

## Surgery of Facial Palsy in Leprosy

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### INTRODUCTION

Leprosy has been the commonest cause of paralysis of the facial nerve in India. Lagophthalmos is the most common presentation of facial nerve paralysis. The manifestations of paralysis, in order of frequency as well as urgency of treatment, are: lagophthalmos (Zygomatic branch) and total facial paralysis (branches to all facial muscles). The exact incidence of facial paralysis in leprosy is not known. However, Courtright et al<sup>4,5</sup> found facial nerve paralysis in 3.8% of newly detected cases. These persons had a 7.5 fold higher risk of keratitis. In our control area in Calcutta, where we cover a population of 1.2 million, in over a period of 20 years, we found that less than 0.1% of cases (a total of 28 cases) had facial paralysis. Of these, 82% had lagophthalmos alone and 18% had paralysis of other facial muscles as well. In 68% of cases the impairment was unilateral and in 32%, bilateral. Twelve out of 28 cases had a patch around the eye and the side of the face (unpublished data). Hogeweg<sup>11</sup> reports an incidence of 2% among cases under treatment with Multi-Drug Therapy.

At one time the involvement of the facial nerve was believed to be restricted to the Zygomatic branch, especially where it crosses the bone. Subsequently, much more proximal involvement of the facial nerve has been demonstrated and Lubbers et al<sup>20</sup> have recorded patchy involvement of the facial nerve. The work of Richards and Jacobs<sup>24</sup> suggests intracranial involvement of the nerve. In short the last word is yet to be written regarding the

site of nerve involvement in leprosy (Palandepersonal communication).

What we do know is that lagophthalmos is common and may often need urgent treatment to prevent impairment of vision secondary to exposure keratitis.

When the cornea is exposed because of lagophthalmos, exposure keratitis is inevitable. The situation becomes much worse when corneal sensation is also lost (because of involvement of the peripheral branches of the trigeminal nerve). This removes the stimulus to blink, and leaves the eye constantly open to the elements. In this situation protection of the eye requires emergency measures. Early surgery may be indicated in order to preserve vision.

Lagophthalmos by itself may require correction because it is unsightly, although it must be realised that some procedures actually worsen the cosmesis. However,

1. The danger of exposure keratitis due to drying of the cornea can lead to corneal ulceration, opaque scar formation and total blindness or organisation of the keratitis and subequatorial blindness, and
2. In the absence of corneal sensation and the stimulus to blink, the risk of corneal ulceration and its complications leading to blindness is increased.

In view of the seriousness of the condition, lagophthalmos with loss of corneal sensation constitutes one of the urgent complications of leprosy, which demands immediate careful treatment.

In the case of early paralysis, (paralysis of less than six months duration), systemic steroids are indicated along with measures to protect the cornea.<sup>12</sup> Measures to protect the cornea include wearing dark glasses during the day and using methylcellulose drops or sterile castor oil drops twice daily for about three months. This helps in keeping the cornea moist and transparent. Eye pads at night are helpful. A simple stay suture placed through the upper lid and then strapped down to the cheek<sup>18</sup> to keep the cornea covered is advocated as a temporary measure by some authors. Strapping of the face, in near symmetrical position and electrical stimulation of the paralysed muscles are also useful measures (Palande- personal communication). Active and passive exercises to close the eyes frequently are of great importance. If no improvement is evident within six months definitive surgical measures are required to protect the cornea, recognising however that in a few cases spontaneous recovery may still occur.<sup>9</sup>

Treatment of paresis of the facial nerve in leprosy has seen increasing choices during the past three decades. The possibilities of surgical treatment of the problem per se, regardless of its pathology, are very extensive—from implantations of springs and weights, to static and dynamic supports and muscle transfers, transposition and suture of regional nerves to branches of the facial nerve (nerve crossovers), cross facial nerve grafts and micro-vascular muscle transplants<sup>2</sup>.

However, in leprosy only some of these methods have been practiced. The common procedures are:

**Static procedures:**

- Tarsorrhaphies
- Canthoplasties
- Canthopexies
- Lid magnets
- Sialastic slings
- Springs
- Lid Loading
- Ear cartilage grafts

**Dynamic Procedures:**

Muscle transfers

**PROCEDURES**

The operation for the correction of lagophthalmos aims at <sup>9</sup>

1. Narrowing the widened palpebral fissure.
2. Correction of ectropion.
3. Apposing the lower eyelid and its lachrymal punctum to the globe to facilitate drainage of tears.
4. Providing for voluntary closing and opening of the eye and.
5. Being cosmetically acceptable to the patient.

The operation for correction of facial palsy involving the buccal and mandibular divisions of the facial nerve in addition to the zygomatic division, aims at all the above as well as providing for the continence of the lips.<sup>2</sup>

If, on light closure of the eye (not closed tightly, but as in sleep), there is a lid-gap of more than 5 mm, a dynamic procedure is usually indicated. If the lid gap is less than 5 mm, a static procedure may be indicated. In case of old age, where there is a laxity of the lower lid and ectropion in addition to the paralysis, a static procedure to either shorten the lower lid and/or bring up the lower lacrymal punctum to appose the globe may be combined with a dynamic procedure.

