On the results of the operations for cicatrices after burns / [by] John Haddy James.

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OPERATIONS
FOR
CICATRICES AFTER BURNS.

J. H. JAMES.

Professor F. Le Gros Clark, F.R.C.S.
With the Author's best respects

p. 37.

ON THE

RESULTS OF THE OPERATIONS

FOR

CICATRICES AFTER BURNS.

BY

J. H. JAMES, F.R.C.S.,

ETC. ETC.

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CICATRICES AFTER BURNS.

A short time since, having occasion to refer to Holmes's 'System of Surgery' for some information on another subject, my attention was called by my friend Mr. Lydall (for I am wholly incapable of reading myself) to an article on "Cicatrices after Burns," at which, I must say, I was both surprised and disappointed, it laying down as an absolute position that the operations which are performed for these sad deformities are altogether useless, and condemning them in no measured terms, as the following extract will show:

"Surgical ingenuity has been pushed to the uttermost to devise operations by which this most distressing calamity may be removed; but I express the opinion of most surgeons of experience of the present

day in affirming that hitherto all such operations have proved failures, and for this simple reason, that whenever an incision is made a new cicatrix must be formed, and this new cicatrix will undergo precisely the same process of contraction as the former which it was intended to alleviate.

"It may be laid down as a rule almost without exception, *that a cicatrix should never be touched with the knife*, and we find that these operations have for some time past been discarded as useless at St. Bartholomew's and some other hospitals of London." (Holmes's 'System of Surgery,' vol. iii, p. 131.)

If this had been merely the dictum of an ordinary person, or been contained in a work which has less claims to respect, I should not have troubled myself with any notice of it; but seeing that the work in question is one that will command considerable influence on the profession, and is calculated to extinguish all endeavours to relieve these miserable cases by the use of the knife, I feel it my duty to state the evidence of the success by which these operations have been attended in this hospital. Before I proceed further, I must confess that I was not aware of any great amount of "surgical ingenuity" which had been applied to this branch of surgery. The following brief history will, I believe, with tolerable correctness, express what these efforts have been, and by whom accomplished.

In the beginning of this century little, if any, en-

deavour had been made to remedy this calamity; at least, I may say during nearly three years that I was a pupil at the Devon and Exeter Hospital, and four years that I was at St. Bartholomew's (during which I was one year house-surgeon, and one year a house-pupil of Mr. Abernethy, and also I was in the habit of visiting several other hospitals), I never saw or heard of any operation being performed for their relief, and it was not till the year 1814 that a paper appeared in the 'Medico-Chirurgical Transactions,' vol. v, and another in 1816, in vol. vii, by my late friend Mr. Henry Earle, that any plan of operating with the knife had been proposed. It is due to his memory to say that he was the first to introduce this practice, as well as to improve other branches of surgery, and he conferred a great boon on the profession by calling its attention to this important point, and had his life been spared it is not improbable that he would have trodden well in the footsteps of a celebrated ancestor, Mr. Pott. In 1816 I had the good fortune to be elected Surgeon to the Devon and Exeter Hospital, an institution of no inconsiderable importance, and it was not long before cases came under my care, both in the arm and neck. Mr. Earle's statement proved the success of the former, and, although it discouraged attempts as to the latter, it remained to be seen whether by any method or care equal success could not be obtained in these. The first case I operated on in the neck was in 1818, but, instead of following Mr. Earle's plan of removing the

cicatrix, I detached it from the subjacent parts, and retained it for a purpose to be hereafter stated. Throwing the head back on a pillow, I treated the wound with soft poultices and subsequent mild dressing, and thought I should establish a good neck by means of a pasteboard collar; but, after three months, found that the wound was healing and contracting, so as to threaten the re-establishment of another cicatrix as intractable as the former. The question then presented itself, *Why should cases occurring in the arm succeed, while those in the neck fail?* It appeared to me to be this—that in the arm we have a hinge-joint at the elbow, and if it be fully extended it will maintain a definite position, and the occurrence of a longitudinal cicatrix be absolutely prevented, while in the neck the normal distance between the head and thorax is preserved by a series of small bones united by elastic substances, and furnished with numerous lateral articulations. Thus, instead of a firm column, *we have a mechanism extremely flexible*, allowing the head, if forcibly drawn down, not suddenly, but gradually, to approach near to the thorax. To meet this difficulty I had a collar made, which will hereafter be more particularly described, but which in this case came too late to procure a thoroughly good cure. This and the two next cases were the subject of a paper communicated to the Medical and Chirurgical Society, and published at length in their 'Transactions,' vol. xiii. No better proof of success can be given than that the second of these

two cases, having seen the first, presented herself for the operation.

