THESIS

ON

ULCER REPAIR

BY

SPONGE, DERM, AND SKIN GRAFTING

APRIL, 1884.

Mr Case's Thesis

on Sponge Dermis & Skin Grafting to be read by Medal Committee

Prof. + Chiene Read.

" Annandale Read

+" Stewart Read.

+" Rutherford Read.

" Turner forward

to Prof Annandale

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PART I.

Scope and Purport of the Paper.

In the present Paper I propose to consider certain points in connection with the subject of ulceration, and to deal more particularly with the causation and practical treatment of ulcerated surfaces as they are seen among the poorest and most destitute classes in large Cities.

Since the success of any method of treatment must to a great extent depend on an accurate and scientific appreciation of the special conditions involved in the particular case, I have first, before proceeding to the subject of Treatment, thought it right to discuss some of the broader facts in the Pathology of Ulceration, and in the normal process of repair. The formation and structure of granulation tissue have therefore been first briefly considered, as well as the regeneration of epithelium, and of fibrous tissue; and later, the practical bearing of these facts in the various methods of treatment has been more fully discussed.

The plans of grafting and transplantation, which have of late years been introduced with such a marked benefit in the management of ulcerated surfaces, have been fully dealt with in my remarks, and the results of my treatment in a large number of severe cases have been

described at length, and will be found tabulated in the latter portion of my work.

Every circumstance which either directly or indirectly influences the natural process of repair of wounds, must continue in the future to receive increasing attention, for it is only by a careful study of the conditions governing inflammatory new formation and repair, that we can hope to make further addition to our methods of treatment in these cases.

Among the various plans advocated of late, is that of Sponge grafting, introduced by Professor Hamilton of Aberdeen; which by setting up a mild chronic inflammation, and by acting somewhat mechanically, promotes the formation of granulation tissue, has proved of extreme utility in assisting to fill up deeply excavated surfaces.

Again — Portions of skin, transplanted either from the cadaver, or the living person, have been shown to be very valuable in completing the cicatrisation of large wounds, and in acting as centers for the regeneration of epithelium.

These are some points, among others, which I have endeavoured to illustrate and discuss, in the following pages, and together with the full details of my own clinical observations will be found tabulated in the appendix —

For the last four years my professional work in the Whitechapel Infirmary, in London, has brought me constantly in contact with a class of persons who are especially

liable to ulcers, and my attention was very early drawn to the vast number who are admitted into the wards, either directly or account of their sores, or indirectly, with sores in addition to other maladies. Even, without attempting to estimate the amount of suffering and misery induced by Ulcers among the more destitute classes; this subject is one which from a merely social and financial point of view must demand a greater share of attention than it has hitherto received. My experience has repeatedly demonstrated to me that, not only are ulcers a fruitful source of poverty, by incapacitating men from work; but, in addition, the Pauper patients admitted into the Metropolitan Workhouse Infirmaries suffer in a very large proportion from these lesions. An enormous expense is, in consequence entailed on the ratis by ulcers, which are to a very great extent preventable, and hence every addition to our knowledge of the treatment of ulcerated surfaces is of the highest importance. A reference to the following statistics (taken from the published annual reports of the Local Government Board, and from our own books) shows at once the extreme importance of this subject on the Metropolitan district, where my own observations have been made.

"During the entire year 1882 — 4300 fresh pauper patients were admitted into the Whitechapel Union Infirmary. Of these, no less than 279 had to lay by primarily on account of their sores — equal therefore to 6.5 per cent.

Whilst the number of those who had sores in addition

to the diseases which were the cause of their admittance, I have no doubt were a larger number still.

In 1883 - of 3985 pauper patients admitted, we find 290 of them were admitted because of their ulcers: thus giving 7.3 per cent.

In the Metropolitan district there are 28 similar Union Infirmaries, containing - minus Whitechapel and its 689 beds - a total of 14.466 beds. And if Whitechapel with its 689, during the year 1883 received 290 cases of ulcer; at a similar rate for the whole Metropolitan district in 1883 alone, 6.089 patients would have been admitted ostensibly for their ulcers. These at the average cost per head per annum actually quoted for the year 1883, viz £16. 16. 11 - gives the vast sum £102.534 - 5 - 7 the London ratepayers alone have to pay for maintaining, or aiding to heal, ulcerated legs.

These figures sufficiently demonstrate the vast amount of material afforded by our Workhouse Infirmaries for the study of Ulceration - In the present paper I have carefully tabulated 45 cases, and on these I specially studied the influence of the various plans of grafting and transplantation to which I have already referred. The results of my treatment were exceedingly gratifying, and convinced me that the careful management of such cases is always well repaid.

The ulcers considered in this Thesis were all of the class known as "simple healing ulcers", but on admission were all, more or less, in a dirty sloughing state.

The mere superficial aspect of an ulcer, I may here remark, to which so much importance was attached in the older nomenclature is, after all, but an artificial and accidental circumstance, depending on a great variety of accessory conditions present at the time — Hence arose the older classification of ulcers, which attempted to define the condition of the part from its appearance — Such terms as Inflamed, Irritable, Callous, &c — though true as far as they go, are yet of necessity contrary to those true principles on which alone a conceptual, scientific classification can be based. Thus a mere accident was elevated into a primary and fundamental position, and the same ulcer might be classed under two or more divisions at the same time, or in different classes at different times. No light was thrown by such terms on the more important pathological conditions underlying the appearance of the part — For example, an ulcer might be irritable or inflamed from a variety of extraneous and accidental circumstances; such as, too much exercise, dirty dressings, or want of local cleanliness, and yet when placed under suitable conditions, rapidly organised, and regain the natural, healthy character.

Again — Improper, or a too severe plan of treatment might transform one form of ulcer into another.

Ulcers have also been classified according to their cause — Thus we hear of Syphilitic Ulcers, the Varicose ulcer, and the like — Of the former an authority observes "In my own practice for the past seven years at the Central

London Sick Asylum, where I have had over 10.000 patients under my care, I have no hesitation in stating that three fourths of them were more or less the subjects of acquired or hereditary Syphilis" (Dr. Dowse, Vol 1, Syphilis of the Brain, page 12) With this statement I can quite agree —

Yet even if we admit that of the 369 cases with ulcers, admitted into the Whitechapel Infirmary during the years 1882-3, about three fourths were tainted with Syphilis; we are still confronted with the fact that their ulcers were of all kinds, so far as superficial appearance was concerned, being irritable, inflamed, callous &c as the case might be.

It follows therefore that the presence of a constitutional taint is not sufficient to embrace alone, all the numerous varieties of ulcer —

The classification of ulcers by their shape only, seems to me to be equally futile — Mr. Jay states (Lancet 1868, Vol 1. page 461) "There are to be met with on varicose legs, varieties of ulcer that would delight the most aspiring urologist; but their general resemblance to other ulcers on legs without varicosity is so great, that he would, I think, be severely puzzled to supply a test by which to distinguish the ulcer in question, otherwise than that of its co existence with varicosity; and then the question of consequence or coincidence would still be open to doubt."

These considerations lead us to infer that it is impossible to classify ulcers under any one class, dependent on either cause, shape or appearance; hence our aim

should always be, to get the ulcer into a healthy, healing condition, and so allow the natural process of granulation to take place under the most favourable conditions - These desirable results can be best effected, by placing the Patient in bed, Cleansing the sore, and preventing putrefaction.

To these, and other questions, I shall recur at a later period when I am considering the whole subject of Treatment, both local and constitutional.

Why Ulcers occur so frequently just above the ankle.

One notes in the annexed table, that of 45 patients ulcers treated, no less than 36 were on the legs reaching downwards to within half an inch of an imaginary line drawn from Colonnal to internal malleolar points, both anteriorly and posteriorly.

Why is this?

It might be said that they so occur because the blood in the veins of the lower extremity has to run up-hill, and gravitation very much interferes with the return of blood; the valves get broken down, and the pressure is retrograde, if we may so term it, and thus these ulcers are caused - If such was the only cause, we should then expect they would be found rather on the feet and toes, because there is this retrograde pressure and gravitation most increased than just above the ankle.

Also, in animals, we should expect a like condition, viz that where the blood pressure is greatest in the dependent parts, the legs; there should ulcerated sores most frequently occur.

But how rarely is this seen? , and I am informed by the

attendant of the Giraffes, Zebras, Elephants &c in the London Zoological Gardens that dermic sores or these animals, except from violence, are extremely rare. Though one giraffe appears to give about 2 seven feet of fore leg, the opportunity of ulcerating - No!

The reasons seem to be rather -

1st That the leg and shin are mostly exposed to violence in the working classes.

2nd Blood pressure is certainly greater in the dependent parts, than in others less so.

3rd Anatomically - In the region of the ankle joint the superficial veins communicate freely with each other, and with the deep veins of the leg - A similar condition obtains at, and for some little distance below, the knee joint - But at the lower third of the leg, the sites principally of these ulcers, we find a very considerable diminution of this free anastamosis.

The first two inches above the ankle joint is where the greatest stress is laid upon these superficial veins; below that point they freely communicate; and if the blood cannot return by the superficial veins, it can do so by the deep veins, or vice versa.

Hence should the skin, or other tissues, in this unfortunate position be subject to injury, theses tissues have not that free anastomotic supply of blood required to remove and reorganise the injured parts, and an ulcer follows.

Again - In this same region of the ankle joint, the subcutaneous fascia is extremely thick and strong. Similarly it extends below, enveloping the foot, being especially thick and strong on its plantar aspect; it also extends above the ankle joint

forming the Anatomists very strong, Annular ligament: but above this region, the special site of these ulcers, this fascia gets thinner, and therefore less strong.

Again - There is the strong, hard, resisting Tibia, in this same region, between which and the force causing the injury, the soft-yielding skin gets crushed; when such occurs. (and of the 45 cases tabulated 32. were so caused). The injury to the skin therefore is very considerably more than would have been, had the same force been applied, but the tissues behind been soft, non resisting, and disseminating the force applied.

PART. II.

Healing of Simple Ulceration.

Sir James Paget, in his Lectures, edited by Professor Turner, - page 311 remarks - " The ulcerative process cannot take place in healthy tissue; previous degeneration of the tissue, and that such as occurs in the inflammatory process, is a condition essential to it".

The converse is required for the "Healing of Simple Ulceration" - Repair cannot take place in unhealthy tissue - And when any lesion is produced by injury, as in 32 of my recorded 145 cases; the injured parts must either be cast off as pus, or repaired by the processes of Nature -

I am convinced of the accuracy of the dictum " That healing is a process of Nature"; or, Professor Jno Chiene's Lectures on the First Principles of Surgery" page 38 - " Suppose in the case of any wound, you have at length succeeded in putting a stop to the bleeding; you have sewed together the edges of the wound; - you have put on the dressing. What can you now do? Nothing. The remainder is a process of nature - (Italics are mine) - and you can only here and there assist that process in the direction of healing".

To assist Nature, the plan I adopt on receiving a patient with an Ulcer is, to place him in bed, and

elevate the bottom legs of his bed by blocks of wood 9 inches high. — This gives complete rest to the patient and his sore, and reduces to a great extent the pressure of the blood in his legs. Poultices, either simple linseed, or medicated are applied; and one quickly finds the various conditions of Ulcers, Inflamed, Irritable or Callous, reduced by Nature to a healing sore. Then "we fix on the dressing". — If the patient be very Syphilitic, Black Wash or Iodoform Ointment is useful. Children, and the Young, if constitutionally fairly healthy, progress on the most innocent lotions. Old persons seem to do best with strong, perhaps stimulating applications. But for middle aged patients, and hence, most general use, I would like to draw attention to Sanitas Oil, and its preparations, made by the Sanitas Company, Bethnal Green, London: by passing steam through Turpentine at a high temperature, and thus producing this Oil — It is a good antiseptic, rather weaker than Carbolic Acid, non absorbable like that drug; and as a lotion 1 in 40, as also Sanitas Lunge (like Carbolic Lunge) I find most useful as a non irritating, safe, antiseptic dressing, and use them chiefly.

Dressings, the size of the granulating sore only, are applied, Oiled Calico, and an Elastic bandage to cover all.

Gutta Percha tissue, and Martin's India Rubber bandage I have found very irritating to most Patients,

producing dermatitis, and small pustules in the breast-ducts, so now I use instead, the white Cotton Elastic bandage, in the shape of a ribbon, three inches wide -

When the sore is healthy, with small granulations, and slight pustular discharge - I graft.

Normal repair of Ulcer's surface — with Pathology.

One frequently notes as in Case 15 recorded:- Post-Mortem we find not only skin and subcutaneous fascia ulcerated, but tissues of all kinds - There were involved bone, Periosteum, Nerves, Artery, Vein, Capillary, Fascia, and skin, all necrosed.

As soon then, as the morbid tissues are removed, either by pus formation, or by morganisation; so soon does nature set about repair; though more actively in some than in others.

And repair seems only to proceed by "like producing its like", connective tissue produces connective tissue; Blood vessels produce Blood vessels; and skin only skin.

My paper proposes treating only "Healing by Second Intention" of John Hunter; or, By granulation and grafting, avoiding rather all other kinds, as By Immediate Union, Primary Adhesion or First Intention, Cicatrisation, Scabbing, &c &c.

No tissues of the body are produced de novo - Supposing we have an ideal sore or ulcer, healing by granulation: a cure ensues by granulations being produced on the abraided surface: by means of blood clot or sponge, these granulations

may be led up to nearly or quite fill any reasonable vacuity caused by previous sloughing of tissue. The superimposed epidermis is only produced normally by a growing in from the margin, or a growing of some of the papillary layer of the skin that may have escaped the previous entire ulceration, and now under favourable circumstances regains activity, and grows up in the wound: or artificially, skin as grafts may be placed on the granulations, which, adhering to these granulations and growing, stretch out to meet the invading margins.

The greatest difficulty I find, is this production, or regeneration of epithelium to cover in the granulations.

Granulation structure – briefly –

Granulations generally, are produced by the force imparted to the blood acting in the capillaries devoid of restraint. When the skin is whole, and acting as a restricting covering to the tissues; or internally, where there is some other restricting medium prevents their formation, as in subcutaneous wounds, there are no granulations formed; but remove the skin, or make the lesion internally where there is no restraining opposing force, and there we see granulations formed. These views, advocated first, I believe, by Professor Hamilton in the Edinburgh Medical Journal for November 1881. as being a normal process of nature, are contrary to the generally taught, and generally received opinions – viz That granulations are an abnormal process of nature – An inflammatory

new formation, which as Dr. Coates expresses it in his Manual of Pathology, page 90. " It is to be observed in the first place, that in order to the production of granulations, the inflammation must be of some duration. If a ~~wound~~ wound close within the first few days, no granulations are formed."

Minute Structure. Each granulation is composed of a capillary loop springing from a vessel, and either returning to that vessel, or to a vein. The convexity of the loop, when complete, is always in the same direction as the blood entering that loop, indicating, it seems, that the blood pressure in its interior is the cause of this uniformity of direction of the loop, and also because the blood pressure is unrestrained by the enveloping skin. Their calibre is generally considered to be wider where they arch round, than where they are given off from their adjacent vessel. Around the capillary loops large numbers of leucocytes are to be seen, always lying in a delicate mesh work of fibrous tissue. These leucocytes come into this fibrous tissue by passing through the walls of the capillaries (this has been noted by many observers) when in a state of inflammation, or irritation; then the capillary walls are distended and stained by the internal blood pressure, and hence the leucocytes more easily pass through. The fluid part of the blood also exudes from the same cause, and goes to help to form the Liquor puris- whilst the leucocytes appear as pus cells.

Formation of Fibrous Tissue -

That the result of the granulations is a fibrous tissue which fills in, and unites the ulcerated surfaces, most observers agree; but in how this is brought about, they differ.

Cohnheim believes it due to transformation and multiplication of the afore mentioned leucocytes.

Professor Hamilton contradicts this, and following somewhat the lead of Virchow, believes in the connective tissue corpuscle as the origin — Whilst Klein very much agrees, but terms them "Placoid Cells", Each having a nucleus and nucleoli. That these connective tissue corpuscles after any irritation (as after the knife is used), or when repair is progressing, enlarge, have their nuclei elongated, divide, and proliferate with great rapidity, produces new cells which displace all adjacent tissues or lymph, cause their disintegration, and substitute for them connective tissue corpuscles. These elongate, unite to and form the resulting reparative fibrous tissue.

Dr Hamilton states (Opus cit) that no one has ever seen leucocytes being transformed into Connective tissue corpuscles, and that they never are; but they either are cast off in the secretion as pus cells, or, are sometimes reabsorbed into the circulation.

Regeneration of Epithelium.

Is, perhaps, the greatest difficulty the Surgeon has to encounter in the treatment of Ulcers and Wounds —

Connective tissue never forms true epithelium, such has never been authentically recorded; (that I know,) though we see generally in Nature the tendency of an organ or tissue to adapt itself to any extraordinary position or requirement cast upon it; as for example — In many diseases when the kidney has diminished secretory power, or may have been removed, we find the other kidney, perhaps, and the skin, assuming the required increase to maintain the conditions required for health. So in the scar formed by connective tissue corpuscles, its surface will become somewhat squamous like epidermis, but never forms true epidermis — In fact, in Embryonic life, — Epidermis is formed from the Epiblast; — but Connective tissue corpuscles from the Mesoblast, and it is improbable that in adult life these distinctive characters should be otherwise.

When a wound is healing and about to be covered in with epithelium — It may be noted that the upper part of the connective tissue layer assumes a spindle shaped and contracting aspect, exactly corresponding to that seen on each side of a wound healing by first intention — (Such may be seen in the slides sent from the ulcer of Case 15.) That these spindle shaped cells contracting, naturally contract on the capillary loops in the granulations, and cut them off from the circulation, and this causes an atrophy of the granulations.

Then the epidermic cells run around first, and then over the atrophied granulations, adhering at the same time to the substrata of spindle shaped fibrous tissue, and thus the cure is brought about.

It may, I think, always be noted that before any granulations fall before the invading Epidermis, they atrophy, and cease to discharge pus, and the foregoing explains why — A wound with large, flabby, discharging granulations will not heal: neither will a skin graft become attached to such a surface.

The Epidermis, according to the observations of Eberth, Klebs and others (Virchow's Archiv 67) is regenerated by cell division — After the manner clearly established by Virchow and Remak — Viz — First, there is a division of the nucleus of a cell, then of the nucleolus, followed by division of the cell itself, and Klebs asserts that these newly formed epithelium cells are possessed of amœboid movement, and can proceed to the spot they have to occupy — That they must possess this power of proliferation very actively must be admitted when one notes ulcers and healthy wounds sometimes becoming covered with epidermis at the rate of 1/2 inch to 1 inch in 24 hours, on all sides of its circumference.

When the marginal skin, or from a healthy growing graft, repair is proceeding, the granulations will be small, discharging very little, and about the same level as the skin, and usually of a healthy, beef steak colour — whilst the edges of epidermis are the same colour as the skin externally, blending through purple to bluish white, as we go inwards, ending in the dry, red band of new formed epidermic tissue that is invading upon the granulations —

During the process of healing by granulation, when the epidermis is covering, or has quite covered the sore, it throws

off its top, scaly, surface just produced; its place being taken by new and more highly developed skin — I have found after an ulcer has just healed over, the covering is very thin indeed, and if the patient subjects the new cicatrix to severe strain, it will often give way; therefore we keep him in bed for a week or so after complete cicatrisation, when several crops of new epidermic scales are usually cast off, and then the existing cicatrix is stronger, tougher, and more likely permanently to remain.

PART III.

Treatment of Ulcers by Sponge, Derm and Skin Grafting.

History. To John Hunter must be awarded the merit of first showing that nature allowed one part of a living body to be cut off its natural position and grafted on to another part; when he demonstrated that a Cock's Spur grafted on to its comb, grew, and with the increased supply of blood, to a great magnitude — There are two of these specimens in the museum of the Royal College of Surgeons of London — number 524 of the Catalogue grew in a spiral fashion till six inches long.

Tagliacozzi 300 years ago published his great work on plastic operations, giving the pedicle to the removal of skin, as a "sine qua-non", to be severed only after complete union had taken place. This operation has been employed more or less, since his time.

