REMARKS

ON

THE GROWTH OF CICATRICES FROM WOUNDS
MADE IN EARLY LIFE, AND THE SUPPOSED
WEARING OUT OF SOME CICATRICES.*

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A GOOD deal of attention has lately been directed to the subject of cicatrices in a medico-legal point of view, chiefly in reference to the kind of wound of which they were the result, and also the possibility of their gradual disappearance in the course of time. I therefore propose to bring under the notice of the Society some facts which have fallen under my observation, in reference to the growth of cicatrices from wounds made in early life, which I am enabled to prove by a series of casts now exhibited to the Society. I also propose to offer a few observations on the supposed wearing out of some cicatrices.

In reference to the first part of our subject, viz., the growth of cicatrices, the four casts now exhibited were taken from the feet of the same child, at an interval of six years and a half, and prove that a cicatrix on each foot had grown during that time fully an inch in length. The child from whom these casts were taken, Master A., aged one year and nine months, was first brought to me on October 19th, 1852. He was the subject of congenital varus of both feet, and the deformity existed in a very marked degree at the time he was brought to me. I was astonished at observing two very long scars, one on each foot, reaching from the front in a curved direction, over the convexity and outer part of the foot, quite to the back, and measuring two inches and a quarter in length. There were also several scars at right angles to the larger ones, evidently from the sutures which had cut their way out. Judge my surprise when I learnt that these were the scars of operations performed only about a year previously to cure the club-foot. As far as I could learn from the family, in explanation of this extraordinary and novel procedure, it appeared that the surgeon who operated commenced the mechanical treatment of the case soon after the birth of the child. At the end of about ten months, however, it seems that very little progress had been made, and then the surgeon performed the operations, the cicatrices of which are shown on the casts.

The operation consisted in cutting away all the loose skin, which could be pinched up between the thumb and finger, on the convexity of the club-foot; and I may remark, that there often appears to be a great excess of skin on the convexity of the foot, in a severe case of varus, and this is rendered more apparent by an effort to bring the foot into its natural position. This probably tempted the surgeon to remove it; and the idea seems to have been to overcome the turning inwards of the foot by the removal of as large a portion of the skin as possible from the outer half and convexity of the foot, trusting to the process of contraction by the cicatrix on the outer side of the foot to overcome the inversion. None of the tendons were divided. I was informed that the wounds healed slowly, and that poultices were required for two months. It is remarkable that such an operation should have been performed instead of tenotomy, and its magnitude may be judged of by the fact, that the scar on each foot measured two inches and a quarter. I cured the deformity in the ordinary way, and the child returned to the country. He was brought up to town again on May 14th, 1859, in consequence of a slight relapse of the deformity, and then I was surprised to observe that the cicatrix on each foot had grown fully an inch in length, but still retained its linear character, *i.e.*, without increasing perceptibly in breadth. Each scar had, therefore, grown one inch in length during the interval of six years and a half. In order to demonstrate this fact, I had models of the feet taken, and they are now exhibited to the Society. They were, at the time, exhibited to the Pathological Society, and are described in vol. xi of the *Transactions* of that society.

The next case to which I would refer is that of a young lady, who, when a baby only a year old, was operated upon by the late Mr. Joseph Henry Green, in the year 1842, for the removal of a rather deep-seated

nævus from the front part of the chest, midway between the clavicle and the nipple. I assisted Mr. Green at the operation, which was performed by excising the nævus; and Mr. Green remarked at the time that only a very small scar would be left, which would not be conspicuous in after-life, and his opinion was, that the cicatrix would be less after excision than after removal by the ligature.

I have no measure of the exact size of the scar left by this operation, but the wound healed favourably, and the cicatrix could not have been more than an inch and a quarter to an inch and a half in length.

When the young lady had completed her growth, at 19 years of age, and had then become stout, with a full development of the breasts, the scar had enormously increased in size, both in length and breadth, measuring three inches in length, and varying in width at different parts from three-fourths of an inch to an inch and a quarter; so that, in eighteen years, this cicatrix had more than doubled its length, and, unlike the cicatrix previously described, had remarkably increased in width. This, no doubt, depended upon the growth of fat and the expansion of the skin in all directions by the development of the breast in this region. I need hardly say, that the disfigurement at the present time is very great, and, from the situation of the scar, as well as from the fact that it is disposed to become conspicuously reddened under the influence of warmth, she is unable to wear a low dress in the evening. I exhibit to the Society a drawing which was taken by tracing the cicatrix on silver paper, when she was 19 years of age.

The rate of growth, as demonstrated by these cases, does not appear to be sufficiently known to surgeons, or considered by them when performing operations on children in exposed portions of the body, the general opinion being, that scars either remain stationary or wear out; but, after deep wounds, or when a portion of skin has been destroyed, the cicatrix appears to be persistent through life, and to grow *pari passu* with the rest of the body, or rather with the portion of the body over which it may be placed.

Although all cicatrices, at the time of their formation, are much less than the wounds from which they result, still, if the wounds should be made in early childhood, the resulting cicatrix will be, at the completion of growth, very much larger than the original wound; but cicatrices of wounds made after the completion of growth maintain through life their same proportions.