Loss of corneal sensation removes the stimulus for active lid closure. In these cases we prefer a dynamic procedure, as it tends to close the eyelids on chewing, which in itself may be protective. Further the concept of 'think and blink' can be practiced effectively only when the ability to close and open the eyes is present and therefore a dynamic procedure is indicated.

Various methods are in use, and there are inadequate follow-up studies to draw specific

conclusions as to which are the best procedures. Multiple procedures or a combination of procedures may be required for individual cases, such as a local procedure both medially and laterally. The following is a brief description of common procedures in use in facial palsy due to leprosy.

### Static procedures

#### Lateral Tarsorrhaphy (McLaughlin)<sup>13</sup>

This is only of historical interest and is mentioned because we still come across patients who have undergone this procedure in the past. Today there is no indication for this procedure except in situations where appropriate expertise is not available. We are still being called upon to correct lagophthalmos in patients who had undergone this procedure. The author prefers to undo this tarsorrhaphy before proceeding with a dynamic procedure. The tarsorrhaphy as described by McLaughlin is as follows.

**Technique:** An incision is made along the lateral end of the lower lid margin for about 5 mm. A part of the anterior lamella is excised. The inter-marginal line of the upper lid is similarly split and a part of the conjunctiva and tarsus is excised. The two raw areas are sutured together using 5:0 silk sutures tying the knot over the

upper lid over a rubber strip. Sutures can be removed on the 5th post-operative day.

This procedure is not very effective because most of the laxity is on the medial side. Fusion of the lateral end of the palpebral fissure does not help.<sup>9</sup> This procedure is not recommended.

#### Fritschi's Medial tarsorrhaphy<sup>9</sup>

This works on the principle of the Z plasty and is indicated in cases with ectropion. The cosmetic result is better in this than in the preceding procedure.

**Technique:** Under local anaesthesia incisions are made in the upper and lower lid margins in the part of the lid medial to the punctum (Fig. 19-1a). These incisions should involve the entire thickness of the lids including the skin and mucous membrane medial to the punctum. Two triangular flaps are designed as follows. The lower flap is designed by incising from the medial end of the full thickness incision of the lower lid to raise a thin skin flap based laterally. The upper flap is cut from the lateral end to raise a thin skin flap based medially. These are both triangular flaps and are raised by undermining. The exposed edges of the tarsal plates of both lids are sutured to each other with 4:0 catgut. The skin flaps are interchanged and sutured with 5:0 silk (Fig. 19-1b). The eye is kept covered by a pressure dressing

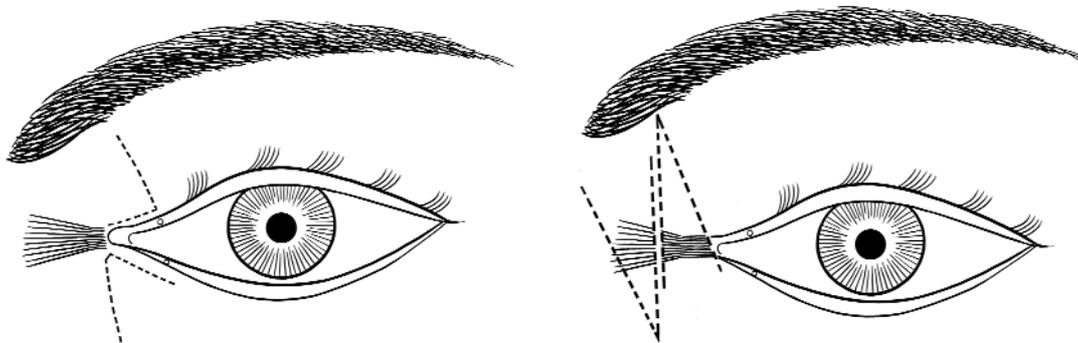


FIGURE 19-1 Fritschi's medial tarsorrhaphy.

for 24 hours. Skin sutures are removed on the 6th postoperative day.

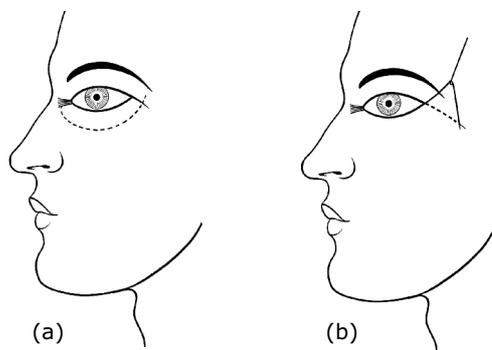
This procedure has the following advantages.

Hitching up the lower lid to the upper is done in the area which shows the maximum laxity. This procedure causes the lachrymal punctum to be turned inwards and thus brings it to appose the globe.

#### Kuhnt-Szymanowski Palpebroplasty<sup>9, 18</sup>

This procedure is indicated when the ectropion is severe and involves the whole of the lower lid. In such cases the lower lid needs to be shortened and supported.