But to M. Reverdin of Paris is due the honour of introducing well to notice, in October 1869, that the pedicle was not essential to skin transplantation, but may be done without: He arranged little bits about the size of a pin's head, mosaic fashion on the ulcer, and they were engrafted, and grew. see Bull de la Soc de Chir — November 27th 1871.

Mr Pollock of St George's Hospital was the first to introduce Skin grafting into this country, and he published

his cases in the "Report of the Medico Chirurgical Society 1870.

In 1870, and since, Scotch Surgeons investigated this subject, taking the skin from living patients. Dr. Page of Edinburgh in December 1870 wrote on skin grafting, and again in the British Medical Journal for 27th May 1871.

Dr. David Fiddes of Aberdeen gave Cases in the Lancet of December 1870. advocating the use of scrapings of Epidermic scales only, which he states grew like ordinary skin grafting.

Dr. J. H. B Macleod and others contributed to the literature of the subject about that time.

That the new skin is formed by the growth of the graft is proven by the fact, that when black skin is engrafted on a sore in a white man, as recorded by Mr. Bryant, the newly formed skin is of the colour of the graft to the extent due to the action of the graft. Mr. Holmes has reversed the experiment, placing some skin from a white man on to a Negro, and it retained its original colour.

In Case 13 recorded — Dark patches distinctly appeared in a sore healing rapidly, where 3 years previously grafts from a Negro had been placed by the Surgeons of University Hospital — I sponge grafted this sore, and it healed, showing after this latter process a slight discolouration.

In March 1875 (British Medical Journal 7th October, 1882) Dr. C. B. Taylor reports excising skin from a lady's upper lid for ptosis, he took too much, that the patient "was hardly able to close the eye, and during sleep it must remain

partially open"; so he replaced the excised portion to its former site and it healed by first intention;" and the shrinkage which followed sufficed to cure the original defect". Dr Wolfe of Glasgow, Dr Macnaughton Jones, and many others have also written on grafting skin from the living subject.

The most extraordinary result of grafting that I have noted, may be seen (in Archiv f Klin Chirurgie B XXVIII. page 562) where Helferich in removing a fibro sarcoma from the arm of a woman aged 36, took away the whole upper half of the biceps, with the exception of a thin strand at its outer part. Into the cavity which was left, he promptly introduced a large fragment of the biceps from the leg of a dog. The cut surfaces were carefully brought together with sutures, as little injury as possible being done to the parts.

The transplanted muscle was much more voluminous than the original portion, and was long after the operation distinctly perceptible to the touch. Electric currents experimentally used about three months after the operation showed the biceps reacted perfectly naturally to both kinds of current. The movements at the elbow joint were almost normal.

The literature on the subject of grafting is very sparse, I know of no book published on this subject. A pamphlet has been written by Mr J. Wodman of Exeter.

Mode of Procedure.

When the granulating sore has a perfectly healthy aspect, No inflammatory redness surrounds it. The margins of skin whitish externally, passing through pale purple to pink-most internally, and invading upon the granulations. The granulations should be small, not-discharging much, and of a bright scarlet colour.

Then I gently scratch these granulations until they bleed slightly at several parts of the sore, and place upon these bleeding spots the Sponge prepared as recommended by Professor Hamilton (Edinburgh Medical Journal, November 1881.) and cut as thin as possible - It is bitter first-washed in a tepid solution of Carbolic acid, 1 to 40; or Sanitas Lotion. before applying, to render it of the body temperature.

If there is a small granulating surface, it may be all covered thus with Sponge; but, if more than a surface 2 inches square, then I partially cover it with Sponge: and a very large sore would require proportionately less sponge, because of its tendency to retain secretions from the wound, which if they become a little septic on a small surface will be harmless, generally, to the patient, and it may be more thoroughly cleansed by the Surgeon, but-a large surface of Sponge cannot-be so easily deprived of its retained pus, and is very liable to set-up septic inflammation. Oiled silk is placed next-the Sponge to prevent friction, and displacement-of the graft; it is also least-irritating to the skin. Then dry

plies of Sanitas gauze, soaked in a Sanitas lotion 1 in 20, oiled calico, and finally the web elastic bandage carefully applied.

The dressings should not be removed till the second day, and then it will be found that the blood oozing has formed an uniting medium, which has gone some way towards organisation, and leading the capillaries into the Sponge.

If the sponge is placed upon or near the Epidermic margin it will not adhere nor grow (contrary to derm or skin), but acts as a foreign body, and the margin will soon be found to have run under it and displaced the Sponge. But if the sponge be upon and surrounded by granulations in a healthy wound it will become organised.

In the 13 cases in which I have tried it, I have never known it not to have undergone tissue digestion.

Derm and Skin grafting require a similar wound, preferably scratched till a little blood is produced. The presence of a small blood clot surrounding each graft seems a decided advantage over not doing so. This is seen in many of my cases. The graft should include the Epidermis and Malpighian layer, but very little of the Corium; it being composed of fibro cellular tissue has a different effect very often. The papillary layer of the cutis is the essential. The Epidermis in most cases when attached to the graft, sloughs away.

The size I find most satisfactory for each graft is 3/16 of an inch long by 1/8 wide. If smaller, and their

Table III.

Skin.	4.	with clot.	61. grafts placed	46 grafts grew.	
Derm.	12.	" "	167.		
Skin.	3.	without clot.	14 " "	8 "	"
Derm.	3.	" "	34 " "	12 "	"

upper surface should slough, as it frequently does, there is little to denote their location till they are sufficiently vitalized to grow themselves and become apparent. Larger and apt to slough considerably, and not get coherent to the granulations quick enough to wholly grow.

Contrary to what obtains in Sponge grafting, Derm and Skin seem to do better, when attached near the invading margin of Epidermis, they seem to become very soon incorporated by the invading Epidermis, and to be more quickly possessed of vitality and to grow, before those placed on the same wound away from the margins; and they seem therefore at the margins to lose less of their substance before taking on active growth.

The dressings and after treatment of Derm and Skin correspond with that of Sponge before mentioned.

The presence of blood clot seems to me a very decided advantage in grafting, over its absence, though this is denied by some writers. Of all the cases recorded in Table I, four (viz Cases 5. 10, 36 and 37.) had 61 grafts applied from skin of the possessor of the sore, and placed in blood clot, and of these, 46 grew well, equal therefore to 75 per cent. Whilst I did three cases of skin grafting as similar as possible, (viz Cases 38. 39 and 40) where 14 grafts were placed on the granulations without any blood clot, and of these only 8 grew - equal therefore to 57 per cent, as against 75 per cent with the clot.

Derm grafts are not fairly comparable

because the conditions of the derm were non comparable — And all my 13 Sponge grafts were placed in slight haemorrhage.

Blood clot acts mechanically, it forms a coagulum around the graft when first placed on the granulations, keeping it there in the one site, which is very necessary for its vital attachment. Without this cementing coagulum I have found the graft shifted after 48 hours had elapsed, but rarely so with the clot. The Liquor Sanguinis softens the graft, permeates its interstices, opens them, and thereby gives greater space and facilities for the capillaries entering them from below.

Again — The clot, like Sponge, is vascular, though more finely porous than any Sponge — Into this clot, in from 12 to 24 hours, if kept aseptic, capillaries may be seen to have entered, and in 48 hours, there is often a distinct rosy tint given to the clot, and it has been demonstrated by Professor Hamilton, that Sponge becomes organised by the entrance into it of capillaries, and connective tissue corpuscles — The same may be seen in Slides No 4. 5. and 6 — Rent, which is a derm graft rapidly organising after four days adhesion, when it had a well marked bud like aspect, whitest at the tops, but a fine pinkish hue around its edges.

Sponge Grafting.

The Profession is indebted to Professor Hamilton of Aberdeen for introducing Sponge grafting as a means of

repair for stubborn sores, or sores with loss of tissue. He showed that it became vascular by leading up granulations, and afterwards was absorbed or transformed into fibrous tissue.

Such a demonstration had been anticipated; Professor Lister had previously shown that aseptic putty placed in contact with granulations, itself became vascular, and bled when scratched. Later – Cat-gut was used for stitches, and Professor Lister showed that it became organised in the tissues, or was absorbed, and did not act entirely as a foreign body. This led to the use of Calf-gut filaments as an organisable, capillary means of drainage, advocated by Professor John Chiene; afterwards calf-gut was employed as a drainage tube, to be organised from within outwards, synchronous with the healing of the wound from within outwards.

But Dr. Hamilton leads one to expect, that as soon as the sponge becomes organised, so soon does epithelium follow and cover the sore – page 388 of the Edinburgh Medical Journal, November 1881, we find – "As soon as it (the sponge) became vascular and filled with new tissue, the epithelium spreads over it. There did not seem to be any difficulty in getting the epithelium to spread over it, when the underlying surface was of a proper nature, that is, whenever it became filled with young and vascular connective tissue elements".

I am sorry to state that my experience does not directly give any epidermis as a result of sponge grafting.

As in most ordinary superficial ulceration, it is not exuberant granulations that are required for its cure: indeed, generally we find the granulations too abundant, too elevated, indicated by the common phrase — "proud flesh", and these require for its healing, to be diminished by the action of astringents or caustics, and the cure induced rather by proliferation of epithelium either inwards from the margins, or as separate independent centers on the granulations: such may be obtained by Derm or Skin grafting, but never, I experience, from Sponge grafting alone. Though Sponge graft may be very useful where there is great loss of substance and deep excavations, requiring tissue acceleration before epithelium can complete the repair.

Sponge then, like blood clot, seems to act mechanically, and does not like derm or skin, beyond proliferating epidermis

Sponge then causes tissue repair by —

1st Sponge is useful in filling up an excavation, and in bringing granulations to the level of the margin of the ulcer, so as to allow the epithelium of the edge to grow inwards over the surface.

2nd Sponge has no power to promote reformation of epithelium it merely excites the formation of granulation tissue, by acting partially as a foreign body and thus setting up mild chronic inflammation.

3rd Grafts of skin and derm act as centers for the proliferation of epithelial cells, and are very useful after the healthy granulation tissue is at a level with the edges.

4th Grafts of skin or derm by forming separate centers

Sponge Graftings.

Table IIII.

Case	Time of Sponge transformation	Remarks.
9.	22 days	Sponge came away in great part
11.	36. "	Do. Do.
12.	19. "	
13.	19 "	Died the 12th day, all removed
14.	——	Do. Do.
18.	27 "	
20.	28 "	No bad symptom
24.	39 "	Do.
25	35 "	Do.
30.	22. "	
32.	17. "	Part removed the 8th day going wrong.
36.	30 "	No bad symptom.
15.	26 "	One third removed. pyrexia followed

12 / 319

26.58

for the reformation of epithelium, cause the ulcerated surface to become covered in by new epithelium much more rapidly, than if the epithelial regeneration were only allowed to take place from the margins of the sore.

3rd. Grafts of skin or derm are important adjuvants to preliminary sponge grafting when the ulcerated surface is very large.

The one great necessity in healing by Sponge grafting is to very carefully maintain its asepticity; and this can only be done, when the sponge surface is considerable, by very careful and complete irrigation with antiseptic lotions, and expressing from the sponge tissue all retained pus.

Of the 13 patients I grafted with Sponge, Numbers 13. 14. 15 and 30 suffered from septic absorption, and required the removal of the Sponge with antiseptic treatment. In 2 others - No's 9 and 11, the Sponge came away in great part, thus preventing the liability to septic absorption, and the other 9 required to have the grafts pared occasionally as they exhibited tendencies to go wrong, by turning dark or black coloured, and smelling unpleasantly. If the grafts were thin, this was rarely seen; if thick, was rarely absent.

As may be seen in Table Number IIII. the average time taken for complete transformation of all sponge tissue, so as to be non discernable was 26.58 days.

The longest time was in Case 24, where a man aged 46, with an ulcer of 12 years origin took 39 days

for complete tissue digestion. The shortest, Number 32 - A man aged 43 took only 17 days - this case was only of 3 years standing, and healed more readily.

Of course, the thicker the sponge, the longer is required for organisation, other things being equal. The slices I applied varied from 1/8 to 3/8 of an inch, in thickness; and this seems to me about the best-workable size.

Derm Grafting.

This term, as used by me, meaning skin removed from a freshly amputated limb, or from a cadaver, is new - I was not aware the experiment of grafting skin from the dead on to the living had been tried, before my first attempt 11th September 1882 - Case 16. But subsequent investigations seem to prove that the Americans calculated this subject prior to myself.

In 1870. Mr Cumberbatch succeeded in transplanting skin grafts taken from a leg 4 hours after amputation.

In 1870. M. Marcellee proposed to substitute Epidermic scales for true skin.

In 1871. (St Louis Medical and Surgical Journal, Volume VIII - July) Dr Hodgen transplanted dry Epidermic

Table V.

Derm Grafting.

Case	Source	numbered	Grafts placed	Grew	Time removed.
16.	Cadaver	1.	20.	4	16 days
21.	do.	1.	23.	6.	2. "
22.	Amputated Leg	2.	6.	0.	12. "
23.	do.	2.	6.	3.	30. days
25.	Cadaver	3.	24.	6.	Same day
27.	Amputated Leg.	2.	12.	3.	95. "
28.	Cadaver	3.	13.	0.	16 "
29.	do.	3.	13.	0.	18. "
31.	do.	4.	5.	0.	Same day
33	do.	4.	11.	2 q.	do.
34	do.	4.	14.	0.	34 days
35.	do.	5.	20.	2.	Same day.
42.	Amputated Leg	6.	14.	4.	do.
44.	do.	6.	6.	4.	do.
45	do.	6.	14.	0.	2 days
			201.	32.	

scales from the thick cuticle of the foot, and he also used flakes of detached epidermis, and they are reported to have grown.

In 1881 – Dr. Biebach of St. Louis' Hospital, and Dr. E. Studer, grafted epidermis peeled from any part of the body, as well as cut skin grafts, successfully.

Epidermic scales and scrapings have been tried in Scotland with varying success. Dr. Fiddes first tried epidermic scales simply, and similar results to the grafting of skin followed. Dr. G. H. B. Macleod repeated the experiments with opposite results. The late Dr. R. C. Williamson in his Edinburgh graduation thesis, reports of skin being taken from a pig at Wakefield and grafted on a man. He did not report that it grew.

My own efforts, as may be seen on Table V. comprise 15 cases; where, we find, 201 grafts were placed on these 15 ulcers, and of them only 32 grew on 8 patients. Of the remaining 7 patients on whom 76 grafts were applied, all went wrong, sloughed away; but in so doing not one of my patients suffered any constitutional disturbance – True, the discharge was profuse in these cases, sometimes turning the oiled silk dark, and in one instance – Number 25, the discharge was offensive, but only in one.

The reason for this sloughing of the grafts seems to be, principally the length of time which had elapsed either before the derm was removed from the body; or the length of time elapsing before it was put on the wound.

It seems interesting to note the influence occasioned

by the length of time elaping between the decease of the owner of the skin and its application to the sore of a second person, as affecting the growth of these grafts.

It is very interesting as affecting the question, whether when life ceases in a person, if all the atoms and component elements of that individual be also dead ?. Also, does death always commence in one organ, or series of organs in a living being, and proceed invariably the same course till physiological death or decomposition ensue, and violate the conditions required for cell life ? and if so, Can we, by any known means of arresting decomposition and physiological death by antiseptics or otherwise, so preserve tissues, seed like, that they may retain their inherent vitality for a greater or lesser period, requiring only the conditions of suitable surroundings for their development and growth ?

My experiments indicate that we may so preserve these tissues — Case 24 - where of 12 grafts taken 95 days previously by Mr Jonathan Hutchinson, and kept by me at a low temperature in a 1 to 20 Carbolic and Glycerine Solution — 3 grafts grew faintly - They appeared as separate specks on the sore and pus, and in these sites the skin was thicker than where they were not.

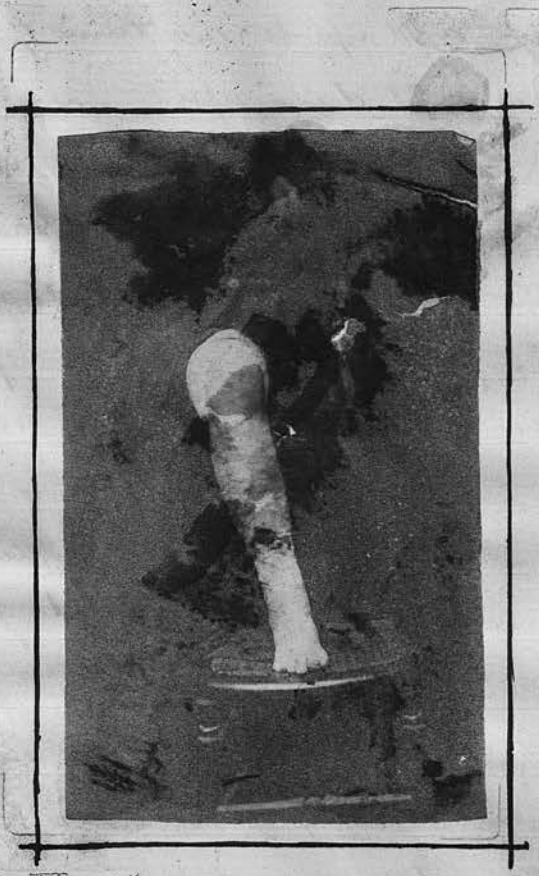
Case 23 — where six grafts from the same

source were applied; three grew and formed islands on the granulations, though the derm was removed from the boy's leg for 30 days.

Case 16— to less certain — After the derm was 16 days removed; I placed 20 grafts on an ulcer, and up to the time of my departing for America, 21 days after, 4 grafts were discernable as thick cuticle and growing.

Cases 21 and 45. Had the derm applied the second day after its removal — On the former 23 grafts were applied; 6 grew and formed a rapid cure. Whilst of 14 grafts applied to case 45 — all sloughed, because they were kept in a solution of Permanganate of Potash, which formed a covering over them. I found it impossible to entirely remove this stain without great irritation, hence they were in some instances applied with this partial covering of Black Manganic oxide; therefore, as the granulations were intercepted in coming against the graft surface, it could not well be expected to grow.

Cases 25. 31. 33. 35. 42 and 44 — six in all, had the derm applied to Ulcers the same day that it was removed from the subject. They total 80 grafts, of which only 16 grew. Of these 16 — four each grew on Cases 42. & 44. The derm was carefully removed directly after the limb was amputated, it was placed in Milk,



Alfred Vaughan – aged 42 – Admitted 8.12.83.

Ulcer then nearly round the leg, and 5 inches up.

Grafted with Derm. 29.1.84

Photographed 14.2.84.

and about five hours afterwards was placed on healthy healing sores, and they grew wondrously; (as indicated by the photographs taken afterwards) making bridges of new cuticle across the sore, and continued to grow for a considerable time: one bridge of new epidermis increased to 3/4 inch wide; then repair seemed to lag, and applications did not seem to stimulate, therefore I again grafted, this sore will skin, with the best result.

Case 42 very quickly healed and strongly.

Cases 25 and 35, had respectively 6 and 2 grafts grow. 18 in each case sloughed away, therefore there was very great discharge, which would act injuriously on the growing grafts. In both a relapse occurred, and the ulcer became a great size. The reason why! is not satisfactory. Very often my patients do not wish their sores healed, and therefore injure them. Case 25 did this. Case 35 is suspected similarly, because once since a similar result has followed when his sore was nearly well.

In Case 31. the grafting was done on a surface previously subjected to Sponge grafting: the germ would not grow; and in Cases 25. and 35, where from 444 grafts 8 did satisfactorily, the resulting cicatrix was possessed of such low vitality that it all broke down leaving the sore as bad as ever.

Invariably where the grafts did not satisfactorily grow and produce proliferating epithelium, there it resulted in a lower form of product; viz, a thin film appeared binding

down the granulations, keeping them small and healthy, hence they invariably the more rapidly healed by marginal invasion, but the film itself did not appear to produce true epidermis.