I must pause for a moment to say that Mr. H. Earle, on seeing this paper, expressed a decided alteration in his opinion with regard to the operation on the neck. It may, however, be here mentioned that he had, in his second paper, related a case in the neck which was operated on by Sir B. (then Mr.) Brodie in 1815. That cicatrix appears to have been a bridle of no great extent, and the edges of the raw surface which was left were united by adhesive plaster to procure union longitudinally—a method which, in the more extensive cases, is perfectly inapplicable. I may also mention that from the time of my appointment to the hospital I was in the habit of taking notes of those cases occurring to myself, as well as those in which I assisted my colleagues, which possessed any considerable interest, and, consequently, of a large number of operations, and these I indexed some years ago. On referring to the class "Cicatrices after Burns," I find twenty-one of the neck, and seven of the extremities. Ten in the neck, hereafter stated, were my own cases; the remainder, as well as some of the arm cases, were under the care of my colleagues (of course I only give my own), and it must be understood that these formed but a small number as compared with those operated on by them down to the present time. I shall now briefly state the principal circumstances belonging to the ten cases above referred to.

(1) Vol. ii, p. 495. October 17, 1818.

*A girl, Lee, æt. 7. Severe burn of neck, treated for three months with a pasteboard collar with very imperfect success. The screw-collar was then adopted, and with benefit. But the success was not so great as in the subsequent cases.

(2) Vol. iv, p. 475. March 9, 1824.

*Elizabeth Bully, æt. 8. Burn seven months since; broad cicatrix; distance between chin and sternum one inch, the chin nearly effaced, and left corner of the mouth much drawn down before the operation. Quite healed in four months. After the operation, distance between chin and sternum, three and a half inches. Treated with the collar.

(3) Vol. iv, p. 480. May 4, 1824.

*Elizabeth Beal, æt. 13. Burn four years since; the cicatrix was more extensive than in the last case, and exceedingly broad and hard. The top of the thorax also showed a very extensive, thin, and tense cicatrix. Chin effaced. Distance between chin and sternum about the same as in last case. The result of this operation was that she could raise her head above the horizontal line without stretching the newly organized skin, which is soft and pliant, and I find the following note in the month of March, 1825:—"It has now been healed several months, and I have continued

* Published at length in the 'Med.-Chir. Transactions,' vol. xiii.

the collar till this time, and certainly additional room has been gained since the wound was healed. There is now more than five inches between the chin and the sternum."

Discharged cured in July. This girl applied to be operated on from seeing the success which Elizabeth Bully obtained.

(4) Vol. iv, p. 486. March 23, 1825.

Frances Pearse, æt. 15. Burn one year since; very extensive and very hard cicatrix, with two lateral bands extending towards the ears. Deformity very great, and the head fixed. Distance from the chin to the sternum before the operation one and a half to two inches. I first tried in this case Mr. Harris's deviation of the collar, which transferred to the shoulders and thorax the support which, in my own collar, sprung from the top of the thorax, but it did not answer. I then reverted to my own collar, and, using the old uniting (or harelip) bandage under the chin, as hereafter explained, the case did perfectly well. Now living, and perfectly free from contraction, as hereafter stated.

(5) Vol. iv, p. 527. August 4, 1827.

"A. Frost, æt. 18, a stout young woman, who had been burnt four years before. Great contraction, chiefly on the right side, to which the head was much turned. Dense cicatrix on the left mamma, extending

across the throat obliquely to the right cheek, and drawing down and everting the lip and right eye. A superficial web ran across the throat, and it was imagined that the division of this would set free the head. This, however, was found not to be the case at all, and I had much to do to divide the dense cellular substance so as to free the chin. She was then dressed in the usual way.

"November 2nd.—The neck is now nearly healed, and certainly considerably improved; the effect, however, of the long-continued dragging of the cicatrix during the growth of this young woman has been very disastrous, and the consequences permanent. The whole cervical vertebræ are thrown so much on one side as to constitute a lasting obstacle to the neck getting right again, and, in truth, such has been its influence that that side of the skull has been prevented from growing in its natural direction, and when the head is placed horizontally the upper edge of the right orbit is at least half an inch lower than the left."

(6) Vol. v, p. 342. December 16, 1829.