An incision is made just below the ciliary margin of the lower lid extending laterally from the medial third to the orbital margin (Fig. 19-2a). The incision is then angled along the 'crow's feet' wrinkles. The skin is undermined right down to the inferior orbital margin. The flap of skin is then raised and pulled laterally. The overlapping part of the flap is excised (Fig. 19-2b). This is then sutured in its new position supporting and shortening the lower lid. This procedure can be modified, by excising a full thickness of the lower lid at the lateral edge. A strip of fascia lata can be added to give support, medially attached to the medial palpebral ligament and laterally to the lateral orbital margin as high as necessary.



**FIGURE 19-2a,b** Kuhnt-Szymanowski palpebroplasty.

#### Edgerton-Montandon technique of canthoplasty and tarsorrhaphy<sup>2,7,23</sup>

Edgerton and Wolford described a technique to support the lower lid using a dermal flap secured to the lateral rim in cases of lower lid laxity. This was similar to the above procedure by Kuhnt-Szymanowski. Montandon later modified this technique to incorporate a portion of the upper and lower eyelid margins with the dermal flap, in effect combining the lateral canthoplasty with a lateral tarsorrhaphy. Grauwin, Saboye and Cartel<sup>10</sup> followed up 30 eyes in 21 leprosy patients treated by this technique and reported favourable results.

#### Lateral Lower Lid Canthoplasty<sup>2,15</sup>

In cases of mild lagophthalmos associated with ectropion, Jelks et al described a procedure of shortening the inferior limb of the lateral canthal tendon and hitching it to the periosteum at the lateral orbital rim. It is also known as the lateral tarsal slip procedure.

**Technique:** The lateral canthal tendon is exposed and the lower limb is divided at the orbital rim (Fig. 19-3a). The skin of the lateral edge of the palpebral fissure is raised from over both tarsal plates and over the lateral orbital rim. Upward and lateral traction is exerted on the lower lid to determine the position of the new lateral canthal angle. At this point a laterally based flap of periosteum is raised from the orbital rim. The lower tarsal plate is then divided (Fig. 19-3b). A 4:0 silk suture is passed through the lower tarsal plate and then through the periosteal flap and brought out through the skin at the level of the eyebrow laterally, and tied over a bolster (Fig. 19-3 c-d). Vicryl sutures are used to reinforce the tarsal plate- periosteum attachment. The skin is closed. The final result should initially show over correction. This procedure is often combined with gold weight implantation to load the upper lid.

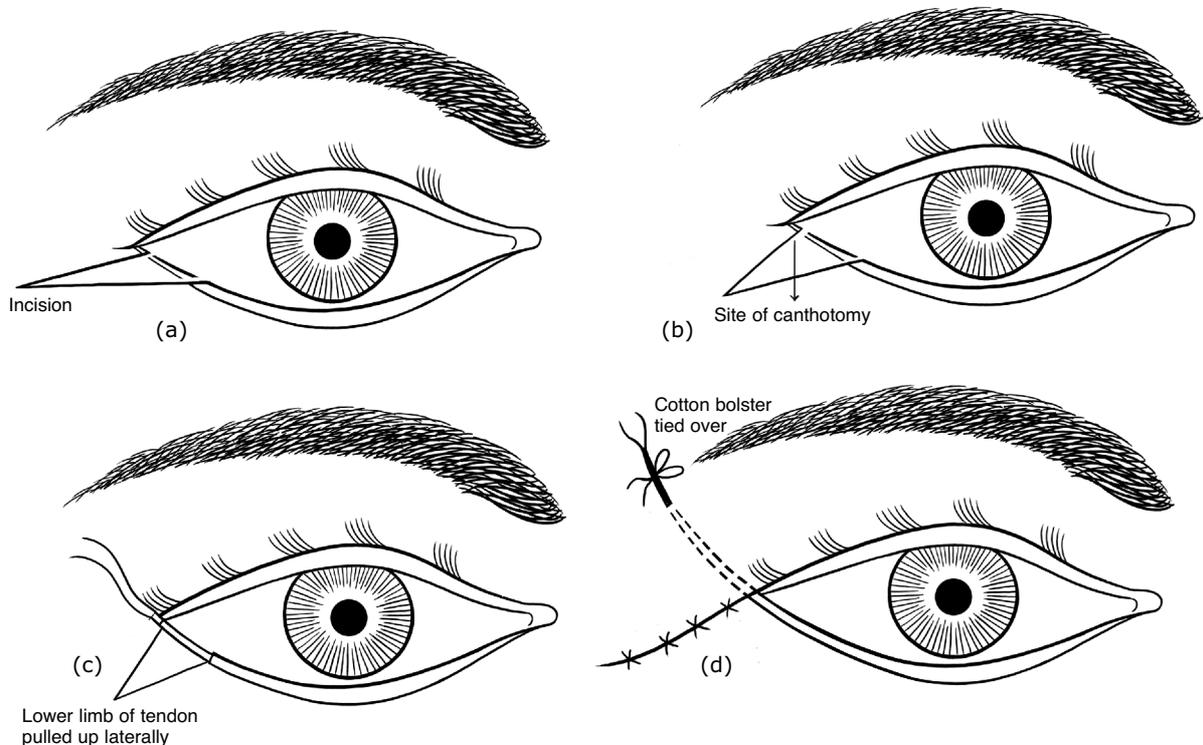


FIGURE 19-3 Lateral lower lid canthoplasty.