Midway between the Unsuccessful and the Successful, stands the negative evidence." That no harm was in any case done to any patient". Though on these 15 patients 149 skin grafts underwent disintegration or, their exposed, and very often, bleeding granulations: and though oftentimes the grafts were a long while removed from the Cadaver, still not one bad symptom in any patient appeared to ensue therefrom.

The only difference was — The discharge of pus from the sore was greatly increased, but daily dressing the wound with antiseptic lotions, in every case, was all sufficient.

Again — In no case did any patient object to its application — rather the reverse — nearly all were anxious to be selected for its application — whilst many patients would not submit to skin grafting, and discharged themselves rather than, as they termed it, "Have their bodies mutilated".

The Successful Cases were 8 out of 15. — The need of success varied from 2/3 growing as in Case 44; to 9/10, where only 2 out of 20 applied grew. Case 35.

During the process of revitalisation of the grafts of dermis applied, invariably whether in Blood Clot or not, the epidermis would slough all away, in from 1 to 3 days. The graft then became permeated with capillaries pushed into it from below, thereupon it assumed the appearance very much of a

little bud of granulations, and often was non discernable for a time from them; so I found difficulty in giving the complete credit due to this method, because I would only tabulate those grafts visibly and undoubtedly growing, island like, in the granulations where none existed previous to the grafting; and very often, by the time the grafts whose epidermis had sloughed, had again renewed their epidermis, the marginal skin had invaded the sore, combined with the epidermis of the new graft, and so was pronounced and recorded by me.

The mode of growth of each Derm graft is identical with that termed "Skin Grafting", and when taken from the skin of the possessor of the ulcer.

In these 8 successful patients of the total 15, great benefits ensued - viz

Their sores were rapidly healed.

No pain was occasioned thereby, and no risk to life.

No mutilation of their persons was needed.

The resulting cicatrix was very much stronger than had one been formed without any derm applied; this was frequently illustrated as in Case 44, where the site of the graft was indicated by a thickened, stronger epidermis, long after complete cicatrisation had taken place.

Very little risk of importing constitutional malady was occasioned, because in all cases, only a very little of the papillary layer was retained on the graft, the epidermis always sloughed away before the graft took on independent action and growth.

Table VI.

Skin Grafting.

Case.	Grafts placed.	Grafts grew.	Remarks.
1.	12.	6.	Broke down when returned to work
2.	6.	4.	Ditto 2 days after from using Martin's bandage
3.	8.	?	Discharged cured after six months.
4.	8.	6.	Ditto Ditto Ditto
5.	16.	16.	
6.	16.	0.	Very small grafts.
7.	9.	?	Not stated, Epidermis of grafts sloughed -
8.	11.	?	Margins united with growing grafts
10.	21.	16.	Private patient -
18.	6.	0.	Many specimens used. 4th grafting.
34.	9.	4.	
38.	15.	10.	Gutta percha produced erythema.
39.	1.	1.	Little epidermis sloughing, and little discharge.
40.	10.	5.	
41.	3.	2.	
43.	6.	4.	
	153.	74.	

Skin Grafting.

On this subject, applied as meaning "Taking skin from the living individual, and replacing it again on the living person", I feel I have little first to add.

The known history of skin grafting I have treated under term Grafting.

The most suitable cases for treating by this method, I have mentioned, as also the Modus Operandi.

The process of healing by Skin Grafting I have also alluded to.

I have done skin grafting on 16 patients, in each case taking the skin from over the left deltoid muscle, in one or two pieces, and then subdividing them into several small sections for grafting. At first I used M. Mathieu's scissors for removing the skin, but owing to the slender nature of the instrument, and its liability to break; the tiny section of skin obtainable, and the consequent number of times the limited store of my patient's pluck had to be drawn upon, to produced, say 20 graft pieces. Also to prevent the having so many small scars on the patient, I discontinued the use of these M. Mathieu's scissors, and substituted an ordinary pair of curved scissors, to take away the required amount of skin, which I elevated by catching in an ordinary pair of artery forceps, and then slicing off the required amount.

The skin removed, as far as possible, only went down far enough to include the Rete Malphigii. Immediately

Robert Lloyd. 29. Admitted 10th October 1881.

Ulcer then 4 inches by 5 inches.

Grafted with Skin 23rd November 1881.

Photographed 12th April 1884

Immediately on its removal, no bleeding usually appeared, only a dry white section; but invariably a few minutes after, the blood would gently ooze, but a little lint and bandage sufficed to stop this bleeding.

The manner of applying these grafts has been previously discussed.

On the 16 sores 153 grafts were placed; and of them, 74 grew immediately and aided the after repair.

One of my best results, where 16 out of 21 grafts grew, occurred on a private patient, well nourished - Case 10 - where an intractible burn of 7 years standing resisted all treatment, by the influence of grafting and rest and special treatment, in 92 days was completely healed, and now continues healed.

Case 5 - Is perhaps better - A deaf mute, suffering with Bright's disease and consequent dropsy of his legs, had 16 grafts placed on his sore, which had existed 4 months. They all grew, and in 115 days quite healed the sore, and though as a Shoeblack - he was unable to shout for customers, or to hear dissatisfied ones express themselves - he did badly - constantly in want or in the workhouse - still the cicatrix holds very firm. He was again admitted 8th April 1884 into our Infirmary, and after 4 days rest with diuretic medicine his dropsy of the legs was greatly improved, then I had the accompanying photograph taken. It will show the strain put upon the cicatrix formed by these grafts, and how firmly

it continues to hold.

In three of my Cases, Numbers 3. 7. and 8– the number of grafts out of the 22 applied that grew, is not stated. There was some doubt in each case how many precisely did grow. Therefore the number is omitted. But the results are.

Number 3– was a second grafting of an old intractible ulcer of 7 years existence, when I placed the grafts in Blood clot, then it healed within two months, though 4½ inches by 1½ inches in extent. The first time, six grafts were applied without any blood clot, then four grew, but owing to the application afterwards of too strong a solution of Lead lotion, the new grafts and tissue sloughed away.

Numbers 7 and 8. were the two feet of a patient frost-bitten, and where all the toes sloughed away. The grafts here did grow, aided by their enveloping blood clot, and the patient was discharged after 61 days quite cured, though the sores when grafted extended 3¼ inches by 2 inches, and 3¼ inches by 1¾ inches respectively.

It is interesting to note in Case 1. that though the cicatrix gave way after the patient returned to every day life as a dock labourer– Yet he states the cicatrix broke away by degrees, the new part formed by epithelial regeneration and invasion breaking first, it being thinnest, and the grafts remained, though they afterwards sloughed away.

Case 18 is very interesting — It was my fourth attempt at grafting a very obstinate sore, where only scanty expressences of epithelium were applied, and not including the papillary layer — bone grew — all six sloughed away in 13 days.

Concluding Summary.

There are several essential conditions modifying tissue repair I desired to treat of here, such as —

The absolute necessity of maintaining the asepticity of the wound and grafts, especially Sponge, which is so apt to retain secretions from the wound till they become septic, if the greatest care be not used.

The necessity of rest in the prone, and the advantages of lessening blood pressure in the granulations by using blocks to elevate the foot of the bed containing the patient.

The advantages of Equable and constant pressure to the sore limb: as best produced, I find, by a good white elastic ribbon bandage applied —

The difficulties following the loss of adjacent flaccid tissues that cannot be drawn upon.

The great necessity for a suitable diet with such patients to overcome one factor, I imagine, producing these sores, viz mal-nutrition.

Where there is any peculiar diathesis or idiosyncrasy peculiar to the patient, to try and remedy it by therapeutic means.

To consider tissue repair not in "A simple healing wound".

But I fear that the already tedious length of my paper must prevent such being considered: and

it will require my briefly summing up the results I arrive at after my many experiments.

It appears, then, looking at Table number I that grafting a granulating sore, when in a proper state, is of unquestionable value, and is called for, in every case where the surface denuded of epithelium is either large, or slow of healing. We note that in nearly every case mentioned in that Table, that whereas the ulcer before treatment existed for years. It can easily be counted in days how long after grafting was required for complete cure: when such a result could not have taken place without grafting.

As to the kind of graft — Sponge will not form epithelium — It will replace lost tissue; will lead up granulations and connective tissue to fill any retained injured cavity produced by previous destruction — will indirectly promote epithelial marginal growth, because it acts as a stimulus to the wound generally; assisted, no doubt, by the extra care the patient will take of his sore when such transformation is in progress.

Derma will undoubtedly grow in many instances on a proper sore — it will form epithelium, and is, I think, of the greatest value where the patient objects to his own skin being used, where he does not mind that taken from an amputated limb or a cadaver. (I do not like the idea of utilising the dead to ameliorate the living, hence having satisfied myself

as to the possibility of this grafting - I propose discarding the practice and using only the skin ~~from persons only skin from~~ amputations recently performed, preserving it as long as possible, vitalized, in a septic condition at a body temperature.

Skin from the same patient is undoubtedly best when it is allowed - There can then be no fear of any morbid transmissions - There is invariably the best interest for the invested skin - It grows wonderfully, and much more successfully than derm -

The resulting cicatrix is the strongest of all, and will often be as strong, or stronger (like the uniting medium in some fractured bones) than the original tissue.

And I have tried to prove that the Rete Malpighii is the essential in the latter two kinds of grafting. Epidermis alone is useless. Both will slough away when placed on the granulations. And the epidermis of a skin graft will invariably slough if there is much discharge from the granulations. And granulations discharging much are typically unhealthy, and do not so actively take on attachments to the grafts.

That placing the graft in Blood Clot is of undoubted value, because it first acts as a cement to keep the grafts and granulations sufficiently long in

NOTES

on

Ulcer Grafting

by

SPONGE DERM and SKIN.

45 Cases treated.

for

Graduation Thesis.,

by

P. W. Perkins Case M.B.

1884.

Skin Grafting. Case I.

Joseph Francis, aged 40, had a large ulcer on the lower third of front of his right leg. It was of many years standing. June 1881. it extended 3½ inches around his leg, and 3½ inches from above downwards, & was then in a fairly healthy, healing state.

Treatment. One large piece of skin was taken from over the insertion of his left deltoid muscle, cutting thro' the whole of the Cutis vera: and this large piece, was subdivided into twelve parts, each part about the size of half a split pea; they were placed in rows upon the ulcer, each row being held in position by strips of linen adhesive plaster, each strip of plaster having a second strip attached to its centre, plaster to plaster, when it passed over the grafts, thus giving to those grafts a linen surface, instead of presenting the adhesive side. Carbolic Oil'd lint was applied, and the dressings not removed for two days and a half. Then dressed every second day. Six grafts took well. Six did not. They continued to grow well, till he discharged himself the following August, with his sore healing rapidly.

Result. 12 grafts. 6 grew. 6 did not.

Seeing this patient the 10th October 1881, he informed me he went to work after leaving the Infirmary, & that he noticed his grafts get smaller & less distinct, as he was unable to be carefully dressed at, as in the Infirmary; and that the centers seem'd to be the last to disappear.

Skin Grafting. Cases II. & III.

Elizabeth Taylor, aged 55. Seamstress was admitted 1877 with a large ulcer on the lower third of her Right-leg -

History. It has been an open sore over 5 years. She has been to several Hospitals, but has never had her ulcer cured -

Present State June 1881. It was an elongated sore over the right tibia and interosseous region, extending from 1 inch above an imaginary line drawn from the tip of the Internal Malleolus, to the tip of the External Malleolus, 4½ inches from below upwards, ½ inch wide at its lowest part, 1½ inches above. Six grafts of skin, taken in one piece from her left arm & subdivided, were placed on the sore as Case I and similarly treated. Four grew, and in two months the ulcer was reduced to 1 inch by ½ inch, then Lotio Plumbi ℨiij Aquæ ℥vj was applied, and a Martin's bandage, and two days afterwards all the four grafts and new tissue had broken down, and the sore was as large as before.

Second Grafting September 1881. Eight grafts were inserted; now the granulations were scratched till they bled slightly, & the grafts placed over the scratched part, and surrounded by a very little blood - Oil'd silk was next applied, no plaster, then Carbolic dressings. The third day the dressings were removed when all looked satisfactory; dressed after every second day and by the 4th November, it was quite healed.

Result - Healed after 5 years previous resistance, to all treatment.

Case III Skin Grafting.

James Wilson had an ulcer on the lower part of his leg 4 inches from above downwards, and 1 to 1½ inches around the leg — In June 1881 the sore was granulating well & healthy looking, when one piece of skin was taken from his arm, subdivided into 8 pieces & placed on the sore. 6 took & grew well, patient was kept persistently in bed, and in about three months he was discharged cured.

Result Discharged Cured. 8 grafts — 6 grew —

Case IV Skin Grafting.

Robert Lloyd, aged 29. — A deaf mute, Shoeblack, was admitted 10th October 1881 with an old phagedenic, sloughing ulcer on the left leg.

History It was caused by the bite of a dog 4 months previously, it increased in size till it

Present State 23rd November — Now the sore is about 3 inches above a malleolar line on his left leg, 4 inches from above downwards, and 3 inches across, margins, healthy and invading. Granulations small & of a bright red colour.

16 grafts were applied as in former cases, & dressed with Sanitas lotion, oil'd silk, lint &c.

26th Dressed for the first time, grafts well adhering. Some appear

to have capillaries running into them through the attaching blood clot, which appears organizing.

8th Dec. — Dressed every second day. Improvement marked each time. Smells sweet; One graft at the margin is surrounded by new epidermis. Another in the centre is three times its original size, and one near the bottom has growths 3/4 inch, extending from it — General health good —

29th Dec. Leg now quite healed. The grafts have all coalesced with the marginal skin. The sites of the grafts have thicker skin than that between those sites — Patient now gets up daily —

13 Jan. All dressings stopped — only Zinci Oxydi sprinkled over the surface daily, to be a slight protection whilst the cutis grows thicker —

18th March. Discharged with a very firm cicatrix —

Result — 16 grafts all took —

Case VI. Skin Grafting.

Jeremiah Shay, aged 44, Labourer, admitted 31st January 82 with an ulcer in front of his left instep — Margin callous and irregular, discharge very offensive. Bodily health pretty good —

History — 2 years ago, in addition to ascites, he had oedema pedis, and six months after, his legs were incised, & poulticed till pus was formed; these incisions sloughed forming a sore which has never since healed — He has attended several hospitals with only slight benefit.

Present State The ulcer on the front of the left instep is 4½ inches from above downwards; 3½ around, tapering downwards and inwards - It was treated by poulticing, rest, & bad to -

15th March — 16 very small grafts were placed on the granulations after each one's site had been gently scratched with a little blood flowed to form a coagulum, and in this the graft placed - Dressings Oil'd silk - Lint - Gutta Percha tissue and Sanitas Lotion -

17th Dressed — considerable discharge having a sweet smell: all grafts are in position, but their epidermal coverings soft and apparently breaking down -

19th Great discharge, grafts appear softer and much smaller -

21st March - All epidermic portions gone, and only a few shreds mark the situation of each graft - The whole ulcer surface appears congested, as though due to increased action and vascularity -

Result Of 16 grafts none took -

Cases VII and VIII. Skin Grafting.

Ann Moule, aged 25. Single, Seamstress, admitted 4 Feb 1881, in a very filthy destitute condition, stating "She had been exposed to the violence of a severe snowstorm first previously, and passed two nights sleeping under archways -

Present State Semicomatose & very foul, Feet black, with dirt &c - She has no power of movement of the lower limbs. Toes frost bitten - She appears much starved -

Treatment. 30th September 81. Now her bodily condition has greatly improved, & the parts frost-bitten have sloughed away from both feet — The Right foot from the head of the meta-tarsal bone of the great toe to one inch below the head of the fifth meta-tarsal bone; but the plantar muscles were not so extensively sloughed as the dorsal muscles and tissues. ~~The heads~~

The Left foot slightly less, viz from one inch external to the head of the meta-tarsal bone of the great toe outwards fairly along the heads of the other meta-tarsal bones —

20th January 82 She came under my care —

23rd " 5 grafts were placed on the Right foot —

11 " " " " " " left foot —

each graft having a rest prepared for it, by previously slightly scratching the granulations till they bled enough to form a blood clot in which to place each graft. They were kept in position by strips of adhesive plaster as in Case 1.

27th Dressed every second day, most of grafts have their epidermic surfaces breaking down, but their lower parts to have become attached by the exuded blood, which seems becoming organised.

31st grafts appear now very small indeed; not so distinct because of their upper white surfaces having sloughed away, and their lower surfaces becoming invaded with capillary loops.

10th February — grafts doing well, now forming visible islands of individual separate growth.

8th March. Both feet quite well, the new skin appears very thin but firm —

25th March Discharged quite cured —

Result of 16 grafts — three growing uncertain —

Case IX. Sponge Grafting.

John Clarke, aged 62 – A blind beggar was my first patient – to try sponge grafting on, because he had an inflaming leg and ulcer, and, of course, could not see my "Modus Operandi" – He was admitted 8th June 1882, with a large ulcer on his right-leg –

History He has been a hard drinker for many years. He has been very much exposed – His ulcers were caused 23-years ago, and since have never been cured longer than three months at-any time – He has now been sores over seven months –

Present State About-five inches above a malleolar line on the front of his right-leg were three irregular ulcers, very dirty and discharging very much –

Treatment- 20th June All three ulcers were covered with Sponge graft (The Sponge prepared as recommended by Professor Hamilton in the Edinburgh Medical Journal.)

All the surfaces had been scratched till blood flowed slightly –

Largest-ulcer was about-2 inches square –

Lesser " " serpiginous, measured 1 3/4 inches by 1 inch.

Least- " " about the size and shape of a florin –

Dressings were Sanitas Gauze, (similar to Carbolic Gauze), and a white elastic bandage.

30th. The dressings were considerably soaked with discharge, in places removing the composition from the gauze. Smell-sweet –

All the sponge adhering well, excepting the lesser ulcer, where it had shifted down & was partly overlapping the margin, but-not

the blood clot has acted as a cement and produced a good union —

The interstices of the sponge were filled with coagulum — Each graft's center was therefore red in colour, whilst the margins were of an orange hue — Slightly raising these margins did not cause bleeding.

4th July — One graft came away from the leper eyed ulcer; causing enough hemorrhage, to run over the edge of the ulcer —

6th " The sponge came away in very great part from the smallest wound leaving a complete epidermal covering below — It appeared to exite greater activity in the granulations, to, perhaps, incorporate some of its substance, & to use the other as a protection, similar to healing by scabbing — The other wounds are much smaller —

12th Some of the sponge grafts have come away attached to the dressings, leaving small particles attached to the granulations the size of ½ a mustard seed — There has been considerable marginal growth.

14th No sponge discernable.

20th July — All the ulcers are quite healed — The largest was the last to heal, & now is covered by thin purplish cuticle —

The least — now covered with healthy looking skin —

Result — Three ulcers cured by sponge grafting &c after 22 days treatment —

Case X — Skin Grafting.

Mr S. a private patient —, aged 47. Grocer —

History Seven years ago, in trying to put out a fire caused by paraffine, he got a severe burn on his Right leg; it extended considerably ups and down the leg, but healed ups to a sore 4½ inches from above downwards, and 3½ inches around, which for these seven years had resisted all Treatment —

Treatment 6 April 1882. The sore was of the above size, not discharging much, but having somewhat callous edges —

21 grafts, taken as one piece from his upper arm, each about the size of half a pea, were placed on the scratched granulations in a little blood clot — and Sanitas dressings. — Old silk, Sanitas gauze, Gutta Percha tissue and a bandage —

26th May — 16 grafts have taken well. The wound is now reduced to a square of 1½ inches. The grafts are well studding the surface, but some have united with the edges.

7th July — It is now 13 weeks since my operation: He has attended his shop since the end of May, gradually increasing his standing and exertion. Now he lifts casks &c, and stands behind his counter nearly all day — The sore is about the size of a pea, with red, thin, healing edges.

This sore he states was caused by rubbing off one of the epidermic scales covering the scar. Previously it was quite healed — It now looks scaley, otherwise strong —

Results — 2 nils cured 16 grafts, taking of 21 placed —

attendant of the Giraffes, Zebras, Elephants &c in the London Zoological Gardens that dermic sores or these animals, except from violence, are extremely rare. Though one Giraffe appears to give about 2 seven feet of fore leg, the opportunity of ulcerating - No!

