

CLINICAL LECTURES

ON THE TREATMENT OF WOUNDS.

DELIVERED AT
THE QUEEN'S HOSPITAL, BIRMINGHAM,
SESSION 1867-68.

By SAMPSON GAMGEE, ESQ.,

Surgeon to the Hospital; Foreign Corresponding Member of the Society of Surgery of Paris; late Staff-Surgeon of the First Class; etc.

LECTURE II.

GENTLEMEN,—That we may enter at once upon the consideration of matters of practical importance, I shall assume that you are acquainted with the physiology of nutrition and repair, while commenting on the four cases which I brought before your notice in the preceding lecture (published in this JOURNAL, Oct. 26th, p. 355)—one of ovariotomy; the second, of simple fracture of the femur; the third, severe compound fracture of the leg; and the fourth, of amputation of the thigh treated after M. Maisonneuve's practice, by the method of pneumatic occlusion. Those cases were as different as it is well possible to conceive; yet they presented one fundamental feature in common, the existence of a wound through or beneath the skin, in the soft parts, or in the bones, or both.

I accept the proposition laid down, with characteristic simplicity of language and force of truth, by John Bell (*Principles of Surgery*, vol. i, p. 41), and endorsed by Sir James Simpson, who quotes it at the commencement of his great work on Acupressure (Edinburgh, 1864), that "in wounds and operations there are but two great points to be attended to: first, the securing the arteries, so that the patient may be in no danger from bleeding; and then the procuring a speedy adhesion, by which the pain, suppuration, waste of substance, and all the other bad consequences of the wound, are prevented."

Let us first inquire into the means taken for the fulfilment of the first indication—the arrest of hæmorrhage—in the three cases in which bleeding occurred. In the compound fracture, after effecting immediate reduction and cleansing the wound by light sponging, its edges were brought together, and held so, by long strips of dry lint, one of which was laid on successively as the previous one became saturated with blood. I then constructed a pasteboard case to fit the limb accurately, compressing its every part gently yet efficiently, and fixing the joint above and below the lesion. I thus secured rest by pressure; and, to facilitate the venous circulation, suspended the limb from an ordinary bed-cradle by three loops of common bandage. The suspension was an aid to the circular apparatus in maintaining close and immovable contact of the divided parts, while it held the limb in the most favourable position. Pressure, rest, and position, are the three greatest therapeutic agencies in arresting hæmorrhage and promoting the healing of wounds; and, in compound fractures, they are generally all-sufficient for the attainment of those ends, with no other means than those employed in the patient brought under your notice. It was otherwise in the case of ovariotomy, where the question of life and death depended on at once securing the artery of the pedicle, to render hæmorrhage impossible; so with the great femoral vessel and its branches in the amputation of the thigh. In the latter case, ligatures were employed; and the subsequent pressure of the pneumatic apparatus was relied on to prevent bleeding from small vessels after reaction. In the ovariotomy, the pedicle was secured in a pair of carpenter's callipers well screwed up, while two little bleeding vessels in the wound were closed by a couple of twists of the forceps, the apposition of the edges contributing most materially to the end, and being frequently sufficient, without torsion, to close such arterial twigs as may be divided along the linea alba.

There can be no doubt that the majority of small and medium sized arteries may be closed most effectually by torsion, avoiding ligatures altogether in a considerable number of cases, and reducing their number in large operations, in which ligature is deemed essential to safety for the arterial trunks. It has been my good fortune to be a pupil of both the great surgeons who have distinguished themselves as advocates of torsion, Amussat and Porta; but I would have you understand that the method is not novel; for Magati, who divides with Ambroise Paré the honour of proving the efficacy of the ligature for the arrest of hæmorrhage, proposes (*De Rarâ Medicatione Vulnerum*. Venetiis: 1616. Lib. i, p. 126), "vel ligatura, vel contorsione", as the alternative for closing divided blood-vessels.