"Sarah Heath, æt. 13. Burn six months since; very extensive and hard cicatrix; chin tied to the sternum; the whole of the lower lip drawn completely down. Operation conducted in the usual way, and the cicatrix turned under the chin as a flap.

"December 21st.—The flap has nearly sloughed, but

the rest of the wound passed into a state of healthy suppuration." There are no further details, but two years and a half afterwards, there is this important note:—"This turned out eventually one of the best cases I have had."

(7) Vol. v, p. 352. May 15, 1831.

Age of the boy not stated. Burn fourteen months before; the chin closely tied to the sternum; great deformity of mouth. "This case was less successful than any I had previously performed." The operation was effected with much facility, but the subsequent treatment was not so satisfactory; both the instrument-maker and the pupils appear to have been in fault.

(8) Vol. vi, p. 441. June 17, 1837.

A girl, Cousins. Burn eight months since; cicatrix the largest yet dealt with; no trace of chin; incisors nearly horizontal. Extended equally on either side. Operation attended with more than usual difficulty from the dense state of the subjacent cellular membrane. Flap disposed of under the chin.

"September 23rd.—Is going on remarkably well. The incisor teeth have been raised to their proper position by the action of the labial muscles, which shows how completely the lip had been relieved."

Vol. viii, p. 400.

"In the hospital (for some other complaint) May,

1844, seven years after the operation. Not the least contraction remains."

(9) Vol. viii, p. 400. July 2, 1842.

Anne Tinsman, æt. 24. Very extensive cicatrix; the lip drawn down, and chin closely approximated to sternum, as shown by a cast taken prior to the operation. This case turned out a very successful one, as may be seen by a cast taken before she left the hospital. The two casts I took with me to Leeds the following August.* I had to return through London, and took the opportunity of showing them to my friend Professor Partridge; he wished to have copies taken of them, to be placed in the museum of King's College. They were returned to me, and are now in our museum.† These casts being accurately measured, give the following results:—The first, taken before the operation, gives one inch and a half between the chin and the sternum; the second, taken before she left the hospital, measures four and a half inches from chin to sternum. The profile shows the neck and chin well restored to their normal shape. It is most satisfactory to be able to state what her present condition is, which I am enabled to do through the kindness of my friend Mr. Kempe, who has obtained for me the important information contained in the accompanying note.

* When I resigned the Presidency of the Provincial Association.

† An engraving from photographs just taken is appended to this paper.

"Exeter; *Aug.* 16, 1868.

"My dear Sir,

"My sister has just received the following from a friend of hers at Fowey:

"'Anne Tinsman was quite well, and able to turn her neck as well as any one; it was not in the least stiff.'

"Yours very truly,

"Arthur Kempe."

(10) Vol. ix, p. 306. October 31, 1846.

A boy, æt. 5. Long and narrow cicatrix on the left side. I divided it at the bottom, set it free by a few touches of the knife, and laid the detached cicatrix under the chin. I then obtained a flap from the thorax, corresponding with the surface now exposed, and united the edges by sutures. The union partially failed, and left a portion of the surface bare; it may, however, be inferred that the usual application of the collar succeeded in obtaining a good cure, for, under the date May, 1847, the neck is described as "an excellent one."

Some questions will naturally arise with respect to this operation. It requires skill and care, but no untoward accident occurred in the ten cases operated on by me, nor, as I believe, in any of the cases by my colleagues. The time occupied in the treatment till the cure was completed varied considerably, but it will be seen that it seldom exceeded a few months; during

this time much less suffering was expressed than might have been expected; indeed, generally speaking, the subjects were both cheerful and patient, probably from the great relief which they had obtained, and probably also from the hope that they now entertained of entering the world more on a par with others, and it is important to observe that wearing a well-adjusted collar was attended with very little suffering. The most important question is that which relates to the formation of a new cicatrix as formidable as the old, being the objection affirmed as the cause of failure, with the recurrence of all the disasters of the former state. This, it will be seen, has been assumed as a fact in the work I have alluded to, but the list presents the following. In the first and seventh cases a fair trial of the collar cannot be said to have taken place; of the remaining eight cases I have fortunately good evidence to present of success in the cure, and *its complete maintenance subsequently in five of the eight.*

Case No. 2 I saw myself a few years since at the house of a friend on St. David's Hill, Exeter; her state was very satisfactory, the corner of the lip alone being a little drawn down. She was then approaching to middle age.