The reasons seem to be rather -

1st That the leg and shin are mostly exposed to violence in the working classes.

2nd Blood pressure is certainly greater in the dependent parts, than in others less so.

3rd Anatomically - In the region of the ankle joint the superficial veins communicate freely with each other, and with the deep veins of the leg - A similar condition obtains at, and for some little distance below, the knee joint - But at the lower third of the leg, the sites principally of these ulcers, we find a very considerable diminution of this free anastamosis.

The first two inches above the ankle joint is where the greatest stress is laid upon these superficial veins; below that point they freely communicate; and if the blood cannot return by the superficial veins, it can do so by the deep veins, or vice versa.

Hence should the skin, or other tissues, in this unfortunate position be subject to injury, these tissues have not that free anastomotic supply of blood required to remove and reorganise the injured parts, and an ulcer follows.

Again - In this same region of the ankle joint, the subcutaneous fascia is extremely thick and strong. Similarly it extends below, enveloping the foot, being especially thick and strong on its plantar aspect; it also extends above the ankle joint

forming the Anatomists very strong, Annular ligament: but above this region, the special site of these ulcers, this fascia gets thinner, and therefore less strong.

Again - There is the strong, hard, resisting Tibia, in this same region, between which and the force causing the injury, the soft-yielding skin gets crushed; when such occurs. (and of the 45 cases tabulated 32. were so caused). The injury to the skin therefore is very considerably more than would have been, had the same force been applied, but the tissues behind been soft, non resisting, and disseminating the force applied.

PART. II.

Healing of Simple Ulceration.

Sir James Paget, in his Lectures, edited by Professor Turner, - page 311 remarks - " The ulcerative process cannot take place in healthy tissue; previous degeneration of the tissue, and that such as occurs in the inflammatory process, is a condition essential to it".

The evidence is required for the "Healing of Simple Ulceration" - Repair cannot take place in unhealthy tissue - And when any lesion is produced by injury, as in 32 of my recorded 45 cases; the injured parts must either be cast off as pus, or repaired by the processes of Nature -

I am convinced of the accuracy of the dictum " That healing is a process of Nature"; or, Professor Jno Chiene's Lectures on the First Principles of Surgery" page 38 - " Suppose in the case of any wound, you have at length succeeded in putting a stop to the bleeding; you have sewed together the edges of the wound; you have fixed on the dressing. What can you now do? Nothing. The remainder is a process of nature - (Italics are mine) - and you can only here and there assist that process in the direction of healing".

To assist nature, the plan I adopt on receiving a patient with an Ulcer is, to place him in bed, and

elevate the bottom legs of his bed by blocks of wood 9 inches high. - This gives complete rest to the patient and his sore, and reduces to a great extent the pressure of the blood in his legs. Poultices, either simple linseed, or medicated are applied; and one quickly finds the various conditions of Ulcers, Inflamed, Irritable or Callous, reduced by Nature to a healing sore. Then "two fix on the dropping". - If the patient be very Syphilitic, Black Wash or Iodoform Ointment is useful. Children, and the Young, if constitutionally fairly healthy, progress on the most innocent lotions. Old persons seem to do best with strong, perhaps stimulating applications. But for middle aged patients, and hence, most general use, I would like to draw attention to Sanitas Oil, and its preparations, made by the Sanitas Company, Bethnal Green, London: by passing steam through Turpentine at a high temperature, and thus producing this oil - It is a good antiseptic, rather weaker than Carbolic Acid, non absorbable like that drug; and as a lotion 1 in 40, as also Sanitas Gauze (like Carbolic Gauze) I find most useful as a non irritating, safe, antiseptic dropping, and use them chiefly.

Droppings the size of the granulating sore only, are applied, Oiled Calico, and an Elastic bandage to cover all.

Gutta Percha tissue, and Martin's India Rubber bandage I have found very irritating to most patients,

producing dermatitis, and small pustules in the breast ducts, so now I use instead, the white Cotton Elastic bandage, in the shape of a ribbon, three inches wide -

when the sore is healthy, with small granulations, and slight pustular discharge. I graft.

Normal repair of Ulcer's surface — with Pathology.

One frequently notes as in Case 15 recorded:- Post-Mortem we find not only skin and subcutaneous fascia ulcerated, but tissues of all kinds - There were involved bone, Periosteum, Nerves, Artery, Vein, Capillary, Fascia, and skin, all necrosed.

As soon then, as the morbid tissues are removed, either by pus formation, or by reorganisation; so soon does nature set about repair; though more actively in some than in others.

And repair seems only to proceed by "like producing its like", connective tissue produces connective tissue; Blood vessels produce Blood vessels; and skin only skin.

"My paper proposes treating only "Healing by Second Intention" of John Hunter; or, By granulation and grafting, avoiding rather all other kinds, as By Immediate Union, Primary Adhesion or First Intention, Cicatrisation, Scabbing, &c &c.

No tissues of the body are produced de novo. Supposing we have an ideal sore or ulcer, healing by granulation: a cure ensues by granulations being produced on the abraided surface: by means of blood clot or sponge, these granulations

may be led up to nearly or quite fill any reasonable vacuity caused by previous sloughing of tissue. The superimposed epidermis is only produced normally by a growing in from the margin, or a growing of some of the papillary layer of the skin that may have escaped the previous entire ulceration, and now under favourable circumstances regains activity, and grows up in the wound: or artificially, skin as grafts may be placed on the granulations, which, adhering to these granulations and growing, stretch out to meet the invading margins.

The greatest difficulty I find, is this production, or regeneration of epithelium to cover in the granulations.

Granulation structure – briefly –

Granulations generally, are produced by the force imparted to the blood acting in the capillaries devoid of restraint. When the skin is whole, and acting as a restricting covering to the tissues; or internally, where there is some other restricting medium prevents their formation, as in subcutaneous wounds, there are no granulations formed; but remove the skin, or make the lesion internally where there is no restraining opposing force, and there we see granulations formed. These views, advocated first, I believe, by Professor Hamilton in the Edinburgh Medical Journal for November 1881. as being a normal process of nature, are contrary to the generally taught, and generally received opinions – viz That granulations are an abnormal process of nature – An inflammatory

new formation, which as Dr. Coates expresses it in his Manual of Pathology, page 90. " It is to be observed in the first place, that in order to the production of granulations, the inflammation must be of some duration. If a ~~wound~~ wound close within the first few days, no granulations are formed."

Minute Structure. Each granulation is composed of a capillary loop springing from a vessel, and either returning to that vessel, or to a vein. The convexity of the loop, when complete, is always in the same direction as the blood entering that loop, indicating, it seems, that the blood pressure in its interior is the cause of this uniformity of direction of the loop, and also because the blood pressure is unrestrained by the enveloping skin. Their calibre is generally considered to be wider where they arch round, than where they are given off from their adjacent vessel. Around the capillary loop large numbers of leucocytes are to be seen, always lying in a delicate mesh work of fibrous tissue.

These leucocytes come into this fibrous tissue by passing through the walls of the capillaries (this has been noted by many observers) when in a state of inflammation, or irritation; then the capillary walls are distended and thinned by the internal blood pressure, and hence the leucocytes more easily pass through. The fluid part of the blood also exudes from the same cause, and goes to help to form the Liquor puris- whilst the leucocytes appear as pus cells.

Formation of Fibrous Tissue -

That the result of the granulations is a fibrous tissue which fills in, and unites the ulcerated surfaces, most observers agree; but in how this is brought about, they differ.

Cohnheim believes it due to transformation and multiplication of the afore mentioned leucocytes.

Professor Hamilton contradicts this, and following somewhat the lead of Virchow, believes in the connective tissue corpuscle as the origin — whilst Klein very much agrees, but terms them "Placoid Cells", Each having a nucleus and nucleoli. That these connective tissue corpuscles after any irritation (as after the knife is used), or when repair is progressing, enlarge, have their nuclei elongated, divide, and proliferate with great rapidity, produces new cells which displace all adjacent tissues or lymph, cause their disintegration, and substitute for them connective tissue corpuscles. These elongate, unite to and form the resulting reparative fibrous tissue.

Dr Hamilton states (Opus cit) that no one has ever seen leucocytes being transformed into Connective tissue corpuscles, and that they never are; but they either are cast off in the secretion as pus cells, or, are sometimes reabsorbed into the circulation.

Regeneration of Epithelium.

Is, perhaps, the greatest difficulty the Surgeon has to encounter in the treatment of Ulcers and Wounds —

Connective tissue never forms true epithelium, such has never been authentically recorded; (that I know,) though we see generally in Nature the tendency of an organ or tissue to adapt itself to any extraordinary position or requirement cast upon it; as for example — In many diseases when the kidney has diminished excretory power, or may have been removed, we find the other kidney, perhaps, and the skin, assuming the required increase to maintain the conditions required for health. So in the scar formed by connective tissue corpuscles, its surface will become somewhat squamous like epidermis, but never forms true epidermis — In fact, in Embryonic life, — Epidermis is formed from the Epiblast; — but Connective tissue corpuscles from the mesoblast, and it is improbable that in adult life these distinctive characters should be otherwise.

When a wound is healing and about to be covered in with epithelium — It may be noted that the upper part of the connective tissue layer assumes a spindle shaped and contracting aspect, exactly corresponding to that seen on each side of a wound healing by first intention — (such may be seen in the slides sent from the ulcer of Case 15—) That these spindle shaped cells contracting, naturally contract on the capillary loops in the granulations, and cut them off from the circulation, and this causes an atrophy of the granulations.

Then the epidermic cells pass around first, and then over the atrophied granulations, adhering at the same time to the substrata of spindle shaped fibrous tissue, and thus the cure is brought about.

It may, I think, always be noted that before any granulations fall before the invading Epidermis, they atrophy, and cease to discharge pus, and the foregoing explains why — A wound with large, flabby, discharging granulations will not heal; neither will a Skin graft become attached to such a surface.

The Epidermis, according to the observations of Eberth, Klebs and others (Virchow's Archiv 67) is regenerated by cell division — After the manner clearly established by Virchow and Remak — Viz — First, there is a division of the nucleus of a cell, then of the nucleolus, followed by division of the cell itself, and Klebs asserts that these newly formed Epithelium cells are possessed of Amaboid movement, and can proceed to the spot they have to occupy — That they must possess this power of proliferation very actively must be admitted when one notes ulcers and healthy wounds sometimes becoming covered with Epidermis at the rate of ½ inch to 1 inch in 24 hours, on all sides of its circumference.

When the marginal Skin, or from a healthy growing graft, repair is proceeding, the granulations will be small, discharging very little, and about the same level as the Skin, and usually of a healthy, beef steak colour — whilst the edges of Epidermis are the same colour as the Skin externally, blending through purple to bluish white, as we go inwards, ending in the dry, red band of new formed Epidermic tissue that is invading upon the granulations —

During the process of healing by granulation, when the Epidermis is covering, or has quite covered the sore, it throws

off its top, scaly, surface just produced; its place being taken by new and more highly developed skin — I have found after an ulcer has just healed over, the covering is very thin indeed, and if the patient subjects the new cicatrix to severe strain, it will often give way; therefore we keep him in bed for a week or so after complete cicatrisation, when several crops of new epidermic scales are usually cast off, and then the existing cicatrix is stronger, tougher, and more likely permanently to remain.

PART III.

Treatment of Ulcers by Sponge, Derm and Skin Grafting.

History. To John Hunter must be awarded the merit of first showing that nature allowed one part of a living body to be cut off its natural position and grafted on to another part; when he demonstrated that a Cocks Spur grafted on to its comb, grew, and with the increased supply of blood, to a great magnitude — There are two of these specimens in the Museum of the Royal College of Surgeons of London — Number 524 of the Catalogue grew in a spiral fashion till six inches long.

Tagliacozzi 300 years ago published his great work on plastic operations, giving the pedicle to the removal of skin, as a "sine qua-non", to be severed only after complete union had taken place. This operation has been employed more or less, since his time.

But to M. Reverdin of Paris is due the honour of introducing well to notice, in October 1869, that the pedicle was not essential to skin transplantation, but may be done without: He arranged little bits about the size of a pins head, mosaic fashion on the ulcer, and they were engrafted, and grew. see Bull de la Soc de Chir — November 24th 1871.

Mr Pollock of St Georges Hospital was the first to introduce Skin grafting into this country, and he published

his cases in the "Report of the Medico Chirurgical Society 1870.

In 1870, and since, Scotch Surgeons investigated this subject, taking the skin from living patients. Dr. Page of Edinburgh in December 1870 wrote on skin grafting, and again in the British Medical Journal for 27th May 1871.

Dr. David Fidler of Aberdeen gave Cases in the Lancet of December 1870. advocating the use of scrapings of Epidermic scales only, which he states grew like ordinary skin grafting.

Dr. J. H. B Macleod and others contributed to the literature of the subject about that time.

That the new skin is formed by the growth of the graft is proven by the fact, that when black skin is engrafted on a sore in a white man, as recorded by Mr. Bryant, the newly formed skin is of the colour of the graft to the extent due to the action of the graft. Mr. Holmes has reversed the experiment, placing some skin from a white man on to a Negro, and it retained its original colour.

In Case 13 recorded — Dark patches distinctly appeared in a sore healing rapidly, where 3 years previously grafts from a Negro had been placed by the Surgeons of University Hospital — I sponge grafted this sore, and it healed, showing after this latter process a slight discolouration.

In March 1875 (British Medical Journal 7th October, 1882) Dr. C. B. Taylor reports obtaining skin from a lady's upper lid for ptosis, he took too much, that the patient "was hardly able to close the eye, and during sleep it must remain

partially open"; so he replaced the excised portion to its former site and it healed by first intention," and the shrinkage which followed sufficed to cure the original defect". Dr. Wolfe of Glasgow, Dr. Macnaughton Jones, and many others have also written on grafting skin from the living subject.

The most extraordinary result of grafting that I have noted, may be seen (in Archiv f. Klin Chirurgie B XXVIII. page 562) where Helferich in removing a fibro sarcoma from the arm of a woman aged 36, took away the whole upper half of the biceps, with the exception of a thin strand at its outer part. Into the cavity which was left, he promptly introduced a large fragment of the biceps from the leg of a dog. The cut surfaces were carefully brought together with sutures, as little injury as possible being done to the parts.

The transplanted muscle was much more voluminous than the original portion, and was long after the operation distinctly perceptible to the touch. Electric currents experimentally used about three months after the operation showed the biceps reacted perfectly naturally to both kinds of current. The movements at the elbow joint were almost normal.

The literature on the subject of grafting is very sparse, I know of no book published on this subject. A pamphlet has been written by Mr. J. Wadman of Leeds.

Mode of Procedure.

When the granulating sore has a perfectly healthy aspect, No inflammatory redness surrounds it. The margins of skin whitish externally, passing through pale purple to pink most internally, and invading upon the granulations. The granulations should be small, not discharging much, and of a bright steak colour.

Then I gently scratch these granulations until they bleed slightly at several parts of the sore, and place upon these bleeding spots the Sponge prepared as recommended by Professor Hamilton (Edinburgh Medical Journal, November 1881.) and cut as thin as possible. It is bitter first washed in a tepid solution of Carbolic acid, 1 to 40; or Sanitas Lotion. before applying, to render it of the body temperature.

If there is a small granulating surface, it may be all covered thus with Sponge; but if more than a surface 2 inches square, then I partially cover it with Sponge: and a very large sore could require proportionately less sponge, because of its tendency to retain secretions from the wound, which if they become a little septic on a small surface will be harmless, generally, to the patient, and it may be more thoroughly cleansed by the Surgeon, but a large surface of Sponge cannot be so easily deprived of its retained pus, and is very liable to set up septic inflammation. Oiled silk is placed next the Sponge to prevent friction, and displacement of the graft; it is also least irritating to the skin. Then six

plies of Sanitas gauze, soaked in a Sanitas lotion 1 in 20, oiled calico, and finally the web elastic bandage carefully applied.

The dressings should not be removed till the second day, and then it will be found that the blood oozing has formed an uniting medium, which has gone some way towards organisation, and leading the capillaries into the sponge.

If the sponge is placed upon or near the epidermic margin it will not adhere nor grow (contrary to derm or skin), but acts as a foreign body, and the margin will soon be found to have run under it and displaced the sponge. But if the sponge be upon and surrounded by granulations in a healthy wound it will become organised.

In the 13 cases in which I have tried it, I have never known it not to have undergone tissue digestion.

Derm and Skin grafting require a similar wound, preferably scratched till a little blood is produced. The presence of a small blood clot surrounding each graft seems a decided advantage over not doing so. This is seen in many of my cases. The graft should include the Epidermis and Malpighian layer, but very little of the Corium; it being composed of fibro cellular tissue has a deterrent effect very often. The papillary layer of the cutis is the essential. The epidermis in most cases when attached to the graft, sloughs away.

The size I find most satisfactory for each graft is 3/16 of an inch long by 1/8 wide. If smaller, and their

Table III.

Skin.	4.	with clot.	61. grafts placed	46 grafts grew.
Derm.	12.	" "	167.	
Skin.	3.	without clot.	14 " "	8 " "
Derm.	3.	" "	34. "	12. "

upper surface should slough, as it frequently does, there is little to denote their location till they are sufficiently vitalised to grow themselves and become apparent. Larger are apt to slough considerably, and not get coherent to the granulations quick enough to wholly grow.

Contrary to what obtains in Sponge grafting, Derm and Skin seem to do better, when attached near the invading margin of Epidermis, they seem to become very soon incorporated by the invading Epidermis, and to be more quickly possessed of vitality and to grow, before those placed on the same wound away from the margins; and they seem therefore at the margins to lose less of their substance before taking on active growth.

The dressings and after treatment of Derm and Skin correspond with that of Sponge before mentioned.

The presence of blood clot seems to me a very decided advantage in grafting, over its absence, though this is denied by some writers. Of all the cases recorded in Table I, four (viz Cases 5. 10, 30 and 37.) had 61 grafts applied from skin of the possessor of the sore, and placed in blood clot, and of these, 46 grew well, equal therefore to 75 per cent. Whilst I did three cases of skin grafting as similar as possible, (viz Cases 38. 39 and 40) where 114 grafts were placed on the granulations without any blood clot, and of these only 8 grew - equal therefore to 7 per cent; as against 75 per cent with the clot. Derm grafts are not fairly comparable

because the conditions of the derm were non comparable — And all my 13 Sponge grafts were placed in slight haemorrhage.

Blood clot acts mechanically, it forms a coagulum around the graft when first placed on the granulations, keeping it there via the one site, which is very necessary for its vital attachment. Without this cementing coagulum I have found the graft shifted after 48 hours had elapsed, but rarely so with the clot. The Liquor Sanguinis softens the graft, permeates its interstices, opens them, and thereby gives greater space and facilities for the capillaries entering them from below.

Again — The clot, like Sponge, is vascular, though more finely porous than any Sponge — Into this clot, in from 12 to 24 hours, if kept aseptic, capillaries may be seen to have entered, and in 48 hours there is often a distinct rosy tint given to the clot, and it has been demonstrated by Professor Hamilton, that Sponge becomes organised by the entrance into it of capillaries, and connective tissue corpuscles — The same may be seen in Slides Nos 4. 5. and 6 — sent, which is a derm graft rapidly organising after four days adhesion, when it had a well marked bud like aspect, whitish at the tops, but a fine pinkish hue around its edges.

Sponge Grafting.

The profession is indebted to Professor Hamilton of Aberdeen for introducing Sponge grafting as a means of

repair for stubborn sores, or sores with loss of tissue. He showed that it became vascular by leading up granulations, and afterwards was absorbed or transformed into fibrous tissue.

Such a demonstration had been anticipated; Professor Lister had previously shown that aseptic putty placed in contact with granulations, itself became vascular, and bled when scratched. Later – Cat-gut was used for stitches, and Professor Lister showed that it became organised in the tissues, or was absorbed, and did not act entirely as a foreign body. This led to the use of Calgut-filaments as an organisable, capillary means of drainage, advocated by Professor John Chiene; afterwards calgut was employed as a drainage tube, to be organised from within outwards, synchronous with the healing of the wound from within outwards.