### Upper Lid Loading<sup>2,19,22</sup>

Implanting a weight in the upper lid uses gravity to reduce the width of the palpebral fissure and to aid in eye closure. A stainless steel mesh, tantalum strip or a gold weight can be implanted into the eyelid. To assess the required load, a series of weights are taped to the upper lid until normal closure is obtained. This weight is then implanted into the upper lid. Gold weights or tantalum strips varying from 0.6 to 1.6 g are implanted. The shape of the tantalum strips can be hand fashioned. This is not possible with gold. In a series by Foda<sup>8</sup>, 40 patients underwent upper lid loading, of which 14 underwent lateral canthoplasty for the lower lid laxity.

Its drawback is that it does not close the eye well when the patient is supine.

Complications include extrusion of the implant, infection and insufficient loading.

### Ear cartilage graft for elongating the levator palpebrae muscle<sup>3,14</sup>

This procedure, originally described by Inigo et al, has been used in leprosy, by Balakrishnan.<sup>3</sup> This operation is helpful in decreasing the palpebral fissure with an ear cartilage sutured between the tarsal plate and the levator palpebrae superioris aponeurosis. The graft provides elongation of the levator muscle and also decreases its strength, since there is no opposing orbicularis oculi activity.

This is performed under local anaesthesia. An incision is made at the supra tarsal fold of the upper eyelid. (Balakrishnan prefers an incision on the palpebral conjunctiva). The insertions of the levator palpebrae superioris and Muller's muscle into the tarsal plate are dissected off the plate. The conjunctiva is completely exposed but left intact.

An auricular conchal cartilage graft is taken with the same length as the tarsal plate and a maximum width of 4 mm for each millimeter of palpebral closure to be achieved. (usually a width of 8 to 12 mm for reducing the palpebral fissure by 2 to 3 mm). The cartilage graft is attached inferiorly to the superior edge of the tarsal plate and superiorly to the levator palpebrae superioris aponeurosis. 5:0 nonabsorbable sutures are used. The skin incision is closed with the same material.

A ptotic eyelid should always be avoided.

**Other techniques** such as the use of sialastic slings (Arion Prosthesis), lid magnets and Morel-Fatio spring implantation in the lids are also available modes of treatment. They have however not found much favour among those working in the field of leprosy as yet, if the available literature is to be taken as reference.

### Dynamic Procedures

These are the procedures of choice in lagophthalmos and facial palsy.

They provide for animation of the face and voluntary closure of the lids. The cosmetic results are also much better with these procedures.

### Temporalis Muscle Transfer:

#### Principles laid down by Gillies<sup>2,9</sup>

The muscle originates from the temporal bone and periosteum between the inferior temporal line and the infra temporal crest on the deep aspect in the infra temporal fossa and from the temporalis fascia superficially. It inserts into the coronoid process and a portion of the ascending ramus of the mandible.

The blood supply is from the anterior and deep temporal arteries and veins which are the tributaries of the internal maxillary system which enter the infra temporal fossa inferior to the zygoma predominantly on its antero-medial aspect and spread out through the muscle superiorly.

The nerve supply is from the anterior and posterior deep temporal nerves which are branches of the mandibular divisions of the trigeminal nerve. The nerves are deeper and posterior to the vascular supply and enter the muscle in proximity with the vessels and traverse it from below upward.

The muscle can therefore be mobilised from its origin and still be viable and retain its nerve supply and its function.

### Temporalis muscle transfer for unilateral, lagophthalmos

**Gillies method<sup>1,18</sup>:** This is the method first described by Gillies and first employed in leprosy by Antia<sup>1</sup>. This is indicated in lagophthalmos. The benefits of this procedure are seen in a very short time.<sup>25</sup>