Vaccination scars in the adult are frequently seen from one-half to three-quarters of an inch in diameter; and there can be no doubt that this size has been attained by growth of the cicatrix. We may also occasionally see a large bald patch on the scalp of an adult, who has had a small nævus removed from this situation during childhood, and many other illustrations might be given.

Surgically speaking, if the rate of growth of cicatrices be borne in mind, pains should be taken to make the wound as small as possible when operating upon children, especially in exposed parts of the body; and, by various subcutaneous methods, nævi may be generally destroyed without using the knife, and a cicatrix altogether avoided.

With regard to the second question raised in the present paper, viz., the supposed wearing out of some cicatrices, the opinion is entertained by many, that cicatrices do diminish in appearance, fading away, as it were, and sometimes wear out; but I doubt whether such an opinion rests upon any well-ascertained facts or accurate observations.

If there be any scars which do wear out, I believe they are only those which result from superficial cuts, which do not penetrate fairly through the deeper layers of the skin into the subcutaneous fat. In the growth and renewal of the skin proceeding from within outwards, such superficial scars may well be supposed to wear out, as there is no separation or retraction of the deeper layers of the skin; but, when the wound penetrates through the substance of the skin to the subcutaneous fat, even such a small incised wound as that made by the point of the lancet in bleeding, or by the tenotomy-knife in dividing tendons, a gap is at once formed between the divided deeper layers of the skin, which retract in consequence of the elasticity of the skin, a property well known to depend upon the abundance of yellow elastic fibrous tissue everywhere permeating its structure. The gap is at once filled by blood, and sometimes by the protrusion of a granule of fat between the lips of the wound; lymph is afterwards effused, and in this the development of white fibrous tissue proceeds.

The new intermediate connective tissue, or proper cicatrix tissue, essentially consists of interweaving fibres of the white fibrous tissue, as well described in an interesting paper on the structure of cicatrices by the late Mr. Henry Gray, in the *Transactions of the Pathological Society*, vol. ii, page 289. Not only does the cicatrix structure differ from true skin in the absence of the yellow elastic fibrous tissue, but it also differs in the greater thickness of the external cuticular layer, and in the absence of hair and the glandular elements of the true skin.

When the cicatrix-tissue is once formed, it becomes a permanent

* Read before the Medical Society of London.

structure of the body, growing in the same proportion as the part of the body on which it is placed, as well described by Sir James Paget in his *Lectures on Surgical Pathology*, vol. i, page 49, where he observes that "the scar of the child, when once completely formed, commonly grows as the body does, at the same rate and according to the same general rule; so that a scar which the child might have said was as long as his own forefinger, will still be as long as his forefinger when he grows to be a man."

We have no evidence to show that the cicatrix-tissue is ever absorbed, or undergoes any process of wasting, by which the scar could be said to wear out; on the contrary, the rule appears to be, that the cicatrix, once formed, if even not more than a line in width, never wears out, but remains as a permanent tissue, renewing itself by assimilation and growing with the rest of the body.

There are two reasons for this permanency of cicatrix-tissue: 1st, that the tissue is sufficiently well-organised to be able to maintain itself in the general nutrition of the body; 2ndly, that the cicatrix-tissue is so widely different from the structure of the true skin, that it never can become assimilated to it, or resemble it, either in the naked eye or microscopic appearances.

CYANOPUON LARYNGIS: THYROIDITIS WITH BLUE SUPPURATION.

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THREE-and-twenty years ago, a case of mine was published in the *British American Medical and Physical Journal* for September, 1850, of what I then called cyanopuon, or cyanuret of iron in the purulent discharge occurring in chronic disease of the breast. The pus imparted a distinct dark blue colour to the linen and dressings, and afforded much interest at the time. In dwelling upon it, I entered into some speculations as to its origin, and gave a summary of the cases that had been published. That paper has been quoted, and is especially referred to in Mr. Holmes Coote's article, "Abscess," in vol. i of *Holmes's System of Surgery*.

In October, 1870, an instance more remarkable still came under my observation, and is unique in the annals of medicine; so much so, indeed, that it seemed to me desirable to place it upon record at once. Independently of the blue suppuration that was present, the pathological lesion was of great interest from its uncommon character, danger, and subsequent good recovery. The particulars are briefly as follows. A single lady, aged 27, consulted me on the 21st October, 1870, with the following history. She had been delicate about the throat for some years, although the general health had always been good. About six months previously, she had suffered from a severe cold, with aphonia for a few days; this was followed by tenderness and subsequent swelling over the right wing of the thyroid cartilage. The former subsided, but the swelling remained permanent, became rather hard, and was sensitive to the touch. About five weeks before I saw her, the swelling again became painful and increased further in size; she applied poultices to it with some relief, and, although it did not decrease nor subside, it became quite soft.