But Mr. Hamilton leads one to expect, that as soon as the sponge becomes organised, so soon does epithelium follow and cover the sore – page 388 of the Edinburgh Medical Journal, November 1881, we find – "As soon as it (the sponge) became vascular and filled with new tissue, the epithelium spreads over it. There did not seem to be any difficulty in getting the epithelium to spread over it, when the underlying surface was of a proper nature, that is, whenever it became filled with young and vascular connective tissue elements".

I am sorry to state that my experience does not directly give any epidermis as a result of sponge grafting.

As we meet ordinary superficial ulceration, it is not exuberant granulations that are required for its cure: indeed, generally we find the granulations too abundant, too elevated, indicating by the common phrase — "proud flesh", and these require for its healing, to be diminished by the action of astringents or caustics, and the cure induced rather by proliferation of Epithelium either inwards from the margins, or as seperate independent centers on the granulations: such may be obtained by Derm or Skin grafting, but never, I experience, from Sponge grafting alone. Though Sponge graft may be very useful where there is great loss of substance and deep excavations, requiring tissue acceleration before Epithelium can complete the repair.

Sponge then, like blood clot, seems to act mechanically, and does not like Derm or Skin, become proliferating epidermis

Sponge then causes tissue repair by —

1st Sponge is useful in filling up an excavation, and in bringing granulations to the level of the margin of the ulcer, so as to allow the Epithelium of the edge to grow inwards over the surface.

2nd Sponge has no power to promote reformation of Epithelium it merely excites the formation of granulation tissue, by acting partially as a foreign body and thus setting up mild, chronic inflammation.

3rd Grafts of skin and derm act as centers for the proliferation of epithelial cells, and are very useful after the healthy granulation tissue is at a level with the edges.

4th Grafts of skin or derm by forming seperate centers

Sponge Graftings.

Table IIII.

Case	Time of Sponge transformation	Remarks.
9.	22 days	Sponge came away in great part
11.	38. "	Do Do
12.	19. "	
13.	19 "	Died the 12th day, all removed
14.	——	Do Do
18.	27 "	
20.	28 "	No bad symptom
24.	39 "	Do
25	35 "	Do
30.	22. "	
32.	17. "	Part-removed the 8th day going strong.
36.	30 "	No bad symptom.
15.	26 "	One third removed, pyrexia followed

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26.58

for the reformation of epithelium, cause the ulcerated surface to become covered in by new epithelium much more rapidly, than if the epithelial regeneration were only allowed to take place from the margins of the sore.

3rd. Grafts of skin or derm are important adjuvants to preliminary sponge grafting when the ulcerated surface is very large.

The one great necessity in healing by Sponge grafting is to very carefully maintain its asepticity; and this can only be done, when the sponge surface is considerable, by very careful and complete irrigation with antiseptic lotions, and expressing from the sponge tissue all retained pus.

Of the 13 patients I grafted with Sponge, Numbers 13. 14. 15 and 30 suffered from septic absorption, and required the removal of the Sponge with antiseptic treatment. In 2 others - No's 9 and 11, the Sponge came away in great part, thus preventing the liability to septic absorption, and the other 9 required to have the grafts pared occasionally as they exhibited tendencies to go wrong, by turning dark or black coloured, and smelling unpleasantly. If the grafts were thin, this was rarely seen; if thick, was rarely absent.

As may be seen in Table Number IIII. the average time taken for complete transformation of all Sponge tissue, so as to be non discernable was 26.38 days.

The longest time was in Case 24, where a man aged 46, with an ulcer of 12 years origin took 39 days

for complete tissue digestion. The shortest, Number 32 - A man aged 43 took only 17 days - this case was only of 3 years standing, and healed more readily.

Of course, the thicker the sponge, the longer is required for organisation, other things being equal. The slicks I applied varied from 1/8 to 3/8 of an inch in thickness; and this seems to me about the best workable size.

Derm Grafting.

This term, as used by me, meaning skin removed from a freshly amputated limb, or from a cadaver, is mine - I was not aware the experiment of grafting skin from the dead on to the living had been tried, before my first attempt 11th September 1882 - Case 16. But subsequent investigations seem to prove that the Americans calculated this subject prior to myself.

In 1870. Mr Cumberbatch succeeded in transplanting skin grafts taken from a leg 4 hours after amputation.

In 1870. M. Marc Lee proposed to substitute Epidermic scales for true skin.

In 1871. (St Louis Medical and Surgical Journal, Volume VIII - July) Dr Hodgen transplanted dry Epidermis

Table V.

Derm Grafting.

Case	Source	numbered	Grafts placed	Grew	Time removed.
16.	Cadaver	1.	20.	4	16 days
21.	Do.	1.	23.	6.	2. "
22.	Amputated Leg	2.	6.	0.	12. "
23.	Do.	2.	6.	3.	30 days
25.	Cadaver	3.	24.	6.	Same day
27.	Amputated Leg.	2.	12.	3.	95 "
28.	Cadaver	3.	13.	0.	16 "
29.	Do.	3.	13.	0.	18 "
31.	Do.	4.	5.	0.	Same day
33	Do.	4.	11.	2 q.	Do.
34	Do.	4.	14.	0.	34 days
35.	Do.	5.	20.	2.	Same day.
42.	Amputated Leg	6.	14.	4.	Do.
44.	Do.	6.	6.	4.	Do.
45	Do.	6.	14.	0.	2 days
			201.	32.	

scales from the thick cuticle of the foot, and he also used flakes of detached epidermis, and they are reported to have grown.

In 1881 Dr. Bibach of St. Louis' Hospital, and Dr. E. Studer, grafted epidermis peeled from any part of the body, as well as cuticle grafts, successfully.

Epidermic scales and scrapings have been tried in Scotland with varying success. Dr. Fiddes first tried epidermic scales simply, and similar results to the grafting of skin followed. Dr. G. H. B. Macleod repeated the experiments with opposite results. The late Dr. R. C. Williamson in his Edinburgh graduation thesis, reports of skin being taken from a pig at Wakefield and grafted on a man. He did not report that it grew.

My own efforts, as may be seen on Table V. comprise 15 cases; where, we find, 201 grafts were placed on these 15 ulcers, and of them only 32 grew on 8 patients. Of the remaining 7 patients on whom 76 grafts were applied, all went wrong, sloughed away; but in so doing not one of my patients suffered any constitutional disturbance - True, the discharge was profuse in these cases, sometimes turning the oiled silk dark, and in one instance - Number 25, the discharge was offensive, but only in one.

The reason for this sloughing of the grafts seems to be, principally the length of time which had elapsed either before the derm was removed from the body; or the length of time elapsing before it was put on the wound.

It seems interesting to note the influence occasioned

by the length of time elaping between the decease of the owner of the skin and its application to the sore of a second person, as affecting the growth of these grafts.

It is very interesting as affecting the question, whether when life ceases in a person, if all the atoms and component elements of that individual be ales dead?. Also, does death always commence in one organ, or series of organs in a living being, and proceed invariably the same course till physiological death or decomposition ensue, and violate the conditions required for cell life? and if so, Can we, by any known means of arresting decomposition and physiological death by antiseptics or otherwise, so preserve tissues, seed like, that they may retain their inherent vitality for a greater or lesser period, requiring only the conditions of suitable surroundings for their development and growth?

My specimens indicate that we may so preserve these tissues — Case 24 - where of 12 grafts, taken 95 days previously by Mr. Jonathan Hutchinson, and kept by me at a low temperature in a 1/to 20 Carbolic and Glycerine Solution — 3 grafts grew faintly - They appeared as seperate specks on the sore and pink, and in these sites the skin was thicker than where they were not.

Case 23 — where six grafts from the same

source were applied; three grew and formed islands on the granulations, though the derm was removed from the host's leg for 30 days.

Case 16— so less certain — After the derm was 16 days removed; I placed 20 grafts on an ulcer, and up to the time of my departing for America, 21 days after, 4 grafts were discernable as thick cuticle and growing.

Cases 21 and 45. Had the derm applied the second day after its removal — On the former 23 grafts were applied; 6 grew and formed a rapid cure. Whilst of 14 grafts applied to case 45 — all sloughed, because they were kept in a solution of Permanganate of Potash, which formed a covering over them. I found it impossible to entirely remove this stain without great manipulation, hence they were in some instances applied with this partial covering of Black Manganic oxide; therefore, as the granulations were intercepted in coming against the graft surface, it could not well be expected to grow.

Cases 25. 31. 33. 35. 42 and 44 — six in all, had the derm applied to Ulcers the same day that it was removed from the subject. They total 80 grafts, of which only 16 grew. Of these 16 — four each grew on Cases 42. & 44. The Derm was carefully removed directly after the limb was amputated, it was placed in Milk,

Alfred Vaughan – aged 42 – Admitted 8.12.83.

Ulcer then nearly round the leg, and 5 inches up.

Grafted with Derm 29.1.84

Photographed 14.2.84.

and about five hours afterwards was placed on healthy healing sores, and they grew wondrously; (as indicated by the photographs taken afterwards) making bridges of new cuticle across the sore, and continued to grow for a considerable time: one bridge of new epidermis increased to 3/4 inch wide; then repair seemed to lag, and applications did not seem to stimulate, therefore I again grafted this sore with skin, with the best result.

Case 42 very quickly healed and strongly.

Cases 25 and 35, had respectively 6 and 2 grafts grow. 18 in each case sloughed away, therefore there was very great discharge, which would act injuriously on the growing grafts. In both a relapse occurred, and the ulcer became a great size. The reason why! is not satisfactory. Very often my patients do not wish their sores healed, and therefore injure them. Case 25 did this. Case 35 is suspected similarly, because once since a similar result has followed when his sore was nearly well.

In Case 31. the grafting was done on a surface previously subjected to Sponge grafting: the scrum would not grow; and in Cases 25. and 35, where from 44 grafts 8 did satisfactorily, the resulting cicatrix was possessed of such low vitality that it all broke down leaving the sore as bad as ever.

Invariably where the grafts did not satisfactorily grow and produce proliferating epithelium, there it resulted in a lower form of product; viz, a thin film appeared binding

down the granulations, keeping them small and healthy, hence they invariably the more rapidly healed by marginal invasion, but the film itself did not appear to produce true epidermis.

Midway between the Unsuccessful and the Successful, stands the negative evidence." That no harm was, in any case done to any patient". Though in these 15 patients 149 skin grafts underwent disintegration on their exposed, and very often, bleeding granulations: and though oftentimes the grafts were a long while removed from the Cadaver, still not one bad symptom, in any patient appeared to ensue therefrom.

The only difference was — The discharge of pus from the sore was greatly increased, but daily dressing the wound with antiseptic lotions, in every case, was all sufficient.

Again — In no case did any patient object to its application — rather the reverse — nearly all were anxious to be selected for its application — whilst many patients would not submit to skin grafting, and discharged themselves rather than, as they termed it: "Have their bodies mutilated".

The Successful cases were 8 out of 15. — The need of success varied from 2/3 growing as in Case 44; to 9/10. where only 2 out of 20 applied grew. Case 35.

During the process of revitalisation of the grafts of dermis applied, invariably whether in Blood Clot or not, the epidermis would slough all away in from 1 to 3 days. The graft then became permeated with capillaries pushed into it from below, therefore it assumed the appearance very much of a

little bud of granulations, and often was non discernable for a time from them; so I found difficulty in giving the complete credit due to this method, because I would only tabulate those grafts visibly and undoubtedly growing, island like, in the granulations where none existed previous to the grafting; and very often, by the time the grafts whose epidermis had sloughed, had again renewed their epidermis, the marginal skin had invaded the sore, combined with the epidermis of the new graft, and so was unrecknoned and uncredited by me.

The mode of growth of each Derm graft is identical with that termed "Skin Grafting", and when taken from the skin of the possessor of the ulcer.

In these 8 successful patients of the total 15, great benefits ensued - viz

Their sores were rapidly healed.

No pain was occasioned thereby, and no risk to life.

No mutilation of their persons was needed.

The resulting cicatrix was very much stronger than had one been formed without any derm applied; this was frequently illustrated as in Case 44, where the site of the graft was indicated by a thickened, stronger epidermis, long after complete cicatrisation had taken place.

Very little risk of imparting constitutional malady was occasioned, because in all cases, only a very little of the papillary layer was retained on the graft, the epidermis always sloughed away before the graft took on independent action and growth.

Table VI.

Skin Grafting.

Case.	Grafts placed.	Grafts grew.	Remarks.
1.	12.	6.	Broke down when returned to work
2.	6.	4.	Do. 2 days after from using Martin's bandage.
3.	8.	?	Discharged cured after six months.
4.	8.	6.	Do. Do. Do.
5.	16.	16.	
6.	16.	0.	Very small grafts.
7.	9.	?	Not stated, Epidermis of grafts sloughed -
8.	11.	?	margins united with growing grafts
10.	21.	16.	Private patient -
18.	6.	0.	Warty specimens used. 4th grafting.
37.	9.	4.	
38.	15.	10.	Gutta percha produced erythema.
39.	1.	1.	Little epidermis sloughing, and little discharge.
40.	10.	5.	
41.	3.	2.	
43.	6.	4.	
	153.	74.	

Skin Grafting.

On this subject, applied as meaning "Taking skin from the living individual, and replacing it again on the living person", I feel I have little fresh to add.

The known history of skin grafting I have treated under Dermic Grafting.

The most suitable cases for treating by this method, I have mentioned, as also the Modus Operandi.

The process of healing by Skin Grafting I have also alluded to.

I have done skin grafting on 16 patients, in each case taking the skin from over the left deltoid muscle, in one or two pieces, and then subdividing them into several small sections for grafting. At first I used M. Mathieu's scissors for removing the skin, but owing to the slender nature of the instrument, and its liability to break; the tiny section of skin obtainable, and the consequent number of times the limited state of my patient's pluck had to be drawn upon, to produced, say 20 graft pieces. Also to prevent the having so many small sores on the patient, I discontinued the use of these M. Mathieu's scissors, and substituted an ordinary pair of curved scissors, to take away the required amount of skin, which I elevated by catching in an ordinary pair of artery forceps, and then slicing off the required amount.

The skin removed, as far as possible, only went down far enough to include the Rete Malphigii. Immediately

Robert Lloyd. 29. Admitted 10th October 1881.

Ulcer when 4 inches by 5 inches.

Grafted with Skin 23rd November 1881.

Photographed 12th April 1884

Immediately on its removal, no bleeding usually appeared, only a dry white section; but invariably a few minutes after, the blood would gently ooze, but a little lint and bandage sufficed to stop this bleeding.

The manner of applying these grafts has been previously discussed.

On the 16 sores 153 grafts were placed; and of them, 74 grew unmistakeably and aided the ulcer repair.

One of my best results, where 16 out of 21 grafts grew, occurred on a private patient, well nourished - Case 10 - where an intractible burn of 7 years standing resisted all treatment, by the influence of grafting and rest and special treatment, in 92 days was completely healed, and now continues healed.

Case 5 - Is perhaps better - A deaf mute, suffering with Bright's disease and consequent dropsy of his legs, had 16 grafts placed on his sore, which had existed 4 months. They all grew, and in 115 days quite healed the sore, and though as a Shoeblack he was unable to shout for customers, or to hear dissatisfied ones express themselves - he did badly - constantly in want or in the workhouse, still the cicatrix holds very firm. He was again admitted 8th April 1884 into our Infirmary, and after 4 days rest with diuretic medicine his dropsy of the legs was greatly improved, then I had the accompanying photograph taken. It will show the strain put upon the cicatrix formed by these grafts, and how firmly

it continues to hold.

In three of my Cases, Numbers 3. 7. and 8— the number of grafts out of the 22 applied that grew, is not stated. There was some doubt in each case how many precisely did grow. Therefore the number is omitted. But the results are.

Number 3— was a second grafting of an old intractible ulcer of 7 years existence, when I placed the grafts in Blood clot, then it healed within two months, though 4½ inches by 1½ inches in extent. The first time, six grafts were applied without any blood clot, then four grew, but owing to the application afterwards of too strong a solution of Lead lotion, the new grafts and tissue sloughed away.

Numbers 7 and 8. were the two feet of a patient frost-bitten, and where all the toes sloughed away. The grafts here did grow, aided by their enveloping blood clot, and the patient was discharged after 61 days quite cured, though the sores when grafted extended 3¼ inches by 2 inches, and 3¼ inches by 1¾ inches respectively.

It is interesting to note in Case 1. that though the cicatrix gave way after the patient returned to every day life as a dock labourer— Yet he states the cicatrix broke away by degrees, the new part formed by epithelial regeneration and invasion went first, it being thinnest, and the grafts remained, though they afterwards sloughed away.

Case 18 is very interesting — It was my fourth attempt at grafting a very obstinate sore, where only scanty excrescences of epithelium were applied, and not including the papillary layer — none grew — all six sloughed away in 13 days.

Concluding Summary.

There are several essential conditions modifying tissue repair I desired to treat of here, such as —

The absolute necessity of maintaining the asepticity of the wound and grafts, especially Sponge, which is so apt to retain secretions from the wound till they become septic, if the greatest care be not used.

The necessity of rest in the prone, and the advantages of lessening blood pressure in the granulations by using blocks to elevate the foot of the bed containing the patient.

The advantages of Equable and constant pressure to the core limit: as best produced, I find, by a good white elastic ribbon bandage applied —

The difficulties following the loss of adjacent flaccid tissues that cannot be drawn upon.

The great necessity for a suitable diet with such patients to overcome one factor, I imagine, producing these cases, viz mal-nutrition.

Where there is any peculiar diathesis or idiosyncrasy peculiar to the patient, to try and remedy it by therapeutic means.

To consider tissue repair not in "A simple healing wound".

But I fear that the already tedious length of my paper must prevent such being considered: and

it will require me briefly summing up the results I arrive at after my many experiments.

It appears, then, looking at Table Number I that grafting a granulating sore, when in a proper state, is of unquestionable value, and is called for in every case where the surface denuded of epithelium is either large, or slow of healing. We note that in nearly every case mentioned in that Table, that whereas the ulcer before treatment existed for years. It can easily be counted in days how long after grafting was required for complete cure: when such a result could not have taken place without grafting.

As to the kind of graft — Sponge will not form epithelium — It will replace lost tissue; will lead up granulations and connective tissue to fill any rational sized cavity produced by previous destruction — will indirectly promote epithelial marginal growth, because it acts as a stimulus to the wound generally; assisted, no doubt, by the extra care the patient will take of his sore when such transformation is in progress.

Derma will undoubtedly grow in many instances on a proper sore — It will form epithelium, and is, I think, of the greatest value when the patient objects to his own skin being used, where he does not mind that taken from an amputated limb or a cadaver. (I do not like the idea of utilising the Dead to incorporate the living, hence having satisfied myself

as to the possibility of this grafting - I purpose discarding the practice and using only the skin ~~from amputations~~ x from amputations recently performed, preserving it as long as possible, vitalised, in a septic condition at a body temperature.

Skin from the same patient is undoubtedly best - where it is allowed - There can then be no fear of any morbid transmissions - There is invariably the best interest for the inserted skin - It grows wonderfully, and much more successfully than derm -

The resulting cicatrix is the strongest of all, and will often be as strong, or stronger (like the uniting medium in some fractured bones) than the original tissue.

And I have tried to prove that the Rete Malphigii is the essential in the latter two kinds of grafting. Epidermis alone is useless. Both will slough away when placed on the granulations. And the epidermis of a skin graft will invariably slough if there is much discharge from the granulations. And granulations discharging much are typically unhealthy, and do not so actively take on attachments to the grafts.

That placing the graft in Blood Clot is of undoubted value, because it first acts as a cement to keep the grafts and granulations sufficiently long in

contact to promote vital activity.

Secondly - Because the blood clot is organisable if kept aseptic, and it is only by the graft becoming organisable that it can grow; therefore the clot acts as an intermediate and an introduction to the granulations to act upon the graft and promote its growth.

It would seem also that the better nourished the patient, the better are the results obtained. This may seem rational. And as all my patients (excepting Case 10) were paupers, therefore badly-nourished. I should quite expect, that were similar careful attempts made upon well conditioned patients, with either Dermis or Skin, or both, better results than these would be obtained.

