seen her first cinema show and the last time I saw her, had learnt to ride a bicycle (Fig 6 B).

### Summary

This paper deals with our experience in the surgical treatment of 5 patients suffering from Xerophthalmia. The etio-pathology and previous methods of treatment have been outlined. The history of the development of the operation described has been traced. The detailed technique of operation and postoperative management has been laid down. The complications have been mentioned.

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### REFERENCES

- Ashley F. L. et al. : Xerophthalmia-surgical treatment by transplantation of parotid duct. *Plastic & Reconst. Surg.* 26: 410-416, 1960.
- Bennett J.E. & Bailey A.L. : A surgical approach to total Xerophthalmia. *Arch. of Ophta.* 58: 367-371, 1957.
- Bennett J.E. & Bailey A.L. : Surgical treatment of total Xerophthalmia, *Arch. of Ophth* 58: 372-374, 1957.
- Chase R.A. : Parotid duct transfer for total Xerophthalmia. *Plastic & Reconst. Surg.* 27: 201-208, 1961.
- Farina R. et al. : Xerophthalmia-surgical treatment by transplantation of parotid duct. *Plastic & Reconst. Surg.* 26: 410-416, 1960. Quoted by Bennets & Bailey.
- Filatov : Surgical treatment of Xerophthalmia. *Chinese Journal of Ophth.*, 6: 474-477, 1954.
- Katsnelson A. B. : Surgical treatment of Xerophthalmia. *Chinese Journal of Ophth.*, 6: 474-477, 1954.
- Lao Y.S. : Transplantation of parotid duct into the conjunctival sac for treatment of Xerophthalmia with report of a case., *Chinese Medical Journal.* 73: 223-229, 1955.
- Miminoshovich. : Quoted by Bennett & Bailey. 1957.
- Ven H.Y. & Lee C. : Transplantation of parotid duct for the treatment of Xerophthalmia. *Chinese Journal of Ophth.*, 6: 407-411 1954.