On presenting herself to me, a decided prominence was observed in the situation described, with distinct fluctuation, and the skin covering and surrounding it was discoloured of a brown and dark blue, as if from ecchymosis, but in reality not so. There was clearly an abscess present, consequent upon inflammation of the wing of the thyroid cartilage in the first instance; and the indication seemed clear enough to evacuate the matter with the lancet, although the propriety of doing so caused me some reflection; yet, if it were allowed to become chronic, the cartilage would be attacked and serious mischief might ensue. In the laryngeal mirror, the integrity of the larynx was seen to be perfect; and the voice was good, whether in speaking or in attempts to utter contralto notes. With a narrow sharp-pointed bistoury, a puncture was made, and a drachm and a half of pus was evacuated, of a dark blue colour, not quite so dark as Prussian blue, but more of an azure tint. The relief was decided, the swelling subsided a good deal, and bread-and-water poultices were prescribed until her next visit. A chemical examination of the pus yielded clear evidences of the existence of iron, by similar tests to those used in my first case. The patient had taken preparations of steel internally some years ago, but not lately; the discoloration of the pus, therefore, was due to some physiological change analogous to that which gives rise sometimes to indigo in the urine.

In the course of two or three days, the swelling of the abscess had greatly gone down, with some discharge of blue pus that stained the linen and dressings. On the 7th day, there was a little oozing only of a thin bluish pus, which tinged the linen of a fainter blue colour. At this time, the parts were a little swollen and indurated; the cartilage, however, did not seem to be involved, and there was no fœtor from the pus. By the twelfth day, the discharge had almost wholly ceased, with no discoloration at all; the general swelling had further subsided; the skin looked more natural, and of a better colour; a little tenderness was present over the abscess, the original seat of which seemed to have been beneath the perichondrium of the thyroid cartilage. On the twenty-fifth day, the opening had closed and all swelling had subsided, yet a little discoloration remained and the merest tenderness. She was considered to be cured. When seen on the subsequent February 1st—fourteen weeks after her first appearance—she was perfectly well and complained of nothing, nor was there anything to be seen beyond the slight cicatrix to mark the site of the abscess. The thyroid cartilage had escaped a great danger; for, although it must have participated to some extent in the inflammation which involved its fibrous covering, yet no subsequent symptom occurred to show that the cartilage itself was injured; and, as upwards of two years have elapsed, we may reasonably infer it has permanently escaped.

It may be observed, however, that suppurative inflammation of the external surface of the thyroid cartilage is extremely rare; and, when to this is added the transformation of the well-known yellow into a distinct blue pus, the case is invested with many points of interest, both in a physiological and pathological sense. Blue stains occasionally occur in the linen dressings, from chemical changes which pus sometimes undergoes, when the matter itself is not blue; and this, I believe, has been the experience of several surgeons, including the late Sir Benjamin Brodie. The actual blue colour of the pus within an abscess, however, is a phenomenon of the highest degree of rarity, although the nature of the pus is perfectly harmless. If iron in any form has been given, we can readily understand its presence as the result of certain well-known chemical changes; but, otherwise, we must look for an explanation in something more subtle and profound, involving a combination of certain elements to produce compounds analogous (as has been already stated) to indigo, which, in its composition, is wholly different from a salt of iron. If physiological chemists were correct in their views, that the source of the indigo-forming substance in the animal economy was or might be due to destruction of some of the proteine compounds, and more especially hæmatosin, then we have an explanation of the colour of blue pus; but, in the present instance, the pigment was due to a salt of iron, and not to indigo. Dr. William Bird Herapath brought an instance before the meeting of the British Association for the Advancement of Science at Bath in 1864, in which pus or the liquor puris was shown to contain blue pigment, and which he believed to be the first instance recorded of that character, whereas I gave a summary of ten cases in 1850. In his case, purulent secretions from the surface of an inflamed leg stained the clothes of a blue colour; whilst in mine the pus of an abscess was blue previously to being evacuated, and had been so for many days before, which is a wholly different thing.

The experiments to determine its nature were these.

1. Liquor potassæ, added to the blue pus, discharged the blue colour, which it does with Prussian blue.
2. The addition of dilute muriatic acid, for the most part, restored the blue colour, which it also does with Prussian blue.
3. Some of the pus was evaporated to dryness and ignited; the calx, acted upon by a solution of ferrocyanide of potassium, gave a distinct alteration of Prussian blue.

I may remark, that these tests are wholly different from those of indigo. Moreover, on boiling some of the blue pus with distilled water, filtering, adding an equal quantity of liquor potassæ, which removed the blue colour, and then, again boiling, a dark brown colour was produced, showing that sugar was present, a phenomenon that I was the first to demonstrate upwards of twenty years ago. Under the microscope, no granules of blue pigment were observed; but the pus-corpuscles seen were those of healthy pus, only coloured of a transparent beautiful blue colour, which was dispelled by adding a drop of liquor potassæ.

In my first paper, published in 1850, the chemistry of the subject was so fully gone into, as well as the consideration of pus of all colours, that it would be a needless repetition to go over the same ground in the present instance. Suffice it to say, that I place upon record a case thus far unique in its combination of thyroiditis running into suppuration, the pus being charged with a salt of iron, giving to it a decided dark blue colour.