**Anaesthesia:** Local or general anaesthesia can be used.

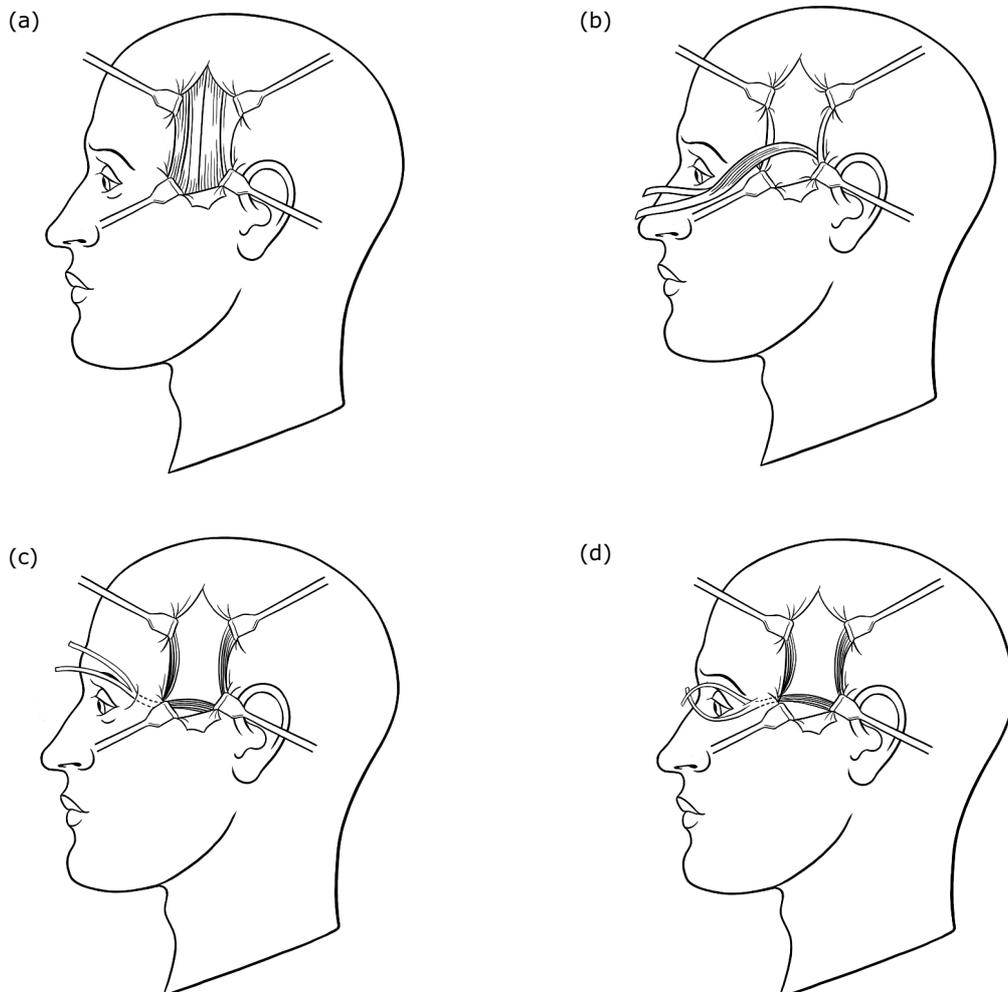
**Procedure:** A vertical incision is made from the superior temporal line down to the zygoma within the hairline. The underlying superficial temporal fascia is exposed. A vertical strip of fascia from about the middle of the muscle extending the length of the incision and about 1 cm in width is cut, detached from the zygoma and raised upwards taking care not to strip it off the superior aspect of the muscle (Fig. 19-4a-b). The strong musculo-periosteal junction at the temporal line is preserved in continuity with the dissected fascia. The periosteum is raised from above, downwards right down into the temporal fossa. A muscle belly of about 3 cm breadth is thus elevated from the bone down to the level of the zygoma. A mattress suture is applied to the musculo-periosteal junction with the temporal fascia to prevent accidental separation during these manipulations. We thus have a strip of muscle in conti-

nuity with a strip of superficial temporal fascia. This fascia is then divided into two slips. Yoleri and Sangur<sup>27</sup> use a small slip for the lower lid and twice this mass for the upper lid.

A horizontal incision is made along the crow's feet wrinkles at the lateral orbital ridge and the two facial slips along with the muscle are tunneled in a subcutaneous plane to that site (Fig. 19-4c).

A curved incision is made on the lateral aspect of the nose to display the medial canthal ligament. This is dissected and undermined.

One of the facial slips is tunneled along the edge of the upper lid in a superficial plane and the other is tunneled similarly through the lower lid from the lateral incision to the medial incision. Care is taken to tunnel along the lid margin and as superficially as possible. Failure to do this will result in eversion of the lid margin when the muscle contracts. At the medial incision, each slip is passed deep to the medial canthal ligament, brought together superficial to it and sutured to each other and to the ligament, using 5:0 silk sutures (Fig. 19-4d).



**FIGURE 19-4 a - d** Temporalis muscle transfer for unilateral lagophthalmos: Gillies method.

Schwarz uses PDS to avoid stitch abscesses (personal communication). The tension is adjusted by allowing the lids to close the eye with a little bit of overlap of the upper over the lower lid. If the free ends of the slips are held by mosquito artery clamps and allowed to hang free after taking up the slack, the tension has been found to be just right. The suture is then applied. The tension on the lower one is usually set higher than the upper, as the major problem is with the lower lid. Too tight on the upper lid and the person can get restricted vision.

All wounds are closed with 5:0 non-absorbable sutures. An antibiotic ointment is placed beneath the eyelids to keep the cornea and conjunctiva lubricated. A pad is placed over the eye and the temporal region for one day. This is removed 24 hours after surgery. Skin sutures are removed on the 5th postoperative day.

The patient is kept on a liquid diet for three weeks. Chewing is gradually resumed and increased as the patient is taught to practice control of facial movements in front of the mirror.

