PLASTIC REPAIR OF THE FACE AND HAND.

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As exemplifying two of the methods which have proved of great service in plastic repair—the tube pedicle, and the Thiersch graft on mould—the following description of the disablements and treatment of a severely-burned patient may be of interest. In a recent article by Lieut.-Colonel H. P. Pickerill and Mr. J. Renfrew White, the application of the tube-pedicle method to gunshot wounds of the face and to areas of chronic ulceration in the limbs was set forth with great clearness (*British Journal of Surgery*, January, 1922, p. 321). The present paper will therefore be restricted to the treatment of the effects of burns in an illustrative case.

L. R. B., age 20, of the R.A.F., was burned by ignition of petrol in a motor launch in Poole harbour in September, 1919. All his shipmates succumbed, and for a considerable time the patient's own chance of survival was uncertain. He was treated for more than six months in a local hospital, in which efforts were directed mainly to saving his life—the prevention of his contracture deformities, in the early months at least, being relegated to a secondary position. Later he was sent to Woolwich Military Hospital, and thence transferred to my wards at Queen's Hospital, Sidcup, in March, 1920.

The illustrations of the progress of the case are almost self-explanatory, but a brief description of the operations will make the various steps more clear.

The Face. (Figs. 56–62.)

1. A strip of skin and platysma, 5 in. long by $1\frac{1}{2}$ in. wide, was dissected up on each side of the neck. The upper ends were left attached, and the lower remained united by a bridge formed by a portion of the skin and subcutaneous tissue of the chest which corresponded exactly to the requirements of covering for the chin as measured by a pattern of tinfoil. The neck strips were then tubed by suture of their free margins with vaselined linen thread, and the skin edges bordering the raw areas were undercut and sutured together beneath the pedicle with silkworm gut. In this first stage, the bridge was demarcated, but only partially freed, in order to avoid too great a primary demand upon the circulatory supply and lymph escape via the pedicles. The raw areas in the neighbourhood of the bridge were dressed with ambrine. The areas of skin-supply are shown in the diagrams.

2. A month later, the dense scar-tissue of the chin was removed. The bridge, having been completely severed from the chest, was turned up into position and sutured with three points of catgut, one at the symphysis and one at each foramen menti, in order to create slight natural depressions, and with horsehair around the lip margins and lower border of the chin, where comparatively healthy skin adjoined. A group of tiny epithelial plants from the abdomen were spread over the raw surface of the chest, according to the Ollier-Thiersch technique, and dressed with gauze wrung out of normal saline. This area rapidly epithelialized, and, with massage and oil inunction, the scar ultimately became soft and pliant.

3. After the lapse of ten weeks, such scarred skin of the nose as remained was turned down, as shown in the diagram, to form a nasal lining. The neck ends of the pedicles were severed, partially opened out, and turned up symmetrically to form the nose.

4. Three weeks later, the unhealthy tissue was removed from the upper lip. The pedicles were divided at the tip of the nose and sutured into the raw area, the free ends meeting at the mid-line of the lip.

Thus in four operations the new coverings for chin, nose, and upper and lower lips were provided. No dressings were used upon the face at any stage. The extent of

FIGS. 56-61.—From photographs illustrating the progress of the operations on the face.

FIG. 62.—Diagrams showing stages (1-8) of the operations on the face.

retraction at the root of the nose and in the new lining of the nostrils was slightly underestimated, with the result that the damaged columella was incompletely concealed; but a small prop of cartilage or local advancement at a later stage will easily remedy this defect. Freed from attachment in the circumoral region, the remaining portion of the skin of the cheek retracted satisfactorily and pulled the scar upwards and outwards at the line of union to the position of the normal nasolabial fold. It also softened to a remarkable degree, and lost its florid and rough look. The final result of this relaxation was a weather-beaten appearance over and below the malar prominence where the colour is usually somewhat deepened. The treatment of the ectropion of the lower lids also helped towards this end.

The Eyes. (*Figs. 63-65.*)

The dressings shown in the early photograph (*Fig. 63*) were necessitated by the

FIGS. 63, 64.—The eyes of the patient open and closed, before and after the operation.

FIG. 65.—Diagram of the steps of the operation (1-4).

condition of the scalp, and by the ulceration over both temporomandibular joints when admitted.

The ectropion of the eyelids, both upper and lower, on both sides, was dealt with by the application of Thiersch grafts upon moulds. This method has been fully described in his admirable book by my late senior colleague, Mr. H. D. Gillies, by whom its utility was early recognized and applied in inlays of the mouth, nose, and eye sockets, and for ectropion.