On my second visit, in 1852, to the clinique of the University of Pavia, which has lost none of its titles to surgical fame since Scarpa

established them, I was particularly anxious to ascertain the views of the author of the Monthyon Prize work, on Arterial Torsion (*Delle Alterazioni Patologiche delle Arterie per la Legatura e la Torsione delle Arterie Esperienze ed Operazioni di Luigi Porta*. Milano: 1845). Professor Porta told me that, as a method in practice, he preferred torsion to ligature, and that he had then twisted the femoral artery, after amputation, fourteen times with perfect success, so far as safety from primary and secondary hæmorrhage was concerned. A man happening to be in the wards that morning, whose leg had been previously condemned, the learned Professor afforded me an opportunity of witnessing his practice. He amputated just below the knee, by a circular incision, and twisted four vessels. No bleeding took place. The stump was dressed, and I afterwards heard that the case did very well. No hæmorrhage; little suppuration and constitutional disturbance; rapid cicatrisation. Yet, with so brilliant an example, and convinced that the ligature is some impediment to the healing process, I have never ventured to employ torsion in any but small vessels, and that because I have always found the ligature perfectly and uniformly successful* in arresting hæmorrhage, and have had an uniformly small percentage of deaths from other accidents. In the ten years which have elapsed since I was appointed to this hospital, I have never seen a single case of pyæmia in it—a fact which I attribute to this being one of the very healthiest hospitals in Europe, of the majority of which I speak from personal observation. The ratio of mortality after surgical operations, of which you read in the current text-books, is in no manner or degree a necessary result of surgical practice, but of the defective situation, construction, and organisation of the hospitals in which the authors of those works practised. This thesis received most able development from Sir James Simpson, in his address at the Belfast meeting of the Social Science Association; and I have no doubt that he was then more correct than when he laid an unduly large share of blame to the ligature in his work on Acupressure—a treatise which, like that of Professor Porta on Torsion, may be studied by any surgeon with great profit, altogether apart from the merit of the views respecting the two methods which the authors respectively advocate. Both works are monuments of learning and fountains of suggestive thought.

My reasons for adhering to the ligature are the same as those which actuated Sir James Simpson in preferring the passive iron of Schönbein to silver as a material for sutures. "I have used", writes the Edinburgh Professor, "iron suture-threads in a great number of cases in the operation for vesico-vaginal fistula, and with such almost invariable success in the way of effecting complete primary union, that I have no desire to change." (*Op. cit.*, p. 89.)

While adhering, for similar reasons, to the ligature for the closure of wounded arteries, and not wishing to retract the statement I have made relative to the causes of surgical mortality, I freely admit that the ligature is an evil, and partly accountable for the deaths in unhealthy hospitals, by giving rise to, or acting as a concurrent cause of, discharges which are the active incidental instruments in pyæmia and allied diseases. Any agency which shall prove to be as powerful and safe as the ligature in arresting hæmorrhage, without acting like the ligature as an incentive to suppuration, will unquestionably be a great surgical gain. The claims of torsion and acupressure to that distinction have been urged with the most passionate enthusiasm, the most ingenious argument, and the most abundant eloquence; but at present, I think, the verdict on these claims must be "not proven", though I cheerfully admit proofs are accumulating.

We have hitherto been considering the first point to be attended to in the treatment of a recent wound, "the securing the arteries, so that the patient may be in no danger from bleeding"; and we have now, to repeat John Bell's words, to study the means "for procuring a speedy adhesion, by which the pain, suppuration, waste of substance, and all the other bad consequences of the wound are prevented." Close, continued, and immovable contact between the lips of a wound, is necessary to its union by the first intention—an expression which some writers and teachers have endeavoured to supersede; but which, I think, ought to be retained, for it is very expressive, its signification is generally understood, and it has been a standard expression in surgical language since its origin in the Hunterian epoch. Sutures are the most efficient and generally available aids in keeping the lips of wounds together; and, although some distinguished ovariatomists—notably Mr. Spencer Wells and Dr. Thomas Keith—have reverted to the use of silk, I do not doubt that the metallic sutures possess several advantages, depending on their less tendency to irritation. Of course, union by first intention has

* At the time this lecture was delivered, I had never lost a patient from hæmorrhage under any form. I have since lost one, a weakly woman, from whose axilla I dissected a cancerous tumour. The subscapular artery required ligature at its origin. No bleeding recurred until the fourth night; when, in spite of Dr. Jolly's skill and unremitting care, the patient died after losing a very few ounces of blood.