NOTES

on

Ulcer Grafting

by

SPONGE DERM and SKIN.

45 Cases treated.

for

Graduation Thesis.,

by

P. W. Perkins Case M.B.

1884.

Skin Grafting. Case I.

Joseph Francis, aged 40, had a large ulcer on the lower third of front of his right leg – It was of many years standing – June 1881 – it extended 3½ inches around his leg, and 2½ inches from above downwards, & was then in a fairly healthy, healing state –

Treatment – One large piece of skin was taken from over the insertion of his left deltoid muscle, cutting thro' the whole of the Cutis vera: and this large piece, was subdivided into twelve parts, each part about the size of half a split pea; they were placed in rows upon the ulcer, each row being held in position by strips of linen adhesive plaster, each strip of plaster having a second strip attached to its centre, plaster to plaster, then it passed over the grafts, thus giving to those grafts a linen surface, instead of presenting the adhesive side – Carbolic Oil'd lint was applied, and the dressings not removed for two days and a half – Then dressed every second day – Six grafts took well – Six did not – They continued to grow well, till he discharged himself the following August, with his sore healing rapidly –

Result – 12 grafts – 6 grew – 6 did not –

Seeing this patient – the 10th October 1881, he informed me he went to work after leaving the Infirmary, & that he noted his grafts get smaller & less distinct, as he was unable to so carefully bind it, as in the Infirmary; and that the centers seem to be the last to disappear —

Skin Grafting. Cases II.. & III.

Elizabeth Taylor, aged 55. Seamstress was admitted 1877 with a large ulcer on the lower third of her Right leg -

History. It has been an open sore over 5 years. She has been to several Hospitals, but has never had her ulcer cured -

Present State June 1881. It was an elongated sore, over the right tibia and interossious region, extending from 1 inch above an imaginary line drawn from the tip of the Internal Malleolus, to the tip of the External Malleolus, 4 1/2 inches from below upwards, 1/2 inch wide at its lowest part, 1 1/2 inches above. Six grafts of skin, taken in one piece from her left arm & subdivided, were placed on the sore as Case I and similarly treated. Four grew, and in two months the ulcer was reduced to 1 inch by 1/2 inch, then Liq. Plumbi 3ij Aquæ 3ij was applied, and a Martins bandage, and two days afterwards all the four grafts and new tissue had broken down, and the sore was as large as before.

Second Grafting September 1881. Eight grafts were inserted; now the granulations were scratched till they bled slightly, & the grafts placed over the scratched part; and surrounded by a very little blood - Oil'd silk was next applied, no plaster, then Carbolic dressings. The third day the dressings were removed when all looked satisfactory; dressed after every second day and by the 4th November it was quite healed.

Result - Healed after 5 years previous resistance to all treatment.

Case III Skin Grafting.

James Wilson had an ulcer on the lower part of his leg 4 inches from above downwards, and 1 to 1½ inches around the leg — On June 1881. the sore was granulating well & healthy looking, then one piece of skin was taken from his arm, subdivided into 8 pieces & placed on the sore. 6 took & grew well, patient was kept persistently in bed, and in about five months he was discharged cured.

Result Discharged Cured. 8 grafts — 6 grew —

Case IV Skin Grafting.

Robert Lloyd, aged 29. — A deaf mute, Shoeblack, was admitted 10th October 1881 with an old Phagedenic, sloughing ulcer on the left leg.

History It was caused by the bite of a dog 4 months previously, it increased in size till its

Present State 23rd November — Now the sore is about 3 inches above a malleolar line on his left leg, 4 inches from above downwards, and 3 inches across, Margins, healthy and invading. Granulations small & of a bright red colour.

16 grafts were applied as in former cases, & dressed with Sanitas lotion, oil'd silk, lint &c.

26th Dressed for the first time, grafts well adhering. Sores appear

to have capillaries running into them through the attaching blood clot, which appears organizing.

8th Dec. — Dressed every second day. Improvement marked each time. Smells sweet; one graft at the margin is surrounded by new epidermis. Another in the centre is three times its original size, and one near the bottom has grown 3/4 inch, extending from it — General health good —

29th Decr. Leg now quite healed. The grafts have all coalesced with the marginal skin. The sites of the grafts have thicker skin than that between those sites — Patient now gets up daily —

13 Jan. All dressings stopped — only Zinci Oxydi sprinkled over the surface daily, to be a slight protection whilst the cutis grows thicker —

18th March. Discharged with a very firm cicatrix —

<u>Result</u> — 16 grafts all took —

Case VI. Skin Grafting.

Jeremiah Shay, aged 44, Labourer, admitted 31st January 82 with an ulcer in front of his left instep — Margin callous and irregular, discharge very offensive. Bodily health pretty good —

History 2 years ago, in addition to ascites, he had oedema pedis, and six months after, his legs were incised, & poulticed, till pus was formed; these incisions sloughed forming a sore which has never since healed — He has attended several hospitals with only slight benefit.

Present State The ulcer on the front of the left instep is 4½ inches from above downwards; 3½ around, tapering downwards and inwards - It was treated by poulticing, rest &c &c -

15th March — 16 very small grafts were placed on the granulations after each ones site had been gently scratched till a little blood flowed to form a coagulum, and in this the graft placed - Dressings Oil'd silk - Lint - Gutta Percha tissue and Carnitas Lotion -

17th Dressed — considerable discharge having a sweet smell: all grafts are in position, but their epidermal coverings soft and apparently breaking down -

19th Great discharge, grafts appear softer and much smaller -

21st March - All epidermic portions gone, and only a few shreds mark the situation of each graft - The whole ulcer surface appears congested, as though due to increased action and vascularity -

Result Of 16 grafts none took -

Cases VII and VIII. Skin Grafting.

Ann Moule, aged 25. Single, Seamstress, admitted 4 Feb 1881, in a very filthy destitute condition, stating "She had been exposed to the violence of a severe snowstorm just previously, and passed two nights sleeping under archways -

Present State Semicomatose & very foul, Feet black, with dirt &c - She has no power of movement of the lower limbs. Toes frost bitten - She appears much starved -

Treatment. 30th September 81. Now her bodily condition has greatly improved, & the parts post-bitten have sloughed away from both feet — The Right foot from the head of the meta-tarsal bone of the great toe to one inch below the head of the fifth meta-tarsal bone; but the plantar muscles were not so extensively sloughed as the dorsal muscles and tissues. ~~The heads~~

The Left foot slightly less, viz from one inch anterior to the head of the meta-tarsal bone of the great toe outwards fairly along the heads of the other meta-tarsal bones —

20th January 82 She came under my care —

23rd " 5 grafts were placed on the Right foot —

11 " " " " " " left foot —

each graft having a nest prepared for it, by previously slightly scratching the granulations till they bled enough to form a blood clot in which to place each graft. They were kept in position by strips of adhesive plaster as in Case 1.

27th Dressed every second day, most of grafts have their epidermic surfaces breaking down, but their lower parts ~~to~~ have become attached by the exuded blood, which seems becoming organised.

31st Grafts appear now very small indeed; not so distinct because of their upper white surfaces having sloughed away, and their lower surfaces becoming invaded with capillary loops.

10th February — Grafts doing well, now forming visible islands of individual separate growth.

8th March. Both feet quite well, the new skin appears very thin but firm —

25th March Discharged quite cured —

Result of 16 grafts — three growing uncertain —

Case IX. Sponge Grafting.

John Clarke, aged 62 – A blind beggar was my first patient – to try sponge grafting on, because he had an outcrop leg and ulcer, and, of course, could not use my "Modus Operandi" – He was admitted 8th June 1882, with a large ulcer on his right-leg –

History He has been a hard drinker for many years. He has been very much exposed – His ulcers were caused 23-years ago, and since have never been cured longer than three months at-any time – They have now been sores over seven months –

Present State About-five-inches above a malleolar line on the front of his right-leg were three irregular ulcers, very dirty and discharging very much –

Treatment- 29th June All three ulcers were covered with Sponge graft (The Sponge prepared as recommended by Professor Hamilton in the Edinburgh Medical Journal.)

All the surfaces had been scratched till blood flowed slightly – Largest-ulcer was about-2-inches square –

Lesser " " serpiginous, measured 1 3/4 inches by 1 inch.

Least- " " about the size and shape of a florin –

Dressings were Sanitas Gauze, (similar to Carbolic Gauze), and a white elastic bandage.

30th The dressings were considerably soaked with discharge, in places removing the composition from the gauze. Smelt sweet –

All the sponge adhering well, excepting the lower ulcer, where it had shifted down & was partly overlapping the margin, but not

the blood clot - has acted as a cement and produced a good union -
The interstices of the sponge were filled with coagulum - Each graft's center, was therefore red in colour, whilst the margins were of an orange hue - Slightly raising these margins did not cause bleeding.

4th July - One graft - came away from the lepers eyed ulcer; causing enough hemorrhage, to run over the edge of the ulcer -

6th " The sponge came away in very great part from the smallest round leaving a complete epidermal covering below - It appeared to excite greater activity in the granulations, so, perhaps, incorporate some of its substance, & so use the other as a protection, similar to healing by scabbing - The other grafts are much smaller -

12th Some of the sponge grafts have come away attached to the dressings, leaving small particles attached to the granulations the size of ½ a mustard seed - There has been considerable marginal growth.

14th No sponge discernable -

20th July - All the ulcers are quite healed - The largest was the last to heal, & now is covered by thin purplish cuticle -
The least - now covered with healthy looking skin -

Result - Three ulcers cured by sponge grafting &c after 22 days treatment -

Case X — Skin Grafting.

Mr S. a private patient —, aged 47. Grocer —

History Seven years ago, in trying to put out a fire caused by paraffine, he got a severe burn on his Right leg; it extended considerably up and down the leg, but healed up to a sore 4½ inches from above downwards, and 3½ inches around, which for these seven years had resisted all treatment —

Treatment — 6 April 1882. The sore was of the above size, not discharging much, but having somewhat callous edges —

21 grafts, taken as one piece from his upper arm, each about the size of half a pea, were placed on the scratched granulations in a little blood clot — and Sanitas Antiseptic. — Old silk, Sanitas Gauze, Gutta Percha Tissue and a bandage —

26th May — 16 grafts have taken well. The wound is now reduced to a square of 1½ inches. The grafts are well studding the surface, but some have united with the edges.

7th July — It is now 13 weeks since my operation; He has attended his shop since the end of May, gradually increasing his standing and exertion. Now he lifts casks &c, and stands behind his counter nearly all day — The sore is about the size of a pea, with red, thin, healing edges.

This sore he states was caused by rubbing off one of the epidermic scales covering the scar. Previously it was quite healed — It now looks scaly, otherwise strong —

Results — 2 wholly cured 16 grafts taking of 21 placed —

Case XI. — Sponge Grafting —

Julia Burke, aged 30. Hawkett, was admitted 7th June 1882 with a very large, foul, ulcer on her Right leg. it was discharging very much.

History — It was caused by a kick 7 years ago, and has never since healed. 5 years ago a large blood vessel burst in it that was ^nearly fatal to her. She has been in several Hospitals —

Present State — On admission it had callous looking edges, great discharge: she was placed in bed, & the sore poulticed —

28 June — The sore looks much healthier, and is healing slightly. Its position, is over the lower third of the tibia and fibula anteriorly, extending 4 inches from above downwards, and 6 inches across the leg.

8 sponge grafts, each about the size of a shilling were applied, the granulations being scratched, till slight bleeding ensued, and in this blood, the grafts placed — Dressings — Oil'd silk, Sanitas Gauze, Lotion, &c.

30th June — Dressed, great discharge, slightly offensive soaking the dressings. Grafts all adherent & filled with clot, darker red in the center than peripherally. The grafts are noted very thick.

2nd July — Great discharge, again soaking thro' 8 plies of gauze — One graft came away, leaving a non bleeding surface, but small particles of sponge adherent.

10th — Discharge now decreasing, owing perhaps, to solution of argent nitras gr iij ad ℥i used — The greater part of each graft has come away, leaving yellow particles of sponge firmly adherent; at the lower edge of the sore small florid specks about the size of small shot appear — Edges, invading well —

18th, no sponge discernable, but their sites were covered by a thin buff film very lightly adherent, which bled when severely scratched.

2nd August – She discharged herself, wishing to see her Soldier Son on his departure to Egypt – This she considers more important than any Sponge grafting – Ulcer was considerably smaller, the marginal growth having covered much of the sponge site – The pale film mentioned did not get much thicker, nor produce epidermis –

Result. discharged before quite healed —

Cases. XII and XIII. Sponge Grafting.

William Elliott, aged 57. A cutler, was admitted 26 June/82 having an ulcer on each leg.

History Earns a little money, then drinks it away; then begins again. Latterly is a travelling tinker.

Present State Is very emaciated, Rheumatic. His ulcers had not been cleansed for 3 days, hence they do smell –

The Right Ulcer is over the middle third of the Tibia, extending 4½ inches from above downwards, and 3 inches across – It was caused 7 years ago by his being struck with a brick, the core so produced has never since healed – Below the ulcer there is a great thickening of the periosteum, causing an elevation below, and partly around the wound, looking as though this ulcer was situated partly on and above the site of a badly united fracture, but this is not so.

The Left Leg has two smaller Ulcers in its middle third anteriorly, extending 2½ inches from above downward, and 2 in across.

A second smaller ulcer about the size of half crown was inferior and posterior to it – All these sores were discharging considerably –

11th July – After scratching the surface, all was covered with Sponge. Now oil'd silk instead of lanyo was placed upon the grafts –

15th Considerable discharge – penetrating the outer bandage, – The grafts have their centers filled with clot; their edges appear like straw coloured jelly, being transformed away; they seem much thinner than their centers.

17th Smaller wound on the left leg is well. It is covered with a thin yellowish white skin. The other ulcers are healing rapidly – Each graft seems of a marked sponge tissue at their centers, having a jelly looking, organising zone around the border.

20th The cuticular edge is rising up and covering the thinned sponge edge. Where it is not adjacent to the margin, this outer edge of sponge gets of a brighter red, granulations of a healthy kind appear, & invades centripetally; the center now has lost it sponge like aspect, & follows the course of the margins. Small on the Left remaining ulcer are dark patches, varying from the size of a pea to that of half a bean – It may be due to grafts from a Negro, placed on his leg 5 years ago at University Hospital, but did not then grow –

29th Scratching the remaining grafts, they bleed – They still as sponge – now remains, only a film, & it is semitransparent; all the other has organised. Right ulcer 3/8 in by 1 inch –
Left ulcer – size of sixpence – He wished for his discharge to-morrow

Result. Sponge nearly all organised – Ulcers much smaller –

Case XIV. Sponge grafting an old burn.

Emily Head, aged 15. Admitted 12 July/82. Has two large scars on her right arm.

History – 3 years ago, her dress caught fire, and burnt her severely, especially on her arms; all the burns are now well except on the Right arm two scars remain, and have not decreased for two years. All around it is cicatrix.

The burn extended from about 2 inches below the shoulder to the upper part of the hand. Her Right arm is smaller and shorter than her Left.

Treatment (The measurements of the two scars, traced are not given) 21st July – Both were covered with Sponge as before mentioned. Dressings Oil'd Silk, Sanitas Jaconet, Bandage, & Sling.

22nd Graft very thick – discharge has passed thro' the dressings.

23rd Graft ¼ inch thick in parts, looks healthy & organising, & pared down its upper surface. It was black looking in places.

2nd Aug – Graft putrid, smelling very offensive – Around the scar is great Erythema. Patient has temperature 104° & pulse 120. Rigors occurred last night – Considerable constitutional disturbance – I cut away the sponge causing it to bleed freely, applied Charcoal Poultices & gave Salines –

8th All the pyæmic symptoms are gone – Six small patches of sponge remain after 3 days poulticing.

13th Slight return of Rigors & erythema. Temp 100°: Sanitas dressings continued –

20th Abscess at the wrist I opened – Burns now healing

The hollow of the larger sore has filled up by granulations - The smaller wound at the elbow is about ½ inch long by ¼ inch wide -

28th Sore at the elbow has healed - A second abscess has formed at the wrist -

30th The two abscesses appear to proceed from a mass of sloughing subcutaneous tissue.

21st September - Ulcer now much smaller, but is not healing as fast as formerly -

23rd Her mother was so pleased with the diminished sore, & now cured she took her out to work -

Result Sponge grafting - first sponge removed owing to pyaemic symptoms ensuing - Great improvement to patient.

Cases XVI. XVII. XVIII. & XV. Sponge, Derm, and Skin.

Joseph Mayhew, aged 53, Soldier and Drover, was admitted 12th May/82. with an Ulcer on his left leg -

History 16 years ago, when a Dragoon in India he was kicked by a horse in the side of his Ulcer. The sore then produced was constantly reappearing, after his residence in Military Hospital caused its cure - In 1866 This place was again struck by a chest of shard, & has never since healed -

He has repeatedly been here and in other Hospitals. On his last admission here the ulcer had gone quite round his leg, & was about 2¼ inches wide in front 1¾ behind - His remedial applications, like his would-be Cures, have been various -

9th August 1882. His wound on the left leg is fairly clean, fiddle shaped, 6 inches above a malleolar line, is 6 inches around his leg, about 2 1/4 from above downwards on each side, and 1 3/4 inches over the tibia; its edges are curled, thick, hard, and callous looking. The marginal skin is purplish, hard and slightly oedematous. To day the whole surface was scratched till blood flowed, and the surface quite covered with Sponge, Oiled silk next, & Sanitas dressings, with an Elastic bandage -

13th Dressed daily - some of the grafts cut thinner with scissors, the squeezing caused considerable pus from the sponge substance to be pressed out - It smelt badly - Patient thinks "his leg is going wrong" It is red & inflamed looking around the sore. He has considerable malaise, & throbbing at the wound. I removed one third of the sponge, which caused free haemorrhage.

21st Daily careful dressing, & removing all absorbed pus by pressure has removed the malaise.

26th Sponge nearly disappeared over the whole surface, organisation commenced from its lower surface upwards, & the margins were the first to disappear. General repair is more active.

4th September - The surface of the ulcer seems to have levelled up. Its marginal skin again feels tense & painful, tho' no sponge appears. Two leeches gave relief -

Second Grafting - Derm or Skin from a Cadaver.

11th Sep - The edges of the ulcer now appear healthy and growing fairly inwards. The granulations look healthier, beef steak like. To day 20 grafts from Case I were placed over the surface of the wound, each placed on slightly

bleeding granulations. They varied from 1/16 to 3/16 inch wide, and from 1/4 to 1/2 inch long. They were the thick skin thickness. Some were placed with their Epidermic surface upwards, some fell on their sides. Scraping the old sponge grafted surface caused distinct pain. He states "There is more active sensation in the leg than for years past."

21st The old skin has been blackened daily, discharge considerable & decidedly offensive. Six grafts only appear, two have blackened surfaces as tho' their upper parts would slough. A very thin cuticle is showing over various sites of the grafts that are gone. The margins are growing well.

30th Sept. I left for America — it appear growing slightly —

3rd Nov. I returned & found no trace of grafts, and the ulcer again nearly encircling his leg.

Third Grafting. Sponge.

14 Jan 7. Having similar measurements as when first grafted, I placed Sponge now only about half over the sore in the usual Blood. Dressings as before.

18th great discharge, smells badly, turns the old silk black.

30th Night sweating dressings impressed matters. Sponge is being steadily transformed. The edges are growing inwards.

20th Feb very little sponge discernable, it only as tiny islands of homogenious pale yellowish jelly. Some of the thicker grafts had to be pared down. The margins of skin are tating on a pearly growth & invading very slowly.

Fourth Grafting. Skin. Epidermic part only.

21st February — Six small pieces of pearly looking skin

from the Ulcer's margin were removed (the removal of nearly all caused bleeding) and placed, graft-like, on the ulcer's surface after scratching.

24th He has not kept in bed. Grafts just visible.

6th March. All grafts are quite fond. The toes are growing better — Phlebitis followed —

14th " The surface of the ulcer got black & phagedenic Slight Pyaemia ensued and local inflammation. Charcoal poultices applied. Rest in bed & medicine.

Fourth. Grafting. Derm, or Skin from a Cadaver.