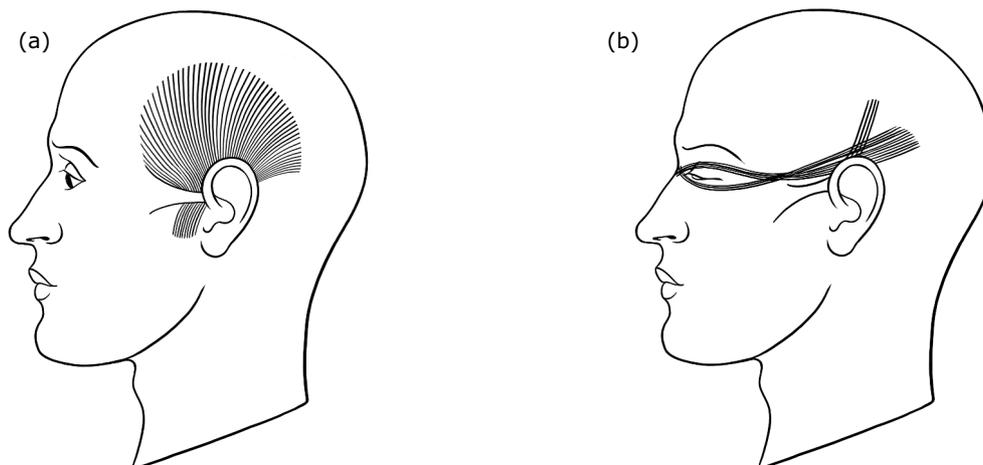
**Johnson's method**<sup>9,16,17,26</sup>

This operation utilises the same muscle but instead of the muscle slip being mobilized from

its origin, a posterior slip of muscle is taken and its tendon just above the zygoma is mobilised, leaving its origin intact. It has the advantage that there is no angulation of the fibres of the slip, there is much less blood loss and there is no visible bulge of muscle seen. The disadvantage is that, removal of the fascia lata has to be done as a separate procedure.

**Anaesthesia:** Local or general anaesthesia can be used. Local anaesthesia is preferred.

**Procedure:** A vertical incision is made from the zygoma for about 4 cm upwards, within the hairline anterior to the ear. The superficial temporal fascia is exposed and incised along this line and widened by cutting across by blunt or sharp dissection. The fibres of the temporalis muscle and its tendon are seen through this incision (Fig. 19-5a). The nearly horizontal posterior fibres of the tendon and muscle are separated and isolated using a right angled or curved artery clamp. This bundle of tendon and muscle is cut away at its insertion and the cut end brought out of the wound and held in an artery clamp. If the procedure is being done under local anaesthesia, on requesting the patient to clench his/her teeth, the cut tendon



**FIGURE 19-5a,b** Temporalis muscle transfer for unilateral, lagophthalmos: Johnson's method.

slip will retract into the wound and on relaxing, will come into the wound.

A 10 cm long, 1 cm wide strip of fascia lata graft is harvested from the thigh under local anaesthesia. Thin fascia is needed, which is found more anteriorly.

The end of the fascia is passed through the free end of the fascicle of muscle and tendon and sutured and the stump buried in the muscle. The fascia in turn is wrapped around the free end of the muscle slip.

A horizontal incision is made along the crow's feet wrinkles at the lateral orbital ridge. The tendon graft is now tunneled to this incision in a subcutaneous plane. Here it is divided into two slips (Fig. 19-5b).

The remainder of the procedure and post-operative care is as described under the Gillies method. Pre- and early post-operative results are seen in Fig. 19-6.

Johnson's method needs a graft for extending the posterior part of the tendon of Temporalis muscle. Fascia lata or palmaris longus tendon are the usual choices. This procedure has the main advantage that the pull is horizontal and not oblique. Hence there is also a higher likelihood of a higher than needed tension. Conversely, excessive care to prevent

higher tension may result in inadequate tension<sup>24</sup>.

In either method, it is essential to ensure that the transferred slip stays along the curved lid margin and does not become straight on contraction of the temporalis. If the slip shifts up/down and becomes straight this would cause eversion of the lid and also lowered tension – inadequate lid closure. An additional stitch in the middle may sometimes be required to prevent lid eversion. (Schwarz, Palande- personal communication). Personally I prefer the technique described by Johnson because the dissection involved is much less. The length of the fascia used can be longer and therefore the final insertion into the medial canthal ligament is easier and the tensions can be easily adjusted without any worry about the availability of adequate fascia. In the Gillies procedure, there is a tendency to be left with inadequate length of the temporal fascia, resulting in difficulty at the point of suturing the slips to the medial canthal ligament.

#### Procedures for Total Facial Palsy

In cases where the entire half of the face requires reanimation, muscle transfers are the most often used procedures. A masseter trans-



**FIGURE 19-6a** Left total facial nerve palsy.



**FIGURE 19-6b** Following Johnson temporalis muscle transfer.

fer for the mouth and cheek can be combined with any of the above-mentioned dynamic procedures. A temporalis muscle transfer as described by Gillies can be used as a single procedure to reanimate the entire face.