been obtained times out of number with non-metallic sutures; and no difference was perceivable in the silver and silken stitches which I introduced a week since in the patient in Ward 7, from whose neck I removed a large lipoma. I may remind you that the tumour extended from the cervical spine and occiput, forwards and downwards on to the carotid sheath, and the incision through the integuments was five inches. I put three silver sutures in the upper half, three silken ones in the lower; subsequently exercising pressure by pads of dry lint and bandage. The vast wound united throughout by first intention. It cannot too often be repeated, that the human organism is so constructed as to resist most opposite influences. Men live in health in the arctic and the torrid zones, and recover from constitutional and local diseases under conditions no less various; but, for all that, it is undoubted that recovery is facilitated and accidents averted, in a given percentage of cases, by the predominance of some influences and agents to the exclusion of others. The selection of the material for sutures is not more important than the manner of using them; and, it must at once be admitted that, for the proper employment of metallic sutures, a little more skill and care is required than with silk ones; the latter are, on the whole, easier to pass, secure, and remove. The needles with lateral grooves are very convenient for silver wire; but I do not think those made with a double eye, after the suggestion of Mr. Price, are preferable to the grooved ones with single eye originally suggested, I believe, by Professor Lister. The silver-wire needle cannot be too carefully prepared, so that the wire be drawn smoothly through the eye and into the grooves, without a shoulder or irregularity to catch in the transit through the soft parts. Whether the suture be fixed by a knot or twist—the latter I think most easy and convenient—care must be observed in withdrawing the stitch, that a long piece be not drawn through the flesh; also, that the end, if cut or untwisted, be smoothed by compression between the forceps before withdrawal, to avoid jagging or laceration, which may cause bleeding, and certainly will occasion pain, which should never be inflicted needlessly. It is an useful precaution for an assistant, or the surgeon, with one hand, to hold the parts together while the suture is withdrawn; and, in the event of several stitches having been inserted, only removing alternate ones at first, narrow strips of unirritating plaster stretching over the gap filled by the withdrawn suture; where practicable; in every case, means being adopted to ensure perfect rest and apposition. Sutures should be inserted much closer than is generally the practice; one-third of an inch is not too small an interval on the average, and good hold should always be secured. In ovariectomy, perineoraphy, and amputations, I like the stitches to be alternately deep and superficial; great care being taken to secure the exact contact of the cut edges, so that the line of incision present the appearance of a hair along the integument immediately after re-union. Laxity and freedom from tension of the adjacent parts is essential. In the abdominal wound for ovariectomy, that indication is easy of fulfilment; but it requires special provision in particular cases, as in the division of the palatal muscles for staphylophary, according to Sir William Fergusson's suggestion, and in Dieffenbach's incision in the perinæum after perineoraphy, when, through previous loss of substance, the soft parts are too scanty to come together without some stretching.

The action of sutures in maintaining coaptation, and the process of healing generally, are greatly aided by the application of pressure, which prevents oozing of blood, twitching and retraction of the muscles, and exercises an influence eminently favourable to rest and repair. In no case could this proposition be better illustrated than in the one of compound fracture which I brought before you; and you may take it as a rule in the treatment of compound fracture, that your success will be proportioned to the speed with which you effect reduction, the accuracy with which you close the wound, the thoroughness with which you fix the joint above and below the lesion, and the efficacy with which you compress the limb, previous swelling notwithstanding,* a principle constantly in course of illustration in this clinique with the most satisfactory result. The healing influence of gentle uniform compression is of course something very different to constriction; but it is constantly objected that it is very difficult, if not impossible, to draw the line, how much to compress, and no further, to avoid constriction. This must, of course, be learned by practice, as must all surgical manipulation; and, by practice, I do not mean occasional fitful trials, but incessant endeavour. I know no surgical operation requiring greater aptitude than the applica-

* It is curious how some of the best authorities, old and recent, agree in condemning what is right. Mr. John Bell said (*op. cit.*, p. 492): "I must declare if there be any great and general error in ancient or in modern surgery, it is that of bandaging a broken limb"; and in discussing the treatment of compound fractures in Holmes's *System of Surgery* (vol. i, p. 763), Mr. Hornidge enjoins that "whatever form of apparatus be used, ready access to the wound is indispensable. Accordingly, all circular apparatus, movable or immovable, is to be rejected." The truth is "le résolutif par excellence dans les contusions avec infiltration et gonflement, c'est la compression."—Velpeau, *Leçons Orales de Clinique Chirurgicale*, p. 438. Bruxelles, 1841.