No. 4 is now living at Sidmouth; she is fast approaching sixty. She resided for many years at Exmouth, where she was seen by Dr. R. M. Smith and Dr. Wilson, now of Guildford, as well as myself,

towards the end of 1863, and the cure had remained perfect, with a well-formed neck.

No. 6 was seen by me more than two years after the operation, and the note, as above stated, is that "This has turned out one of the best cases I have had."

No. 8, which appears to have been an extreme case, was reported seven years afterwards (when in the hospital for another complaint), "Not the least contraction remains."

No. 9, it will be seen, has been traced from the time of the operation, 1842, to the present time, 1868. The two casts I have before alluded to prove the immense benefit she derived from the operation. Of the remaining three cases I have no positive evidence to produce; No. 3, described in the 'Medico-Chirurgical Transactions,' I have not seen since, but I have not the slightest reason to believe there was any recurrence; No. 5, although benefited, was, from the alteration in the cervical vertebræ and bony structures of the face, incapable of a complete cure; No. 10, which was a rhinoplastic operation, does not come under the common category with the others, but is described as a very good case. This disposes of the cases (nine of extreme deformity) on which I operated, and the evidence is conclusive as to the completeness and permanence of success in five of these, and they are quite sufficient to prove the fact that, if the operation and subsequent treatment are carefully conducted, a recurrence of this dreadful deformity, far from being

a necessary, is by no means a usual result, and the others offer no contrary evidence.

In addition to the results of my own experience, it is highly important that I should state the fact that from 1818 till the present period (fifty years) numerous operations on the neck and extremities have been performed by my colleagues, and with great success. The fact speaks for itself, for it cannot be supposed that such men as the late Mr. Barnes and Mr. Harris, and the present surgeons, Mr. De la Garde and Mr. Kempe, the former of whom has been nearly thirty years one of the surgeons, the latter over twenty, would have continued to perform these operations, both in the neck and extremities, unless they had been successful; and I am gratified at finding that both Mr. Roper and Mr. Cumming (appointed since my illness) continue the practice. In a conversation with Mr. Kempe a short time since, he expressed a decidedly favorable opinion, and not only so, but, whilst speaking of the collar, which he greatly approved, he also commended its use in strong terms in cases of diseased cervical spine, of which more hereafter. It is in my power to give the recorded evidence of my friend Mr. De la Garde, in a very able address he delivered at Torquay in 1860, at the meeting of the British Medical Association. After doing full justice to my share in the introduction of the operation, he describes a case in the neck of extreme severity, in which he perfectly succeeded, but not without long-continued

attention, and this is the more especially valuable because it adds another case in proof of the cure remaining complete. The subject was twenty years old at the time, has since been married, and at the expiration of sixteen years from the time of the operation the neck remains perfectly well. It is not only as regards the neck, but as regards the arm also, that I especially wish to avail myself of his terse and expressive, but not too forcible language.

"The cases, however, which have interested me most are the distortion of the limbs, especially of the arm. Here are photographs, one of the contracted arm of a child, six years of age, and another of the same arm nine months after the operation, and another two years after that.* It has been said that these limbs contract again. That is the experience of those who say so. I am quite able to affirm, from ample experience, that such return of contraction proves neglect in the after-treatment. I need hardly say that a division of the cicatrices, and an extension during the whole period of healing, is the mode of treatment. But this is not enough. The limb must be extended every night for many months after—it is safer to say for a year. Each case must have its own apparatus for making the extension. A roller-bandage carefully put on has an excellect effect in smoothing down the scars." (Printed Address, p. 41.) If any additional evidence were wanted to support *the use of the knife*

* Plates of these were given.

in these operations, I might go to the metropolis itself, where we find two of the highest authorities, Mr. Erichsen * and Sir W. Fergusson,† expressing opinions which are certainly favorable to it.

I have given a description of the operation in the 'Medico-Chirurgical Transactions,' vol. xiii. Further experience has led me to some alterations; I will, therefore, give a brief sketch of it as I more recently practised it, and not only so, but propose an explanation of the pathological condition, as relates to the formation of new skin, on which the benefits of the operation essentially depend. The position of the patient is, of course, that of the head thrown back. The cicatrix is more or less movable upon a layer of loose cellular membrane. It is essential that a free division of the cicatrix should be made down to this layer. Till that is accomplished its benefits cannot be obtained, and the free dissection of the dense gristly matter and dense cellular membrane beneath it, which constitutes the cicatrix, from the loose cellular membrane below freely upwards, and the lower portion downwards, is necessary through the whole extent. This may be done, as formerly stated, by incisions commencing at the two edges, or the loose layer may be got at by dividing on some point which shall have no important relations, as the front of the trachea or thyroid cartilage. In dissecting it up I found it useful

* 'Science and Art of Surgery,' pp. 151, 152.

