ROLE OF PLASTIC RECONSTRUCTIVE SURGERY IN LEPROSY

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To an average person, the mention of the word 'leprosy' brings to his mind the picture of typical disfigured face, deformed hands and feet, missing fingers and toes, and open sores. Such a deformed leprosy patient is at once detected. He is feared, shunned and avoided, even though his disease might have been cured, and he may be non-infectious, bacteriologically negative, and may even be carrying a certificate of non-infectivity from a leprosy clinic or hospital.

Although leprosy has been associated with horror in the public mind it does not kill so often. The fear of leprosy is due to its crippling deformities. The disease mutilates, disfigures and deforms the sufferer, converting him to a caricature of his own. This paper discusses about the role of plastic reconstructive surgery in bringing the deformed and disfigured man back to as near normal appearance and functional capacity as possible.

It has now been accepted that leprosy is 'curable' with treatment. the disease possibly shows a great tendency to self - healing or self-cure than even tuberculosis in untreated cases Leprosy heals either with or without deformity.

It is interesting to note that in India the underformed leprosy patient may remain undetected in the society, both in the active and cured (burnt out) stages of the disease. He freely moves about in public, and is not spotted out or labelled a leper or *kohri*. Such a patient in the infectious phase of the disease is a danger to the society, because he freely mixes with all and spreads the disease. This is of utmost importance to those who undertake to control and eradicate leprosy from the country.

But as far as post-leprosy rehabilitation programmes are concerned, a patient who has healed without deformity presents no problem in India because his condition has never been detected. Such a patient is really fortunate who had neither suffered from the crippling deformities of leprosy, nor experienced the insults, and pangs of separation from home, freinds and the society, and was never compelled to take to begging in the streets.

Leprosy is thus associated in public mind with deformity. This wrong impression needs correction It should be stressed that :

1 the deformity is only a complication of leprosy, resulting either directly from infiltration and healing of lepromatous lesions or indirectly from nerve paralysis and trauma to anaesthetic hands and feet;

2 the deformity is not leprosy;

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3. the deformity is not a 'must' in leprosy, because it can be prevented as well as corrected by plastic reconstructive surgical operations;

4. the deformity remains or may even increase after leprosy has been cured.

An analogy with poliomyelitis will clarify the subject better. Deformities remind us that the child had suffered from poliomyelitis, and that the child is now free from the disease and carries no infection. The same is true of deformities of leprosy in cured patients. We call these post - leprosy residual deformities (PLRD). One difference should, however. be kept in mind. Whereas paralysis after poliomyelitis has a natural tendency to recover partially or sometimes fully in the first six to eighteen months of post-polio period, the deformity of leprosy may in some cases increase after leprosy is cured. This is because of the permanent anaesthesia of hands and feet; and if the patient is careless and subjects these parts to trauma and heat, secondary infection, stiffening and contractures may supervene. The patient should observe preventive measures through out his 'after-leprosy' life.

DEFORMITY IN LEPROSY

Deformities and surgical complications of leprosy have been enumerated in Table 1. They have been divided into four groups, viz, those involving the face, upper extremity, lower extremity, and miscellaneous conditions. They are caused either as a direct result of lepromatous infiltration, destruction, necrosis and atrophy of tissues and subsequent fibrosis and contractures on healing, or secondary to peripheral nerve paralysis, mucle wasting, anesthesia of hands and feet with superadded trauma and infection due to the patient's negligence.

WHY DEFORMITIES ARE A PROBLEM

For people of North India where leprosy is not common, it is difficult to realise the problems which 'cured' patients of leprosy face in South, East and Central India where the incidence of the disease is very high. 'Cured' leprosy patients even if they want to go back to their homes and society are not accepted by the latter, because they carry the stigma of the disease in the form of disfigurement of the face, and physically incapacitated because of the deformities of hands and feet. They are very easily spotted out, viewed with contempt and treated as outcasts even though they may carry the 'cure' certificate from the doctors. And this is a challenge which plastic reconstuctive surgery in leprosy has to meet.

SURGERY IN LEPROSY

Surgery in leprosy is not new, but formerly it consisted only of amputations of fingers or toes, incision of abscesses, dressings of wounds, operations for necrosis and osteomylities, and arrangement of footwear and artificial limbs. The destructive surgery of leprosy is now being replaced by reconstructive plastic surgery, wnich aims at restoration of improved functions of deformed hands and feet, and normal appearance of the disfigured face.

PLASTIC RECONSTRUCTIVE SURGERY IN LEPROSY

Table 2 enumerates the common recontructive plastic surgical operations performed in leprosy. Without going into details the following introductory remarks regarding these operations would not be out of place.