The dental composition known as 'stent' is softened by heat and then pressed into a hollow created by an incision alongside the ciliary margin and the freeing of the lid by dissection. The mould, when set, is removed, and around it is wrapped a Thiersch graft, raw surface outwards: graft and mould are re-inserted into the prepared bed and almost buried by cross-suturing. Ten days later, the mould is removed and the cavity is found to be lined with smooth and healthy epithelium. This process is usefully practised in

the ectropion following severe lupus ; indeed, the whole clinical picture of this case was not dissimilar to the effects of that disease when it has been allowed to progress beyond the stage of primary excision followed by plastic restitution, which, as for rodent ulcer, appears to be the most reasonable line of treatment in those cases in which local applications have been thoroughly tried but have proved ineffective. The accompanying diagrams (*Fig. 65*) serve to illustrate the method ; and the photographs, with eyes closed and open before and after operation, show the degree of restitution which was effected.

The Hands. (*Figs. 66-68.*)

As the photograph of the right hand indicates, the hands and wrists were very

FIGS. 66, 67.—Hand before and after operation.

FIG. 68.—Showing four stages of the grafting operations.

severely burned. The wrists were fixed in a position of extreme flexion, and large unhealed areas were present on the dorsal aspects, which had been dressed for many months with the accompaniment of severe pain. The palms were filled with thickened and sodden masses of epithelium. On the left side, two sinuses led down in the direction of the head of the middle metacarpal bone. The distal phalanges of all fingers had disappeared, and several necrosing pieces of bone protruded from the shapeless masses which represented the fused remains of fingers and thumbs of both hands. Small blebs on the dorsal aspects, which occasionally broke down and emitted foul-smelling sebaceous matter,

indicated the sites of the digital clefts. On account of the fusion of the stumps in dense scar-tissue, no trace of independent movement was discernible in fingers or thumbs, although the patient still preserved a subjective sense of control of each digit. Radiographic examination indicated, and subsequent dissection confirmed the fact, that actual synostosis had taken place between the proximal phalanges of the left middle and ring fingers.

The patient was right-handed. Sepsis and pain were greater on the left side. It was impossible to obtain from the abdomen sufficient covering for both hands without the production of a disabling scar, as, for the right hand alone, I estimated that 38 square inches of skin were required. In view of these facts, amputation was performed at the lowest level of unscarred skin in the middle third of the left forearm, and an artificial arm of the 'Cauet' type, fitted later, gave him a limb of considerable usefulness.

1. For the right hand, an abdominal pedicle was cut, 9 in. long by 3 in. wide, slightly aslant the natural skin fold, and in the vascular and trophic line of supply. At right angles to the main pedicle, a thumb extension was also fashioned. By a little under-cutting of the skin and relaxation by flexion at the hips, the edges were easily apposed beneath the pedicle, and primary union resulted.

2. The second stage was carried out three months later, but this long interval was due to the difficulty of so reducing the sepsis of the hand that no unnecessary risk of losing a portion of the pedicle by this means would be incurred on attachment.

The dorsum of the hand was cleaned, the extensor tendons defined, and the thumb freed by removal of the dense scar-tissue which had bound it to the stump of the index finger. The medial ends of the pedicle and thumb extension were divided and opened out. The hand was then held in position while the new coverings were sutured over the raw areas. The remainder of the pedicle, designed for ultimate application to the palm, was thus left unopened at this stage, and its range of movement obviated the need for absolute and uncomfortable fixation; this, with the absence of any raw surface on hand or abdomen, is of considerable importance in view of the discomfort and sepsis occasionally produced by the 'flap' method in this region.

3. In three weeks' time sound union had been established, along with a dependable reverse circulation, which had been accelerated by frequent constriction of the abdominal attachment. The pedicle was severed, opened, and applied to the palm and radial side of the stump of the index. On healing, this produced a full thumb sulcus and a pliable web which gave excellent movement. The patient could write well, and for the first time in a year was able to feed himself with a fork or spoon.

4. A second pedicle was cut on the right side of the abdomen to cover the remainder of the hand, consisting of the ulnar border, the stump of the little finger, a concavity created by the removal of the stumps of the middle and ring fingers, together with the heads of their corresponding metacarpals and, finally, the outer aspect of the thumb. This was carried out in stages of operation similar to the other.

The operations for facial repair, for the eyes, and for the hands, were carried out concurrently, and necessitated fourteen general anæsthetics of gas and oxygen, which were administered intratracheally except when treatment was directed only to the hands or abdomen.

The patient's health improved steadily as his septic foci were eliminated and as he was enabled to go about in the open air with eyes adequately protected from dust and glare, and with the consciousness that his appearance had ceased to be repulsive. The psychic effect of any obvious disfigurement, whether due to trauma, disease, or a congenital affection such as nævus, is always a factor worthy of consideration, and it was pleasing to note the steady mental uplift in this stout-hearted lad as his many disablements were ameliorated.