† 'Practical Surgery,' p. 628.

to pinch up the dense cellular membrane with my finger and thumb, and divide it with light touches of the knife, especially in situations where there were large vessels. I often could not distinguish the superficial fascia, for the bleeding from many vessels was so considerable as to obscure this. The subjects mostly were children, and the thyroid gland naturally small, and in those more advanced I do not remember a considerable size to have existed, probably from the pressure of the cicatrix. When the loose cellular layer is fairly reached, with a light hand and a knife having little point, it is generally not very difficult to dissect up all the upper part of the cicatrix so as to render it perfectly free. If the patient is not under chloroform, she should be directed to close her lips firmly; if she is, an assistant must do this.* It will indicate the degree of liberation which has been effected. In the many cases we have had, although a good deal incommoded by the bleeding of many vessels, I do not remember any of considerable size being wounded, nor to have found it necessary to tie more than two or three. The sound skin at the margin, from its long contraction, may still resist the free separation of the chin from the sternum, but that is got rid of by notching it in two or three places. It will then be found that we have a movable flap, which may be disposed of under the jaw, reducing considerably the extent of the wound, and will contribute to

* I use the term applied to females, as being by far the most frequent sufferers.

restore the proper contour of the neck; in point of fact, it will be, *pro tanto*, rhinoplastic. This flap should be supported by a broad strap of plaster secured upon the temples; at the same time a soft smooth pad of lint should be laid upon it, and over this the old uniting (or harelip) bandage, as it was called, and at one time used with much advantage, should be brought up, and the threads crossed at the top of the head, the bandage being brought down and secured at the temples; a strap carried round the back of the head will secure it. The gentle pressure which may be made as this is drawn, materially *contributes to the formation of a good chin.* In lieu of the uniting bandage, a piece of a common roller of proper width may be passed from under the chin to the top of the head, and one end pierced sufficiently to allow the other end to pass through it, when they may be drawn contrariwise, as in the uniting bandage. A large raw surface still presents itself below on the front of the neck; this may be treated by mild dressing on the softest lint, with thin poultices over, and a pasteboard collar nicely adapted applied after the first two or three days, and kept on till free suppuration is well established, when the screw-collar should be applied.

The collar I used consisted of an upper arch adapted to the base of the jaw, and of a lower arch adapted either to the sternum and clavicles or to the upper part of the thorax, as the state of the integuments might require. From the centre of the lower arch

was raised a steel frame perforated with a screw, which acted on the upper arch beneath the chin. The two arches were united behind by uprights springing from the lower arch, and furnished with hinges where they joined, so that by working the screw the distance between the two arches might be further increased. In many cases the state of the integuments in the lower margin made it desirable to frame the lower arch in two segments, which were united by the framework in the centre which supported the screw; it was always important that the upper arch should not be too open, as the chin might then be withdrawn within it. This collar kept the lower jaw and the thorax at a definite distance, while at the same time by the action of the screw it raised the central portion of the head, for as it raised the base of the jaw the rami were necessarily raised also, and the condyloid processes received into the glenoid cavities also raised the central portion of the head, and thereby enabled the cervical vertebræ to resume their normal position. Some alterations in the collar have since been made, but the general principle has been retained. I need hardly say that the arches must be carefully padded, and properly secured by straps carried behind, brought under the arms, and fastened in front.* In these cases, if the collar was at

* In vol. xiii, 'Med.-Chir. Trans.,' there is a sketch of the collar I then used, and a description varying but little from that now offered. A copy of this will be appended to the memoir.

all removed, it was only for a very short space, while the patient was recumbent, and after the wound was healed it was used for several months, and only gradually discontinued. I may here mention that it is not only in these cases of burn, but also in cases of wry neck, and more especially in diseases of the cervical spine, that it is eminently useful. Of the value of this support I can give a melancholy example. A man who was wearing one of these collars, and with apparent advantage, incautiously took it off when in an upright posture. The odontoid process gave way, and he died instantly. The effect of this collar, then, will be, first, to preserve the head and thorax at the relative distance obtained by the operation, and defeat all the efforts to form a new *contracting* cicatrix; and secondly, by raising the head to restore the cervical vertebræ to their normal position. Of course it is understood that when the collar has been applied the patient need no longer be kept in a horizontal position. Furthermore, it may be useful to adapt a second collar to increase the advantages which have been gained by the first, if further progress can be so obtained.* I may repeat