Nose : Once developed nasal deformity is the most conspicuous stigma of leprosy on the face. The depressed nose results from actual lepromatous infiltration and destruction of the nasal mucous membrane, followed by exposure chondritis of the nasal septum and nasal cartilages and to varying extent absorption of nasal bones. When the disease process is arrested the patient may be left with a mild to moderate collapsed nose, or even to a total collapse where the nose disappears into a pit in the maxilla. It is interesting to observe that the outer skin cover of the nose remains almost unaffected even in the extreme case of nasal collapse. As a matter of fact total destruction of nose in leprosy is an extremely rare occurrence, and forehead rhinoplasty (Indian method) or arm tube-epedicle rhinoplasty (Italian method) in order to supply skin cover to the leprosy' nose has been applied by some surgeons only through lack of knowledge about the fact that buried nose contained the skin in the nose intact in its entirety. The reconstruction of this buried nose (collapsed like a tent whose inner support has been removed) by the operation of postnasal inlay skin graft on the principle enunciated by late Sir Harold Gillies for reconstruction of syphilitic nose, is a most gratiffying operation both for the patient and the operating surgeon, because of its simplicity and safety.

Eyes : Lagophthalmos, ectropion and epiphora and the alopecia of the eyebrows are the main conditions which confront the plastic surgeon. The first three conditions result from the paralysis of facial nerve, wnereas alopecia is due to the lepromatous infiltration of the hairy skin of the eyebrows, with falling of the hair as the disease progresses and is later arrested. Absence of eyebrows due to plucking of hair in Jain Munis is a part of their self torture or may be a fashion in Paris or custom with Africans, but in areas where leprosy is endemic, lost eyebrows mean a clear stigma of leprosy. And the sufferers readily volunteer for grafting of hairy skin. For lagophthalmos, temporalis musculofacial sling operation of Gillies (for Bell's palsy) performed on both sides in a single or two stage operation gives excellent results. In course of time the patient learns to separate the movements involved in chewing from those of closing and opening the eyes, and he even blinks periodically.

Lateral tarsorrhaphy for ectropion and a small skin flap from the medial end of the upper eyelid rotated down and attached to the lower eyelid pulls the latter upward and backwards when the eyes open, and thus stops epiphora.

Replacement of eyebrows is achieved by either of the three methods which have their advantages as well as disadvantages. They are : (i) free graft of retro-auricular hair-bearing skin in one stage for both eyebrows; (2) transposition flap

of hairy skin of temporal region, and (3) intact temporal artery and vein island scalp flap (biological flap!. Whereas after free graft of hairy skin there is temporary alopecia for about 3 months after operation, which may discourage the patient initially, the island flap eyebrows are too bushy and have to be trimmed periodically.

Ears and Face: Elongated ear lobules are trimmed to normal size and in the 'rat-eaten' type the destroyed helix is repaired at the same sitting as some other operation on the face, such as 'face lift' operation for the 'aged looking' wrinkled face.

Hands: The main deformities which are correctible by plastic reconstructive surgical procedures are flexion contractures of fingers and thumb, loss of webspace between the thumb and index finger, and the typical clawhand deformity where the long extensors and flexors are usually spared and the lumbrical group of muscels are affected.

Plastic surgery of the hand in leprosy consists of treatment of flexion contracture of fingers by full thickness Wolff graft, and thumbweb skinplasty for contracted webs.

For the clawhand, tendon transfer or grafting operation should only be performed when the joints have been fully mobilised by physiotherapy and if necessary as described above by skin grafting. The sublimis transfer (Stiles and Bunnel) or preferably the many-tailed graft of Brand (Vellore, India) give consistently good results when combined with pre-and post-operative physiotherapy. Operation on the thumb include abductor-opponens replacement and occasionally tenodesis of the flexor policis longus to give the patient a better position for 'pinch'.

Reconstruction of thumb in cases of loss of thumb is necessary; and if all fingers and thumb are lost, deepenning of the web by excision of the index metacarpal will permit adequate grip and pinch.

Feet: There are three paralytic deformities of the foot in leprosy, viz;. (i) foot-drop, (2) clawtoes, and (3) inversion of the foot, each of which predisposes to unceration. Foot-drop leads to ulceration under metatarsar heads. Clawtoes predispose to ulcer on the tips of the toes, whereas inversion of the foot causes ulceration on the outer border of the foot

For the correction of foot-drops, tibialis posterior transfer gives successful results This acts as a dorsiflexor of foot. Tendon division and transfel operation or arthrodesis of interphalangeal joints may be necessary for the correction of clawtoes. A standard triple arthrodesis operation is performed in obstinate cases of inversion of foot.

Chronic ulcers on the foot respond well to prolonged plaster of Paris immobilisation and protection; and in selected cases to excision of necrosed or protruding bone and closure of the wound with local flaps or skin grafting.

BREASTS: Eneargement of the breasts in males (gynaecomastia) is a not uncommon surgical complication of leprosy. The cause of this enlargement is the accompanying testicular atrophy and hormonal imbalance. Associated with the alopecia of the face the sufferer feels embarrassed with the loss of his male characters and appearance of the female sex characters.

SOME OBSERVATIONS

Certain interesting observations have been made during the reconstructive surgical work on cured leprosy patients.

1. Healing of wounds: The operation wounds in post-leprosy patients healed as well as in normal subjects. This is contrary to the belief that healing of wounds is delayed in leprosy.