tion of a nicely compressing bandage, which some fail in doing because their untutored fingers are all thumbs, and others because they think so simple a matter as bandaging below their notice; forgetting that the greatest results are often vitally affected by the simplest processes and the most trivial details. I am in the habit of illustrating compression and constriction, the one eminently conducive, the other inimical, to adhesion, by a simile which may be repeated. Assume that you unexpectedly meet an old school chum, and a lady whom you hold in high regard. Shaking hands with the two, you grip the first and press the second—that is painful, this soothing; that, if continued, numbs, this heals. The feeling of gentle, little more than touching, pressure of the lady's hand is the sensation which you must teach yourself to experience—physically, at any rate—in applying a compressing-bandage to promote the healing of wounds, through or beneath the skin.

About dressings. Unquestionably, the simpler they are, the better. It was, a very few years since, all but the universal practice with British surgeons, and it is still a very general custom, to delay the dressing of amputations until four or five hours after the operation. In Mr. Liston's school, in which I had the good fortune to receive my earlier surgical education, the practice of deferred dressings of stumps was looked upon with great favour. I am now satisfied that, care being taken to secure the bleeding vessels, it is best to bring the cut surfaces together at once. I have also discarded water-dressing after recent operations, as acting something like a poultice in encouraging discharge; and I think dry pads of lint, with gently compressing bandage, the best application, not requiring removal for at least three days after the operation. A fashion is just now becoming prevalent, of painting recent wounds with a variety of caustic, astringent, and disinfectant solutions, with a view to promote healing action, and avert the danger of blood-poisoning. With the greatest respect for the advocates of this change in practice, I do not believe it to be a progressive one. Physiological repair, now, as in the days of Hunter, who first demonstrated it, is best secured by coaptation of cut surfaces, perfect rest, exclusion of air, and elimination of all sources of irritation.

In the amputation of the thigh, treated after M. Maisonneuve's method, by pneumatic occlusion, the principles enunciated in this lecture were carried into practice to the fullest extent. The wound was brought together immediately; and the cut surfaces were held together, the air excluded, and the stump compressed by the India-rubber sheath, from which the air was exhausted. Progress was very satisfactory to the close of the fifth day, when, according to Mr. England's notes, the temperature was 99°, pulse 104, respiration 24, tongue moist and furred; but, the next morning, the aspect of affairs had changed; the patient had passed a bad night, vomited frequently, and complained of painful tightness in the stump. During that day, the temperature rose to 102°, the pulse to 120, and respiration to 32; the stump at the same time becoming larger and more tense, though nearly six ounces of treacly fluid was drawn off by the piston, at different times, during the twenty-four hours. Under these conditions, I removed the apparatus. The stump was cool and pale, with only a light red mark, and abrasion of the cuticle at one point, corresponding to the upper constricting edge of the apparatus. The wound was united throughout its entire extent, and there was no accumulation of fluid. None of the ligatures were yet loose. Within twenty-four hours, the temperature had fallen to 100°, the pulse to 104, and respiration to 24; the line of constriction having at the same time disappeared. A fortnight has now elapsed since the operation, and I must confess that the woman's condition is disquieting.* M. Maisonneuve informed me at the Hôtel Dieu this summer, that he had employed the new method of treating stumps, in five amputations of the thigh, three of the leg, and one of the forearm, with as many recoveries. Two of the cases came under my own observation; and I was perfectly satisfied with the stumps, and with the answers of the patients to all my questions. The apparatus employed in my case was purchased from Charrière, the maker of the Hôtel Dieu; but only two of the hoods were in stock; and, though I used the largest, it was rather too small; and I attribute the inflammation of the vein to its excessive constriction. Our instrument-maker, Mr. T. P. Salt, is constructing a graduated series of hoods, nicely adapted for different stumps; and some valuable suggestions by Mr. Montague Gillott are being availed of, to perfect the apparatus. I am averse to novelties, unless good reason be shown for them. I adopted M. Maisonneuve's suggestion, because based on good evidence. As one swallow does not make a summer, neither can a method of treatment be condemned for one unsuccessful case. Happily, the issue of particular cases always furthers the truth, if they be honestly reported, and studied with judicial impartiality.

* Symptoms of phlebitis subsequently developed, and the patient died on the 16th of November. The femoral vein contained pus, and the iliac was obliterated to the cava. The internal organs were quite healthy, without maculæ or congestion.