* For a long period I considered myself as the original inventor of this useful apparatus, but some years since my attention was called to a statement in one of the journals that Mr. Gooch had described such a collar. Mr. Gooch's works, to my shame be it spoken, I had never read or looked into till then. From the best of my recollection (for I cannot now see) there was some difference in the construction, and it would hardly have been applicable to these cases in the neck; nor, indeed, does he at all allude to them, even when speaking of cicatrices in the

that any operation on cicatrices of the neck has been objected to on the ground that it would be useless, from the recurrence of a cicatrix *similar to the first;* but it is quite clear that by the use of the collar described the parts separated can no more be approximated than in the arm or elsewhere, and the granulating surface will be compelled to form new skin, as will now be stated. It would be monstrous to suppose that this mode of repair had been neglected, and that the natural processes offer no means of adequately restoring a wounded surface where the conditions of an injury have been such that the edges could not be brought together. I must here venture some observations on the pathology of healing wounds.

In ordinary cases, where parts are simply divided, the process of repair is so well known that it is unnecessary to enter upon it; the especial process consists in the absorption of the plasma and granulations first formed to unite the divided parts by this absorption bringing the edges together; but there is a material difference where there has been an absolute loss of parts. In this case there is still the same endeavour to bring the edges or margins together, as

hands and fingers ('Gooch's Surgery,' vol. i, p. 450, vol. ii, p. 80), but it would rather appear that it was for the benefit of cases of wry-neck or of diseased cervical spine that he invented this apparatus. At all events, at my age it can matter little who was the inventor. My purpose is to benefit those who labour under these sad deformities, and if in this way any good may have resulted from my endeavours I shall be fully satisfied.

far as it is possible to do so, and to stretch the adjoining skin to assist where it can be done. When, therefore, we have, as in the neck, one of the margins movable, *i. e.* the jaw, and the other fixed, as the top of the thorax, we shall have the former drawn down by the absorbing and contracting power, and if there were any movable skin, that would be stretched. In some parts of the body this is not difficult, as in the abdomen, where the skin is naturally extensible and contractile, as the contingencies of that part require, *e. g.* pregnancy, dropsy, tympany, &c., but in the neck there is no such advantage (the thorax being commonly implicated in the burn), the adjoining skin is that of the face, and for the most part mixed with muscular fibre, and not separated by fascia; consequently, if drawn down, it is *en masse*, and hence the distortion of the lips, cheeks, &c. This is the mere result of loss of substance, for if a man cuts his throat the parts easily unite in a simple line; but if the integuments are destroyed by fire the union is effected at the cost of the face, as stated, and by a cicatrix organized with extreme toughness and resisting power. If this cicatrix be simply divided the chin may be raised, and for the moment everything promise relief, but the same nisus to unite the edges recurs, and we have the same cicatrix again, so that it is quite true, *if further means are not employed*, that such operations are useless. Throughout the body many cases of loss of substance occur in which the margins cannot be

brought together. For example, Mr. H—, when a youth, was severely burnt by some rockets which he indiscreetly carried under his arm, and which were accidentally ignited. A very considerable portion of the integuments of the side of the thorax sloughed, and of course granulations succeeded. The margins of this destruction were in great measure fixed (*i. e.* by the ribs), and no skin could be gained by stretching, and any approximation which would have produced curvature was prevented. The wound healed; the granulations were not absorbed, but converted into new skin, allowing free motion to the arm to the present day, now many years since the occurrence. Mr. F—, who was engaged in a large tanning concern, had his arm caught in the machinery, and so mangled that I was obliged to amputate at the shoulder; there was also an immense flap torn from the side, much in the same situation as in the last case. This also healed, and the new integument proved an excellent substitute. Without multiplying examples, I may call attention to a disaster which many surgeons have witnessed, viz. the scrotum having sloughed from extravasation of urine into it. This is too often fatal, but, if the patient survives, the slough is separated, and granulations pullulate from the tunicæ vaginales; and in these, as in all such cases, a new integument is formed or tends to form, in essential matters supplying the place of the original. We must transfer this principle to the operations on the neck, when the

approximation of the lower jaw to the thorax is absolutely prevented by the neck-collar; after a time the process of contraction is abandoned *ex necessitate rei*, and Nature, working in a different way, forms a new skin upon the same principle as in the cases just stated, and this skin, from some circumstance or other —it may possibly be from the peculiar tendency of the region, the skin being naturally loose in the neck— becomes, after a time, remarkably supple and flexible; at least, such was the case in the patients whose notes I have given.