2. Post-operative scar - There is no tendency at all in these patients to form hypertrophoid scars or keloids. This may be due to lack of tension at the wound margins and absence of subcutaneous fat and elasticity of skin. It may be mentioned here that persons with tuberculous diathesis have a tendency for formation of keloids on scars, and the scars of cervical tuberculous lymphadenitis are hypertrophic in type. Both M. tuberculosis and M. leprae belong to the same acid-fast bacilli group, but this contrast in scar formation in the two conditions is striking.

3. Wound infection: This is rare in the post-operative period. This may be explained by the hypothesis of increased resistance of these patients to infection, or by the fact that the possibility of cross infection as in hospital wards is eliminated in those operated in isolated homes or huts.

4. Malignancy in chronic leprotic ulcers: There are patients who have had chronic ulcers of the foot or hand for over 10 to 14 years and it is astonishing to find not a single case of malignat change in these ulcers. One peculiarity of these ulcers is that they are painless. Could it be that lack of pain prevents the ulcer from undergoing malignant change, or is there any unexplained factor which is peculiar to leprosy patients and theirs blood chemistry that inhibits any predisposition to malignancy and keloid formation

5. Tetanus: If the number of open wounds in the leprosy patients is taken into account and the careless way these patients move about in dirty places, tetanus should be an everyday occurrence among them. But luckily for them, the occurrence of tetanus is rare, and a majority among them who get tetanus survive it. At Anandgram Colony about 500 leprosy patients reside, and 300 of them have got one or more ulcers, on their hands and feet. There were only 6 cases of tetanus in 3 years in the colony and out of these sufferers, 5 survived after antitetanus treatment, there being one death.

6. Safety of the surgeon–During operation surgeons often prick their fingers accidentally with the suture needle, and theoretically this means a clear risk of the disease to the surgeon who operates on leprosy patient. One of the

pioneer surgeons in this field who has been operating on cases of leprosy for about 15 years recorded the number and site of the pricks along with the date of operation on a chart representing his body and hands. He has not yet contracted leprosy; neither have any of the other surgeons and operation room assistants who have been working in the new specialty for many years. The incubation period of leprosy varies from six months to 30 years; and though for all practical purposes the surgical staff is safe, they should not be careless and must observe all necessary precautions while carrying out work in the leprosy colonies or hospitals.

CONCLUSION

While concluding, the author desires to convey that the purpose of this paper has been twofold first, it is informative, because this work being in its infancy needs to be introduced to the profession; secondly, here is an invitation to those who feel inspired to help in this mission.

TABLE 2 SHOWING PLASTIC RECONSTRUCTIVE SURGERY

Operations in Leprosy

1. Rhinoplasty (reconstruction of nose) :
   (a) Postnasal inlay skin graft.
   (b) Bone graft.
   (c) Total reconstruction for total loss.
2. Temporalis-musculofascial sling operation for lagopthalmos.
3. (a) McLaughlin's lateral tarsorrhaphy for ectropion
   (b) Upper to lower lid rotation-flap for epiphora.
4. Grafting of hairy skin for loss of eyebrows :
   (a) Free graft of hairy skin.
   (b) Transposition flap.
   (c) Temporal artery island scalp flap.
5. Ear lobule reconstruction.
6. Face-lift operation for improving the aged looks.
7. Many-tail tendon graft (Brand's operation) for clawhands.
8. Tibialis posterior transfer operation (T. P. T.) for foot-drop.
9. Webster's operation for gynaecomastia.
10. Skin grafting for chronic ulcers and flexion contractures.
11. Miscellaneous operations of the bones, joints and nerves.

Table I showing deformities and surgical complications of leprosy.

Face	Upper Rxmnity	Lower Extranitive	Miscellaneous
1. Depressed or destroyed nose.	1. Clawhands,	1. Foot drop (Lateral popliteal nerve paralysis).	1. Gynaecomastia
2. (a) Loss of hair and eye-brows.	(a) Ulnar paralysis.	2. Clawtoes.	2. Atrophy of testis.
(b) Scanty beard and moustache.	(b) Combined ulnar and median nerve paralysis.	3. Inversion of foot.	3. Sterility
3. 'Aged' look, due to nasola' bial, perioral' mandibular or generalised wrinkles.	(c) Postburn contractures of fingers and thumb.	4. Absorption of toes and foot.	4. Lymphadenopathy (femoral, inguinal)
4. Elongated ear lobules and nibbled or rat-eaten type	2. Absorption of fingers.	5. Chronic plantar ulcers	5. Alopecia of scalp.
5. Destroyed helix	3. Sores and chronic ulcers.	6. Amputations.	6. Skin diseases (fungal)
(a) Perforation of palate (occasional)	4. Amputations.	7. Nerve thickening, neurtis and abscess.	7. Trigeminal neuralgia.
(b) Destroyed uvula.	5. Nerve thickening and nerve abscess (ulnar and median).	8. *Lymphoedema of legs (elephantiasis)	
6. Facial paralysis unilateral or bilateral.		9. *Thrombophlebitis due to venous obstruction.	
7. Lagophthalmos.		*Comparatively rare.	
8. Corne ıl ulcer, corneal opacity, iritis, blindness, epiphora.			
9. *Stenostomia (Button-hole mouth), acrostoma, macro -cheilia).			
*Comparatively rare.			