#### Masseter Transfer<sup>1,2</sup>

This procedure can be combined with any of the above-mentioned procedures for lagophthalmos, when the lips need to be made continent and the lower face reanimated.

The surgical anatomy, and location of the masseter muscle make it ideal for transposition to animate the upper and lower lips and the oral commissure. The muscle arises from the inferior surface of the zygomatic arch and is inserted into the lateral aspect of the ascending ramus of the mandible (Fig. 19-7a).

the entire muscle may be used. Transposing only the anterior two third of the muscle runs the risk of denervating and devascularising the transposed part of the muscle. Mobilising the entire muscle causes problems of reach. The posterior fibres of the muscle may not extend up to the oral commissure. Methods to counter these problems are described with the procedure. The latter is the safer technique.

**Anaesthesia:** The surgery can be done under general anaesthesia or under local anaesthesia.

**Procedure:** Antia<sup>1</sup> describes a submandibular incision, and transfers only the anterior two thirds of the muscle. Baker<sup>2</sup> refers to an intra-oral approach for limited transfers of the muscle and an extra-oral approach using a preau-

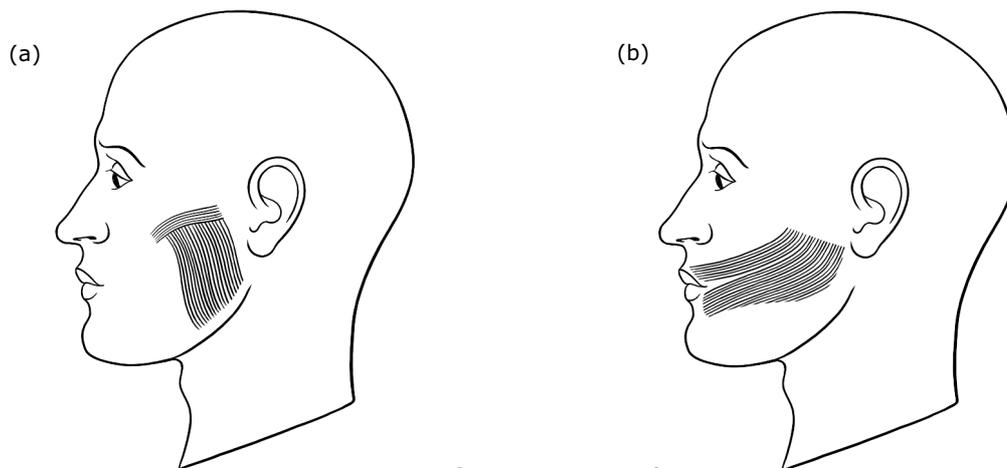


FIGURE 19-7 a-b Masseter Transfer.

The nerve supply is from the masseteric nerve arising from the mandibular nerve and the blood supply is from the masseteric artery arising from the internal maxillary artery in the infratemporal fossa. The neurovascular bundle passes through the coronoid notch of the mandible and runs obliquely forward and diagonally downward across the muscle. In transposing the muscle for reanimation of the lips, part of the muscle (anterior two third) or

ricular incision with a submandibular extension for transfer of the entire muscle. The skin needs to be undermined to expose the muscle.

This last is favoured by the author, as it provides adequate exposure when the cheek flap is elevated. This is also cosmetically acceptable. The tendinous insertion of the muscle is incised and raised from the lower end of the horizontal ramus of the mandible. The muscle is mobilised from the mandible taking care not to

injure its neurovascular supply at the coronoid notch. The anterior portion can be freed entirely from the mandible. The lateral cheek is undermined to create a tunnel for the muscle to the lips. At the angle of the mouth, the tunnel extends into the upper and lower lips as two extensions. As described by Antia<sup>1</sup> and by Baker<sup>2</sup>, the muscle is received in the cheek through an incision along the nasolabial fold, divided into two slips. This division should not extend proximal to its distal third so as not to damage its nerve supply and vascularity. If the muscle is long the slips can be tunneled into the lips one into the upper lip and one into the lower lip (Fig. 19-7b). If short, the slips are lengthened by two fascia-lata strips and passed into the lips. Alternatively length can be gained by partial release of the muscle from its tendinous origin. Insertion is into the intact orbicularis oris muscle of the opposite side and into the dermis using a pullout suture. Suitable incisions can be made over the philtral column of the non-paralysed side.

Meticulous haemostasis is achieved. The wounds are closed in two layers over a drain. A tight dressing is applied. The drain is removed after 48 hours and sutures are removed on the 5th post-operative day. Postoperative management is the same as for the previously described muscle transfer procedures.

#### **Temporalis muscle transfer for unilateral, total facial palsy<sup>2</sup>**

The procedure described here is Gillies' procedure, modified by Baker<sup>2</sup> for facial paralysis involving the zygomatic, buccal and mandibular divisions. This has the advantage of using one muscle to reanimate the entire face, providing continence to the lips and closure of the eye.