It seems to be the opinion of very high authorities that the absolute process of skinning is derived from the surrounding skin, and the islands which are often observed to form on these large surfaces are attributed to portions of true skin not absolutely destroyed; but in the case of the scrotum and others the destruction has been complete, and yet these islands have formed, coalesced, and constituted good subsidiary skin; if that, however, is in any case effected, it matters little what the exact process may be. To call this new creation a cicatrix would involve a difficulty as to its real constitution. After a time it has no tendency to contract, and its physical constitution differs materially from ordinary cicatrix. I regret to say my loss of sight and other ailments prevent me now from investigating the different characters of these formations, but I do not think we should err much in calling them substituted or self-organized skin. As far as my

memory goes, when I could see, and as far as my means of investigation, by the help of others, goes now, the principle here advocated of new skin being organized *ex necessitate rei* does not appear in any recent works. I may be in error on this point, but, at all events, the cases now recorded are in proof that in the neck, at least, when the approximation of the margins is absolutely prevented, such a substitute is obtained in lieu of the dense intractable cicatrices.*

A few words may be added as to the treatment of the sores during the process of healing. Believing that pus is *ex officio* an integument until a new one is formed, it was considered not desirable to clear this away too officiously, and, instead of hurrying by astringent applications the process of healing, it was pretty much left to Nature, proceeding in her own way, and organizing the supplementary integument in her own

* We have very elaborate accounts of the minute structure of granulations, and the conditions of their blood-vessels and cells have been fully described. We also know that they are secreting and absorbing bodies, but in addition to this there is the very remarkable fact that they are extremely sentient, although it does not appear that nerves have ever been traced into them. From what, then, does this sentient power proceed, on which both the preservation and the functions of these granulations essentially depend? We know very well that the reproduction of nerves after their division is very slow, and yet, if we suppose the existence of nerves so small as to be imperceptible, the fact that granulations may be swept away and reproduced as sensitive as before in a few hours will make it improbable, on any principle of analogy, that nerves are the cause of the sensibility of granulations. What, then, is the cause? Is it some modification of what Mr. Hunter described as the "materia vitæ diffusa"?

good time. Should the process be long delayed, running a stick of nitrate of silver lightly over the margins will accelerate the process by making a temporary cuticle, and stimulating the granulations. When the surface is completely healed it is not advisable to withdraw the use of the collar at once, but, on the contrary, to wear it constantly for a time, and then gradually leave it off. Any tendency in the newly formed integument to contract, should it exist, will wear off, and two additional guarantees against a return be created, *i. e.* the full re-establishment of the cervical spine, and the motion produced by the greater liberty given to the head. It is not my intention to dwell upon cases in the extremities, but the same principle applies. We counteract the nisus to re-form the longitudinal cicatrix, and we compel the wound which remains after the edges have been brought together as far as possible, to form supplemental skin. In neck cases of no extreme severity it is not necessary to dissect up the cicatrix, but a simple division, and a few touches of the knife, will set free the parts sufficiently, and if the collar is worn the neck will heal without the formation of a dense cicatrix; and it is still more important to add that if in recent burns the use of the collar be adopted, it will greatly tend to prevent the contraction of the healing sore.

I must now proceed to mention another mode of dealing with these terrible deformities—I mean the rhinoplastic plan. It was first adopted in this country

by Mr. Carden, of Worcester, in 1839. In America Professor Mütter, four years afterwards, also adopted it, as it would appear, with much success. In 1855 the late Mr. Teale also employed it with advantage—and I cannot mention his name without connecting it with one of the greatest improvements in modern surgery, I mean the mode of amputation; simple and obvious as it is, and legitimately deduced, one might say, from the precepts of another celebrated surgeon of the same city, Mr. Hey (as applied to amputation of the leg), the plan of absolute measurement was not adopted generally till Mr. Teale brought it prominently before the profession. Where good skin can be procured I have no doubt that the rhinoplastic plan is a valuable operation, and I gave it a trial in case No. 10, but I can only say that in the great majority of these neck cases no skin in the immediate neighbourhood can be found sufficiently reliable. It is material to observe that, where the wound can be covered in by sound skin, Nature does not attempt to renew the old process of cicatrization, and it is one of the advantages of this operation that this is rendered unnecessary, and, excepting in so far as the collar may be useful in raising the cervical vertebræ, it may probably be dispensed with. The ordinary process of healing belongs to the part whence the flap has been provided.