4th April — Ulcer has a callous look, but the granulations are nearly all gone from the margins — The granulations appear flabby, large & weak. Its size about as when first grafted.

I placed 18 grafts from Case III (a dead Child 1½ hours old) on the bleeding ulcer, each grafts being about 1/16 to 1/8 wide, and 3/8 in long & thus the whole derma.

12th Grafts have nearly all sloughed. There is great discharge. This infantile skin seems possessed of low vitality & seems to slough away quicker than the skin from an adult —

14th Pyrexia & local inflammation followed. The glands of his leg are very enlarged. Poultices were applied & medicine given.

30th Patient's health very good — he discharged himself —

2nd November 82. Patient readmitted with his leg very much worse. Fascia, Tendons, Skin &c had sloughed & he had very little movement of his toes in the left leg.

He gradually got worse & died 3rd December 1883.

Post Mortem notes as over

Post-Mortem notes 6th December 1884. on Joseph Mayhew.

-Body badly nourished and not-injected. -Below the wound was very hard and oedematous. The surrounding skin was congested, & bronzed in colour. Just around the wound the skin was easily removed, but 1½ inches distant was very firmly adherent.

Sacs of pus were found below the marginal skin, causing its erosion.

Saphenous Veins — Internal was normal 4 inches above, but atrophied before reaching the ulcer surface. Below the ulcer it was very congested. External had above it, the only bridge of skin, about 3/8 inch wide, which intercepted the ulcer pursuing quite round — Vein very small above & over this bridge, below it also was congested.

Fascia — Absent over the ulcer site; lightly adherent to the skin round the sore. About ½ inch away, above was a layer of fatty tissue, below none, but the fascia hypertrophied to nearly ¼ inch at the anterior annular ligament.

Tibialis Anticus — Tendon for 3 inches entirely through.

Extensor longus digitorum — Similar, excepting the tendon to the 5th toe.

Anterior Tibial Nerve — nearly eroded away at the wound.

" " Artery & Vein — Artery thickened — Vein dilated & containing blood, semi solidified — no clot. There was great anastamosis.

Extensor Longus Hallucis — nearly eroded through.

Posterior Tibial Artery & Veins — passed also under this only bridge of skin and tissue, the veins were very anastamotic

Posterior muscles normal — Tibia uncovered and devoid of periosteum: it had a beak like growth extending into the wound. it was black & porous looking —

Case XX. Sponge Grafting.

Ellen Crawley – aged 55 – Widow, Charwoman was admitted 1st August 1882 with a large foul, sloughing ulcer on her Right leg.

History 30 years ago she scratched the skin of this Right shin producing a sore: she thinks the dye from her stocking poisoned this wound, causing it to be a large ulcer; since then it has been healed and again reformed about seven times. It has now been unhealed 3 years.

Habits – pretty steady – sometimes gets drunk.

Treatment – 21st August – She has now two sores on the lower third of her Right shin. The larger is irregularly triangular, and measures about 1¾ inches each way. The smaller is about the size of half a crown. The surfaces of both were scratched by a probe till they bled, then prepared sponge about ¼ inch thick was applied all over.

23rd Great discharge, the transforming jelly like margin well notable. The dressings, oiled silk, Lardas gauze. &c.

11th September – The whole wound surface is now covered with thin, pale bluish white cuticle, excepting one spot about as large as half a pea of sponge appears, island like, on its surface: this sponge is being invaded by cuticle. Patient keeps in bed. The sponge texture may still be seen by the unaided eye, tho' of the jelly like character.

18th Result – Quite healed –

Case XXI. Derm or Skin from a Cadaver.

John Clarke (Case IX) readmitted 9th August 1882.

History — He states "his sore (previously grafted with sponge) kept well seven days, whilst he continued walking very much in his professional career as a Beggar. He kept the same rags round his leg all the time, and did not remove them till this present day, when small blisters appeared, which speedily broke, ran together, and 14 days after his sore extended 7 inches across by 2 inches from above downwards." —

On admission — The cuticle was gone, the subcutaneous surface yellow and elevated, and not the usual hollowed look —

29th August — Treatment — Ulcer very vascular, bleeds easily. Edges healthy and invading — 23 grafts from a cadaver, (removed two days ago) and each cut about 3/8 inch long, were placed irregularly on the scratched granulations — Dressing, Old silk Vaniloa —

Great difficulty was experienced in determining which was the lower surface of the skin after its minute subdivision, hence, very probably, all were not placed with the epidermis upwards. The skin cut with a hard leathery section.

3rd Sept. 15 grafts adhere & are organising, some are being incorporated with new epidermis. Very considerable discharge and slightly offensive.

15th 6 grafts disseminate, 2 came away in the bandage. These 6 have a reddish pink zone around their margins.

Result discharged quite healed.

22nd Nov. Clarke readmitted with Phthisis, but his leg remains sound —

John Gardner, aged 62. Labourer was admitted 4th August 82. with a burn below his right knee -

History It was caused by his falling asleep before a furnace fire, and there remaining for two hours. His trousers were not then burned through, but his leg and knee were very sore. He was admitted here about a week after.

Present State 24th November - A very large sore, 6in around the leg and 4 inches down, has been produced by sloughing of the tissues. Now is healthy, granulating, and has contracted somewhat - Six grafts of derm from Case II. were placed on, but I fear I did not scarify the surface enough, hence there was very little blood where the grafts were placed. Dressing Old Silk - Sanitas Jersey, Lotion to

26th - grafts not adhering well, tending to break down.

28th Streaks of pus pus from the grafts, very slightly adhering.

10th Dec. - grafts not well marked - a thin skin, like film, covers the right side of the ulcer - Healing marginally -

1st Jan. - Quite healed - The grafts, as such, have not appeared well on the surface, but in place of which a thin film appeared, which may have accelerated the healing.

Result: 4th Jan. discharged well - 6 derm grafts used -

Case XXIII. Derm Grafting.

George Hall, aged 47. Labourer, was admitted 14th November 82. with two large burns on his left leg.

History State – He fell asleep before a fire and burnt the back of his left leg. He felt nothing of it, till awakening, it was only a little sore, but on his coming into the wind from his hut he experienced severe pains. His trousers were charred.

Present State Has two burns close together about 2 inches below the knee posteriorly – Their superficial area is about 2 inches square.

12th Dec. 6 derm grafts from Case II were placed on the burn, which has now a very healthy look, the granulations are small and compact. They bled more freely when touched than Case 22. – Dressing as usual.

14th 5 grafts adhering well in their blood clot. wh appears to be becoming organised. One graft came away in the dressing.

18th grafts are distinctly discernable, though their upper surfaces have sloughed. Again a film covers one corner of the ulcer.

20th Healing very rapid, especially at the margins – Three small specks, Island like, in the centre of the sore now mark the position of the grafts.

2nd Jan 4 – Burn quite healed, though the covering skin appears thin – The grafts adhered well, & gradually united with the invading margin, now incorporated –

Result. 6 derm grafts, 5 adhered & grew. Burn healed –

Case XXIV. Sponge Grafting.

Mary A. Davis, aged 32, Widow, was admitted 22nd Nov 1882 with a contused cut and ulcer on the lower third of her Right leg anteriorly.

History 3 years ago she fell down stairs & injured her shin. The abrasion then caused never healed.

Present State – The filthy state existing on admittance has now very greatly improved – the ulcer is about 4 inches above a transverse line on the Right leg, extending 4 1/4 inches from above downwards, and 3 1/2 around the leg. Now its surface is clean, with healthy small granulations, & a nice invading margin –

18th January 83 – I scratched lightly the surface and placed sponge irregularly over about 3/4 of this surface – Strapping as usual –

22nd The sponge is becoming very gelatinous & transformed. The edges and thick parts have been pared –

12th February – Very little sponge as such, now remains; only little masses of yellowish jelly looking material –

20th The Sponge has quite disappeared, but its cuticle taken its place. The ulcer has a filled-up, granular look, but mends only from the sides.

18th March – Decrease only marginal, and it very slow.

Case XXV Derm Grafting.

4th April – The ulcer has now a clean granular surface, showing no signs of sponge, & no cuticle but the marginal growth.

24 grafts from Case III were placed on the sore, now

extending 3 inches from above downwards, and two inches across.

On scratching the granulations for planting my grafts, there was much greater hemorrhage from those at the margins, than those at the center. No pain was felt at the scratching.

5th – grafts are sloughing considerably –

9th Patient – unfortunately rubbed his sore severely with cotton wool at his early cleansing it –

12th Six grafts are showing as thin pellicles of skin about as large as half mustard seeds on the wound surface; they appear flat and contracting on the granulation surface.

14th April – Considerable discharge of an offensive nature – Patient keeps continuously in bed. Several pale elevated granulations are appearing.

24th These pale islands now appear more defined, and like epidermis, they are nearly white – I did not scratch them.

4 May – Retrograde condition – A second ulcer is appearing

16th " The two ulcers have united. The dermic grafts sloughed away, & the sore now getting clean again –

Clean bandages &c are now applied –

RESULT. – Sponge grafts all transformed – with no bad symptom.

Of 26 dermic grafts, 6 took & grew, but had low vitality & broke down –

Case XXVI. Sponge Grafting.

Wm Barber, aged 46. was admitted 6th January 1883 with an ulcer of his Left leg –

History 12 years ago he had erysipelas in this leg which caused a breach of surface. It has quite healed three times since then, the longest period it remained whole being four months. Being a Dock Labourer, has often been without food for considerable periods. Has never had syphilis.

Present State On his left leg about 4 inches above the malleolar line, and on the inner surface of the Tibia an ulcer extends 2 1/2 inches from above downwards, and 1 1/4 inches below. A little above and external to the former is a smaller about 3/4 inch square. Both have healthy surfaces and healing edges. All around the front of the leg the surface is squamous, with dirty looking scales.

10th January – Having scratched these sores till they bled. I placed sponge on nearly the whole surface. Usual dressings.

16th The grafts are adhering firmly and becoming organised. The outer Gutta Percha causing slight dermatitis, was not used –

22nd Some of the edges of sponge are undermined by ingrowing marginal skin – such were removed – The central parts of the sponge are being transformed. Repair seems very active –

14th February – All sponge tissue has become organised. No epidermis has taken its place — The sore relapsed the end of the month, due, I believe, to malpractice by Barber, who did not wish to go out –

1st May – Discharged well. Result.

Case XXVII. Derm Grafting.

Joseph Thomas, aged 33. Labourer, was admitted 22nd January 83 with a large dirty ulcer on his left leg.

History It was caused by the rubbing of his boot 3 years ago. and has never since healed.

Present State On the outside of the left leg, 2 3/4 inches above the tip of the external malleolus, is an irregularly triangular ulcer, 3 5/8 inches from above downwards, and varying from 1 3/4 inches to 3/4 across, the apex being downwards. Its surface on admission was very dirty and shrinking, now, 3rd February, is clean, but with flabby granulations.

3rd February 12 derm grafts, each 1/4 inch long by 1/16 inch wide, were placed on the scratched surface, about 1/2 inch from each other. and dressed as usual, the outer dressing being gutta percha.

5th grafts esp & beating down – 6 came away on the dressing.

7th Three remain, but smaller than when applied, & sloughing.

9th Three white specks only, mark these three grafts. The cicatricial tissue is not darkened. Edges are invading healthily.

18th Ulcer is now only 3/8 of an inch wide of the central part, but the new skin formed by the margins is considerably thickened at the site of the three grafts.

20th Result. patient discharged quite cured —

Case XXVIII. Derm Grafting.

Thomas Bristowe, aged 43, was admitted 2nd June 1882. with a large ulcer on his Right-leg. was a dragoon.

History 7 years ago he had a kick on his right-shin causing a wound after sloughing. was on account of it discharged from the army, when he lived a dissipated life. It has never been healed since. Has had Ss. = Syphilis

Present State On his Right-leg about 2 inches above a malleolar line the ulcer extends 4 inches upwards, and 2 1/4 inches across, over the Tibia and Fibula. the former bone being thinly covered: the surface is considerably hollowed out, especially as between the bones. The edges are callous and abrupt: There is not much discharge from the surface.

30th April 83. 13 grafts from Case III were placed upon scratched granulations on the upper half of the wound. The long axis of each graft was parallel to that of the leg. Blood clot formed adhering coagula. The grafts were 16 days removed from the corpse.

24th great discharge, not putrid. The epidermic parts of the grafts are gone, but elevations of granulations appear in their places.

28th grafts not well marked. Edges invading more vigorously than before the grafting — but much discharge.

7th grafts all gone — Ulcer not decreasing because the patient walks daily on his legs too much.

Result: 13 grafts — 16 days old — all sloughed.

Case XXIX. to XXXI Derm. Sponge & Derm.

1

William King, aged 55. Hawker was admitted 3rd January 83. with an ulcer a his left leg.

History 28 years ago a pimple came on the hinder part of his left leg. He scratched it & made thereby a sore. In about 2 years went up the leg 9 inches, & around, all but 1 inch. It has never been quite healed. He had chancres 32 years ago, then he led a fast life, & was a heavy drinker.

Present State. About 2 inches above a malleolar line on the front of his left leg, an ulcer extends 3 inches upwards, and 3½ inches across.

22nd April - Sore is trifoliate having a healthy look, florid granulations, not a great discharge, with thin purple healing margins. On the inner half I placed 13 grafts from Case III, in the usual manner, placing all with their long axes parallel with those of the vessels of the limb. 5 grafts were close to, or touching the margin. The patient was placed in bed.

24th great discharge, very offensive, discolouring the oiled silk - grafts very sodden -

28th Dressed daily - grafts slightly visible as whitish specks - A quantity of thread like material comes away daily. Edges healing -

1st May - grafts gone

16th " Repair now stagnating - Patient keeps in bed.

Case XXX. Sponge.

Patient William King, as last-

26th June- Several kinds of dressings have been used without much avail- Now the ulcer measures 2 7/8 inches from above downwards, and 2 3/4 inches across. The granulations are now unhealthy, flabby, pale, and seem to contain a great deal of fibrous tissue. Bleed with difficulty when scratched. Two small ulcers are commencing at the sides of the larger. Sponge was placed over 1/3rd of the entire surface, after severe scratching.

30th June - Dressed daily - A little sponge turning black was removed. Most was full of blood clot.

4th July No bad symptom - Several dark spots were removed. They contained pus in early putrefaction.

10th All the margins turning into jelly like substance. The marginal increase of growth in places undermines the sponge. Since this sloughing, repair had returned vigorously.

12th Measurements now are 1 inch from above downwards, and 2 inches across. The sponge where thickest is quite gone. The thickest are represented by this yellow translucent jelly like substance.

18th All sponge has disappeared, leaving a red, florid, healthy look, comparing very favourably with the former condition present when the sponge was placed on.

Also repair has gone on well since.

Case XXXI. Derm Grafting.

Wm King again the subject as before.

10th August 83 — Ulcer now extends ½ inch from above downwards, and ¾ inches across. Granulations are now very congested - They bleed freely when scratched.

5 grafts were placed on the bleeding surface, particularly at the edges, and Sanitas dressings applied with an Elastic bandage.

14th 4 grafts are adhering, I cannot answer for the dressings - The 4 have their upper surfaces epithelised. No pyrexia.

12th September — Returned from my holiday & find the sore ½ inch by ¾ in with thickened edges, & a fairly healthy surface. The new skin has a squamous look and scales frequently.

Strips of plaster were now used, tightly across the sore.

22nd Patient is not so well. Is pale and anæmic — A fungus (mould like) has attacked his sore, especially any epidermis lying around the wound, and the bandages especially. Slight sloughing ensued - Treatment - Charcoal Poultices. -

Similar fungoid growths have attacked five other ulcers in the ward. Microscopically they appear like the Penicillium

29th September — Result:

Discharged - Sore the size of sixpence.

Case XXXII. Sponge Grafting.

Thomas Butler, 43. Dock Labourer, was admitted 20th April/83. with an Ulcer on his Right-leg.

History 3 years ago he had his pimples on the front of his right shin, which he scratched, and caused a sore. In 18 months it extended to its present size, owing chiefly to his neglect. Has led an irregular life - A hard and steady drinker. A small eater, often having no food. Patient now looks an old man, anæmic & emaciated -

Present-State Legs oedematous. The Right-about 3/4 inch above a malleolar line extends 8 1/2 inches upwards, principally on its outer side, and 6 1/2 inches across. It is nearly round the leg. and is very dirty, and callous looking.

20th June - Sore is clean healthy looking. But discharges rather much. Sponge grafts, 3 in number, were placed on the scratched surface.

30th. Grafts well. Raised slightly in their thickest parts. They bled freely when scratched - but give no sensation.

6th July - The thickest pieces it is necessary to press to free of retained pus, - daily.

10th " Nearly all are gone - In their place appear a few yellow specks dotted with red (apparently enlarged capillaries). A little blood is extracted on scratching, still no sensation.

13th No trace of Sponge - This mentioned vascularity seems increased. The blood vessels are distinctly blue like & easily seen.

Case XXXIII. Derm Grafting.

Thomas Butler – again –

10th August – The Ulcer has a healthy look, with skin invading margins – how the sore extends from 1/4 to 6/8 inch across, & 4 inches from above downwards.

11 Derm grafts from Castlemore placed in the blood oozing from the scratched granulations – Dressings – Sanitas.

12th 10 very satisfactory – one came away. No pain.

14th Healing rapidly – one graft seems enveloped in clot, which appears organising and holding the graft securely. Two of others are on the ulcer surface. No unfavourable symptoms.

12th September – During my month's absence I am informed the nine grafts all grew. how they are incorporated with new skin, and the sore nearly healed. Granulations healthy.

29th Healing is encouraged by placing in bed, Keeping the feet & legs elevated about 9 inches, with blocks below the bottom legs of the bed – & strips of plaster applied to the sore.

22nd October – Sore quite healed – He leaves to-morrow. Bridges of skin followed the plaster over the granulations and sore subdivided the Ulcer.

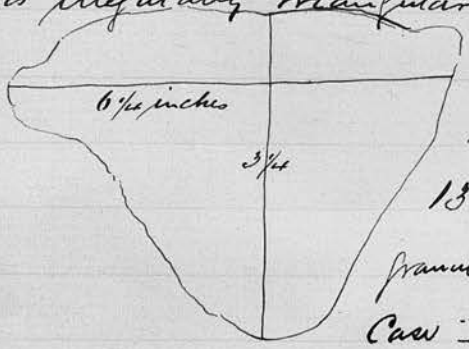
Result – Discharged well after the second grafting.

Case XXXIV. Derm Grafting.

William Cox. aged 59, Horsekeeper, was admitted 31st January/83 with a large indolent ulcer on the shin of his Right-leg, and very dirty. Habits – very irregular, has been a regular drinker, an irregular Eater, and had Syphilis.

History – 5 years ago he was kicked by a horse in this site, & neglected the injury. In 8 months got – nearly its present size, viz 6 1/4 inches around the leg, & 3 1/4 from above downwards.

Present-State Sore extends on the Right-leg in front, as above stated, commencing about 2 inches above a transmalar line. & is irregularly triangular. Surface bright crimson, and easily and freely bleeds when scratched. Edges healing – Surrounding skin cyctematous.



13th September I placed on the scratched granulations 14 elongated very thin grafts from Case IV. now 34 days removed from the corpse and kept in serum of sheeps blood at a temperature of about 98° F – The serum smelt slightly on opening it – The granulations bled freely, therefore the grafts were placed in considerable coagulum – The dressings were as usual –

15th Nearly all the grafts are adhering well in the coagulum – No putrid odour, and the leg comfortable –

14th Dressed daily – The grafts are softening at their surfaces, but in well-marked instances the uniting coagulum was infiltrated with small capillaries, and the adjacent granulations were engorged – The oil'd silk was only darkened in three tiny places about 3/8 in square.

24th Dressed daily - no unhealthy symptom - In the same ward a green fungus has appeared on the marginal epidermis of some wounds, especially so in denuded epidermis - The site of six grafts has a congested look of its granulations, capillaries are enlarged & purple, some may be seen with a small hand glass. Over one of these purple patches a thin film appears - The Ulcer is healing from the margin -

4th Oct. Ulcer now 2 in long. by 3/4 in across at its widest - Strips of plaster were placed across the ulcer and round the leg -

11th Oct. Reduced to 1 1/4 in by 1/2 inch: Dressings his ointment.