**Anaesthesia:** General anaesthesia is preferred but the procedure can be carried out under

local infiltration with 1% Xylocaine with 1 in 200,000 dilution of Adrenaline.

**Procedure:** The superficial temporal fascia is exposed above the zygoma through a crescent-shaped, cruciate, or T type of incision anterior to the ear of the affected side. The entire temporal muscle is elevated with 2 cm of pericranium about its peripheral margin, starting from above, proceeding downwards using a periosteal elevator down to the level of the zygoma. The superficial temporal fascia is separated from the zygoma and five slips<sup>3</sup> of the fascia are created by incising the fascia vertically. This is then separated from the muscle, starting inferiorly and proceeding upwards, and the slips of fascia are left attached to the pericranium at the superior extent of the dissection. At this point, each of the five slips are sutured to the dissected pericranium and the superior end of the temporalis muscle by mattress sutures, to prevent them from accidentally separating from the muscle. The muscle is now incised so as to provide five active muscle bellies for the five facial slips. The two anterior slips are set apart for use for the eyelids and the other three for the upper lip, angle of the mouth and the lower lip respectively (Fig. 19-8a).

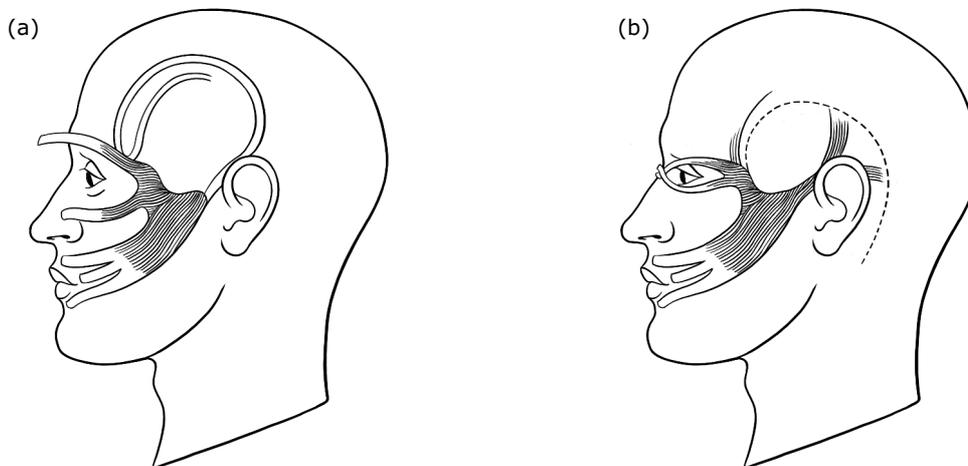
**For the eyelids:** A horizontal incision is made along the crow's feet wrinkles at the lateral orbital ridge and two facial slips along with the muscle slips are tunneled in a subcutaneous plane to that site.

The remainder of the eye portion of the procedure is as that described for the Gillies transfer above.

**For the mouth:** An incision is then made along the naso-labial fold of the affected side.

The other three slips are tunneled in a subcutaneous plane to the naso-labial fold incision (Fig. 19-8b). Here the slack is taken up.

**For the upper lip:** One of these slips is then again tunneled along the upper lip in a subcu-



**FIGURE 19-8** Temporalis muscle transfer for unilateral, total facial palsy.

taneous plane to an incision along the philtral column of the opposite side. The slip is sutured to the dermis of the skin just lateral to this incision, using 4:0 or 5:0 vicryl sutures. If the slip does not extend this far, a fascia lata graft can be anastomosed to the tip of this slip and used. Adequate tension is used to provide over correction enough to bring the opposite philtral column to the midline. The point between the first incisors of either side determines the midline.

**For the lower lip:** The last slip is now tunneled through the subcutaneous plane of the lower lip and recovered through an incision on the skin at a site just below the opposite philtral column before the sutures of the upper lip had been applied. This is sutured now under similar tension producing an over correction bringing this sutured site to the midline (point between the first incisors of either side)

**For the angle of the mouth:** One slip is sutured to the dermis at the commissure, at the same tension. Just taking up the slack will now produce the desired result. This step can be accomplished from the same nasolabial incision.

Over correction and exaggeration of the

nasolabial fold and corner of the mouth are essential. The over correction resolves within a few weeks.

All wounds are closed with 5:0 non-absorbable sutures. An antibiotic ointment is placed beneath the eyelids to keep the cornea and conjunctiva lubricated. A pad is placed over the eye and the temporal region for one day. This is removed 24 hours after surgery. Skin sutures are removed on the 5th postoperative day.

The patient is kept on a liquid diet for three weeks. Chewing is gradually resumed and increased as the patient is taught to practice control of facial movements in front of the mirror.

This can also be done as per the Johnson technique. Pre- and post-operative results are seen in Fig. 19-6.

**Other Procedures:** Procedures such as cross facial nerve grafts, hypoglossal nerve crossovers (end to end and side to end), and microvascular functional muscle transfers used in cases of facial nerve palsy due to other causes have not as yet found application among those working in leprosy. The future possibilities are immense and need to be explored.

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