Instead of operations by the knife, denounced in Holmes's 'System of Surgery,' gradual extension is there

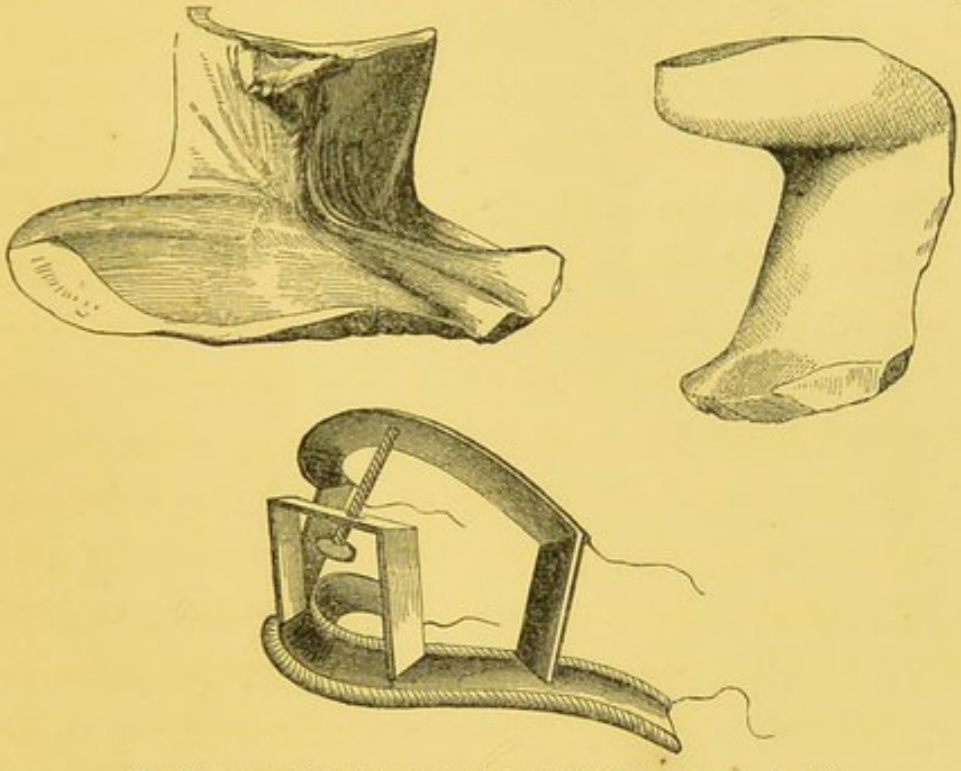
recommended. With respect to this method, I can only say that, as regards the cases in the neck I have above related, I am perfectly satisfied no process of extension would have accomplished what was done by the knife and neck-collar, if, indeed, any advantage could have been obtained by it, for the chin had so completely disappeared that I cannot conceive any suitable *point d'appui* to which I could have applied any extending apparatus; and even if it had succeeded in extending the cicatrix, that would still have formed a web between the chin and the thorax, much deformity still remaining, and the head being prevented from free motion. It also seems probable that a strong extending power had already been applied in vain to these—I mean the power of GROWTH—for most of these occurred in young people, and when the contractile power of the cicatrix had done its utmost there was another force in action, that of growth, which, indeed, was in some cases evinced even by a material deviation from the ordinary form of the bony system, as exemplified in the orbits and cervical vertebræ. These prove the efforts made to overcome the resisting powers of the cicatrix, and must have been *pro tanto* in the nature of extension, for action and reaction are equal. It is unnecessary to cite examples of the power of growth, either morbid or natural. The protrusion of the eyeballs, and the displacement even of bones, by the growth of tumours, are sufficiently known to show what force growth can exert.

(Front.)

"568. Cast of neck of Anne Tinsman, æt. 24, Fowey, Cornwall; operated on July 2, 1842. This cast was taken before the operation. The contraction was extreme and very extensive."

(Profile.)

"569. Cast of the same neck after the operation prior to her leaving the hospital. From the last account she was perfectly well, and no contraction remains (September, 1844). Treated by my collar."—*Notes in the Museum Catalogue.*



The collar, copied from the engraving in 'Med.-Chir. Trans.,' vol. xiii.

Photographed by C. Hart, Artist, Southernhay, 1868.

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