20th. Plaster causes improvement = Dressings now Sanitas lotion.

11th Nov Tr. Benzoin Co applied to make a scabbing, acted as an irritant & caused a fresh breaking down of the skin.

2nd Jan 7 All grafts disappeared -

4th April - Ulcer quite healed -

Result - Healed considerably after Derm grafting - afterwards broke down again - Discharged well -

Case XXXV. Derm Grafting.

James Elliston, aged 55, Potman, was admitted 21st September /83 with a large ulcer on his left shin - It was very callous. Edges thick.

History - It was caused by a kick two years previously, which neglected, got very large. Has never healed. He has varicosity of the Internal Saphenous Vein below the knee, little on the thigh. H Habits unsteady, but a steady drinker. Livelihood precarious, sometimes plenty, often none. Is fairly well nourished now - Has had Syphilis -

Present State Over the front of the lower third of his left leg an ulcer extends 6 inches across, & from 3 inches to 1 inch from above downwards.  Granulations flabby, congested, bleeding easily when scratched. Discharge great. Margins healthy and invading -

Treatment 3rd October /83 - 20 Derm grafts were placed on the scratched granulations from Case V; 8 hours after death. (The Cadaver was 2 years old) Dressings Carbolic Oil, & Bandas Gauze.

6th Great discharge requiring daily dressings. Grafts soft & breaking down - A little coagulum appears in various sites, & there the granulations are congested -

9th No unfavourable symptom - Great purulent discharge - Ulcer is healing rapidly. One graft is growing very well.

29th Ulcer very small, graft has blended with the marginal skin -

4th Nov. Another graft has appeared and is growing vigorously - It is quite insular in the granulations. The bottom of the bed has been elevated by blocks 10 inches high. Now marginal growth seems lessened.

11th - Second graft grows well - Elastic bandages are supplemented.

6th Dec. Two bridges of skin have run across the ulcer, subdividing it into three small ones, each section is healing satisfactorily.

20th December 1883. Improvement continues; each bridge of new tissue is widening and over the sites of previous grafts.

27th The wound, from an unexplained cause, has broken out again, now it is 3/4 inches across by 1/8 from above downwards. It may be due to overmuch Xmas festivities. No fresh mould was pre-existing.

Result 20 bone grafts - two grew very well.

Case XXXVI. Sponge Grafting.

Thomas Richards aged 61. Hawker, was admitted 15th Oct. /83 with a large ulcer on his left leg, and ruptured.

History 3 years ago he was struck by a Policeman's staff on his left shin, this caused a wound:- neglected; it assumed its present shape. Has never been cured: once after residence at King's Hospital it was reduced to the size of a shilling. Habits drinking, & wanting.

Present State. From 1/2 inch above a malleolar line on the outer side of the left leg the ulcer extends 3 inches - It is oval, having its greatest breadth 2 inches. It is principally over the lower part of the tibia. Edges callous & thick. Granulations clean and not exuding much, It is seemingly hollowed from loss of substance. Surrounding skin normal.

Treatment Sponge grafts were placed over about 1/2 the surface after scratching. Dressings, Carbolic Oil, Oil'd silk, Sanitas Gauze &c. on the 27th October 1884.

~~29th~~ 3rd November - Dressed daily - Sponge is being transformed rapidly. No bad symptoms have ensued. Edges are not growing much.

10th November. Blocks have been placed at the bottom of the patients bedstead.

17th November. The elevation of the legs has caused a quicker penetration of the sponge by granulations, & its absorption. Where the sponge was 1/16 of an inch thick, it now appears quite jelly like; where thicker, its upper surface remains as sponge holding pus. Irrigation best removes this pus. The grafts frequently bleed during their dressing.

21st Very little sponge texture can now be seen, only in the thickest places. Margin invading cause traction on surrounding ~~painful~~ parts, which causes pain.

26th Nov. No sponge visible.

11th Dec. He has been up a little. Eyes seem congested, also the granulations, having apparently low vitality.

13th Discharged, and all sponge having undergone tissue digestion, & the ears much smaller.

Result as 13th December.

Skin Grafting. Case XXXVII.

Michael Forman, aged 38, Dock Labourer, was admitted 25th October 1883, with an ulcer on his left leg.

History Ten years ago when an Engine Driver, in India he struck his left shin against the Engine Step causing an abrasion. Neglected, it produced a sloughing wound. which, more or less, has troubled him ever since. Living now precarious.

Present Condition – U. serpiginous in shape over the left shin, commencing 4 inches above a malleolar line, 4 inches from above down and 1 3/8 inches across at its widest. Surface clean, copes healing.

31st Oct. 9 small pieces, subdivided from one piece taken from over the left biceps, were placed on the granulations not previously scratched. Each graft was about 1/8 in by 1/16 inch. Dressings were Carbolic.

2nd Nov. One graft gone, some have shifted, but 8 are adhering.

9th " Dressed every second day only. 4 grafts appear as knotted elevations, purple in colour below, but having the epidermis sloughed.

12th Independent growth has commenced in these 4, viz, a zone of whitish skin is invading the granulations. One has united with the margin.

20th Patient states his leg has never healed so rapidly. Grafts growing.

26th The wound has healed excepting 4 little specks where the new thin skin has given way. Patient sits up.

Result = Discharged cured 3rd December 1883. Residence therefore was 5 weeks and 4 days.

Case XXXVIII. Skin Grafting.

Catherine Harrington, aged 56, Single, was admitted 22nd October 83 with a large ulcer on each leg.

History – 8 years ago she was kicked on her left shin & the laceration so produced healed only three years afterwards. A pimple formed 14 months afterwards, which scratched, formed a sore & since has has never properly healed. Habits – Prostitute, & drunkard, consequently often has very little food sometimes. For two days before admission she had nothing to eat. Has had two illegitimate children.

Present State Ulcer very dirty – It extends 6 inches up the leg, (left) commencing 1½ inches above the malleolar line, pear shaped and measures 2⅝ inches at its widest. Its site is over the tibia & internal to that bone. No varicosity is discernable.

Treatment – 15 sections of a piece taken from her left arm were placed on the scratched granulations: their long axes pres, as far as possible, parallel to that of the leg. on 19th November 1883.

20th Nov. – The grafts adhere firmly in ~~on~~ of an oozing clot, which have the appearance of buds with pinkish bases on the sore.

11th December – 10 grafts grow well, two have united. The gutta percha tissue produced erythema, so was discarded. Each graft has a thick elevated center (the original deposit) with an external zone of pale pinkish skin.

28th December – She discharged herself, the wound was nearly healed.

Result. 15 grafts in clot, 10 took very well, causing a rapid cure of the sore.

Case XXXIX. Skin Grafting.

Emily Read, aged 15, (see Case XIV), was again admitted for the extensive burn of her Right arm, on 10th August 1883.

Present State. The previous cicatrix induced by Sponge grafting holds very well. Now she has a sore 1 1/8 inches long, by 5/8 inches across, on the under surface of her Right arm, 1 1/2 inches below the Olecranon. The surrounding skin being all cicatrix, there is none to give way by traction.

Treatment — 1 December 83 — I removed skin from over her left biceps 3/8 inches by 1/4 inch, and at once placed it on the granulations, without their being scratched. Dressings as usual.

5th Dec.r Dressed every second day — It adheres well, and has a pinkish blue line of attachment. Not much discharge.

11th All is now a purple little elevation, bleeds when scratched, has a very slight marginal growth.

24th December — Now the graft nearly covers the entire sore, the sloughing of the Epidermis has been inconsiderable.

28th December — Quite healed —

Result — One Graft placed on a sore grew very well.

Case XL. and XLI. Skin Grafting.

David McLaughlin, aged 47, Fishmonger, was admitted 15th Dec 83 with a large dirty ulcer on his left-leg.

History. 6 years ago he had a small sore about one inch above the ankle; this scratched, spread to its present-size. It has quite healed under treatment. Habits irregular, & food supply ditto. Has had Syphilis -

Present-State On his left-leg 3 inches above a malleolar line in front- and laterally, his ulcer extends 2 1/4 inches from above downwards, and 4 1/2 inches across.

23rd December. The sore being fairly clean, discharging slightly, and with small granulations; 10 small pieces from his arm were placed dry on it. Sanitas dressings.

1st Jan. Five small-grafts have fond, 4 round the margins, and one large central one are seen. Their upper surfaces have sloughed, deep surfaces richly permeated with capillaries.

20th The 4 marginal grafts have incorporated with the margins. Central one is about as large as a three penny piece.

25th The central graft is about as large as a sixpence.

28th Three new grafts, taken from his Right-arm were placed around the existing graft without any scratching. Each was 1/4 inch long by 1/8 inch wide.

4th February. There has been great purulent-discharge, now only one graft remains, it is about as large as a three penny piece.

25th " Result: Completely healed.

Case XLII. Derm Grafting.

Alfred Vaughan, aged 42, Single, Dock Labourer, was admitted 8th December 1884 with a large sloughing, stinking ulcer on his right-leg.

History — 14 years ago he struck his right shin with a keg of butter; the sore so formed increased; and 11 months after violent hemorrhage followed; it was cured in the London Hospital. It has been a sore off and on ever since. It is now 11 years since it quite healed.

Has been a hard drinker occasionally. Never long deprived of food.

No syphilitic history — He is of full habit.

Present State — 1 inch above a marked bar line on his right leg the ulcer extends upwards for 5 inches — It extends round the leg excepting a bridge of about 2 inches.

Treatment — 29th January 84 — 14 small grafts from Case VI. were studded over the unscratched granulations. Dressings and Carbolic oil + Canvas bandage &c as usual.

4th February. Dressed daily. Grafts have their upper surfaces sloughing, and appear to have moved.

11th The grafts are growing well. 4 have united with the margin.

14th They have formed a line of new tissue 1½ inches long, almost parallel with the lower edge of the ulcer, but having a granulating surface 3/8 inch dividing — To day, was photographed — as over —

24th The grafts have united below with the margin, and others have grown across the sore as bridges of skin — now there are 4 separate ulcers.

10th March — The bridges of skin are widening slowly, the widest is now 3/4 inch wide.

Case XLIII. Skin Grafting after Derm Grafting.

Alfred Vaughan, the previous patient.

After the early part of March repair of the ulcer seemed to lag, the granulations became large and flabby and had to be reduced by Caustic.

31st March. A more healthy surface following the caustic. On the remaining large area, 2 inches by 1½ inches; 6 small grafts, taken from over the Left biceps were applied on the scratched granulations. Dressings were Sanitas lotion & gauze.

2nd April – All six grafts are satisfactory, not moved.

7th " Dischage great, the Epidermic surfaces of the grafts are sloughing, but they all appear as red buds on the sore.

9th Now are assuming growth "de novo".

10th – Four grafts do very well, two marginal, have incorporated with the marginal skin – Two central are growing actively. Very noticeable is the improved general repair since the grafting

22nd Improvement continues. The Four grafts now nearly cover the wound except at its upper part. They have united considerably with one another & with the margins.

Timothy Collins . 53. admitted 6th November 1883.

Ulcer then 4/in x 4/in.

Grafted with Derm. 29th January 1884.

Case XLIV. Derm Grafting.

Timothy Collins. 53. Single, a Dock Labourer, was admitted 6th November /83 with Ulceration of his Right-Leg.

History. 10 years ago a pimple appeared just below the External malleolus of his right-leg. Scratched this made an ulcer, which has 3 or 4 times healed. Now it has been a sore six months.

Present State He is a peculiar fellow; having many attributes of an hermaphrodite - viz Small genital organs, little hair on the mons Veneris, Very enlarged mammæ. No hair on his face. A shrill, female like voice. Very prominent abdomen. He states "He is no use to a woman", hence, has never had Syphilis.

Habits precarious - frequently goes without food.

With a radius of about 2 inches from the external malleolus on his Right leg, an ulcer appears, dirty and callous.

Treatment. 29th January /84 - The sore being cleansed and healthy, and Hocks elevating the bottom legs of his bed. 6 grafts of Derm from Case VI. were placed on his granulations not scratched.

4th February - Dressed daily, grafts growing well. Around their margins, they are permeated with capillaries which produced a pink zone: their tops are dark buff, soft and breaking down.

11th Some grafts have merged with the margins. Two others in the sore have doubled their size. They appear as opaque islands of a pale pink hue, with a margin of a deeper pink, due doubtless to the capillaries.

14th Was photographed. These two islands grow very well.

1st March. Result - Completely healed. The new skin is purple & the sites of the grafts show as white specks, & is thickest.

Case XLV. Derm Grafting.

George Wilson, 45, a Hawker, was admitted 22nd January 1884. with a large Ulcer on his Right leg. It was very dirty.

History It was caused 6 years ago by a kick; followed by being scraped by a step of a cart; produced a very large sore. It has never been healed. Has had Syphilis & is of very uncertain habits.

Present State The ulcer is now nearly round the leg, & extends 4 1/4 inches upwards, commencing 1 inch above a malleolar line. granulations large, discharging considerably —

Treatment. 14 grafts (2 days removed from the leg and kept in Condy's fluid, which turned them black outside) were placed on the two scratched granulations. The black was pared away as much as possible. 1 February 1884.

7th daily dressings. All grafts are rapidly sloughing away. There is very great discharge. Patient has no bad symptoms.

14th Very little of the grafts remain. The ulcer is healing from its margin.

1st March. No trace of grafts remain. The legs are elevated by blocks, & marginal healing proceeds.

11th March. He discharged himself very greatly better.

Result 14 grafts — all sloughed.

Derm Supply.

Case I. 26th August 1882 — Jno Davis, aged 46 died of apoplexy, after an attack of 10 hours duration. 6 hours after death, when the body temperature was about 84° F. I removed a strip of skin down to the subcutaneous tissue from the middle line of the abdomen. It was cut into pieces about 3/4 inch square, and placed in Solution. Glycerine, and Carbolic Acid of each 1 part. Water 20 parts. It was applied in Cases 16, and 21.

Case II. 12th November 1882. Mr Jonathan Hutchinson Senior Surgeon to the London Hospital amputated below the hips of a boy for Strumous disease of the knee. Within half an hour after its removal I took strips of skin from the thigh, similar to the above, and placed in 1 to 20 Carbolic and Glycerine Solution. The strips at once curled up, and about an hour after they had a hard leathery feel. The boy was 9 years old.

It was applied in Cases 22, 23; and 24.

Case III.

4 April 1883. Skin was taken from a fetus aged 1½ hours, within one hour after its death. It was taken from 1 inch to the right of the Spine. No subcutaneous fascia or fat was retained. It was placed in 1/6240 Lanitas Oil Solution. It was a 7 months fetus, and its parents being Irish caused a little stir at my removing the skin — It was used in

= Cases 25, 28 and 29.

Case IV.

10th August 1883 — I removed skin from the front of the left thigh of Caroline Hurscrop, aged 48, who died of apoplexy yesterday. 13 hours had elapsed. The body was warm.

The skin deprived of subcutaneous fascia and fat was placed in Serum of Sheeps blood to which Acid Carbolic M iij per ounce was added. It was placed in a chamber remaining about a temperature of 90° F and used in

Cases 31, 33, and 34.

Case V.

3rd October 1883. Skin 4½ inches by ¾ inch was taken from the thigh of Marian Francis Berry, aged 2 years, six hours after death, while the body was warm. Meningitis was the cause of death. The skin was placed in the Serum of Sheep's blood, obtained 1st August, to which Acid Carbolic 3 drops per ounce were added. Though two months old, no bacteria could be detected, & it smelt sweet.

It was placed on Cases 35—

Case VI.

29th January 1884. A woman's leg was amputated at the London Hospital; skin was at once taken from the limb, placed in milk and applied the same day to

Cases 42. — 44, and 45 2 days afterwards.

Number grew –	Dressing –	Previous duration.	When healed.	Remarks –
?	Sanitas	28 – years	nearly 49 days.	– Penicillum mould appeared
All –	Not stated	3 years	24 days –	All transformed.
reported grew	Sanitas	3 years	79 "	I was absent on holiday.
[illegible] well –	D°	5 "	Increased vascularity followed	
1 grew fairly	D°	2 "	64 days was divided into 3 bridges of skin.	
All.	D°	3 "	47 "	Discharged nearly cured.
4 very vigorously	Carbolic	10 "	33 "	Sent to Canada.
10.	Sanitas	5½ "	39 "	
1 grew well –	D°	?	28 "	
5	D°	?	——	
2	Carbolic	?	64 "	
8.	D°	?	——	
4.	D°	?		
4	D°	6 months	30 "	
[illegible] well	D°	6 years		Grafts placed in Condy's fluid previous to grafting — —

Table of Ulce

	Name.	Age.	Site.	Size.	Graft.	Number p
1.	Joseph F.	40.	?	?	Skin.	1.
2.	Elizabeth T.	55.	From 1 inch above Malleolar line	4 in by 1½ inches	Skin.	6
3.	" (Second time)	"	" 1 inch above M.L.	4½ in by 1½ in.	Skin.	8
4.	James W.		" 1 inch	4 × 1½.	Skin.	6
5.	Robert L.	29.	" 3 "	5 × 4.	Skin.	1
6.	Jeremiah S.	44	Front of Instep.	4½ × 3.	Skin.	16
7.	Ann M.	25	Instride of toes	3¼ × 2	Skin.	6
8.	" "	"	of both feet —	3¼ × 1¾	Skin.	1
9.	John C.	62.	5 inches above M.L.	2 × 2	Sponge	Surface co
10.	Mr. S.	45.	Do.	4½ × 5½	Skin.	21
11.	Julia B.	50.	Lower ⅔ of Shin.	6 × 4	Sponge.	8
12.	William C.	57 Right.	Middle ⅓.	2½ × 2.	Do.	— nearly cover
13.	" "	" Left.	Do.	4½ × 5.	Do.	" "
14.	Emily H.	15.	Arm.	?	Do.	quite cover
15.	Joseph M.	53.	6 inches above	2¼ × 1¾	Do.	" "
16.	" "	"	M.L.	?	Skin	70
17.	" "	54.	Do.	2¼ × 6.	Sponge.	half cover
18.	" "	"	Do.	?	Skin.	
18A	" "	"	Do.	?	Skin.	
19.	Ellen C.	55.	Lower part of R Shin.	2½ × 2½.	Sponge	¾ cover
20.	John C.	62. (hog)	5 in above M.L.	6 × 1¾	Skin.	23.
21.	John G.	62.	Burn below R Knee.	4 × 6.	Do.	6.
22.	George H.	47.	Do.	4 × 4	Do.	6.
23.	Mary D.	32	4 in above M.L.	4½ × 3½	Sponge.	— nearly cover
24.	" "	"	Do.	3 × 1¼ to 2	Skin.	24.
25.	William B.	46.	Do.	2½ × 1¼	Sponge.	¾ cover
26.	Joseph T.	33.	2¾ in above M.L.	1¾ × 3⅝	Skin.	12.
27.	Thomas B	43.	2 in above M.L.	4½ × 2½.	Do.	13.
28.	William K.	55.	½ in Do.	3½ × 3.	Do.	13.
29.	" "	"	Do.	2¾ × 2⅝	Sponge.	⅔ covering
30.	" "	"	Do.	¾ in × ½ in	Skin.	5.

Nc Grafted. I.

ber	Number grew.	Dressing.	Previous duration	When healed	Remarks
	6.	Carbolic Oil & Lint.	Not stated	Not stated	
	4.	D°	5 years	——	
	?	D°	"	2 months.	
	6.	D°	Not stated.	Not stated.	
	16.	Sanitas dressings.	4 months.	115 days.	Not since ulcerated
	None satisfactory.	D°	18 months	?	Great purulent discharge.
	not stated.	D°	360 days	61 days.	
	" "	D°	D°	D°	
	3 small pieces came away.	D°	7 months	22 days	
21	16.	D°	7 years	92 days.	
	4.	D°	7 "	35 days	Discharged herself before quite cured.
	all.	D°	7 "	35 "	D° D°
	All excepting a little passed.	D°	7 years	19 days	D° 3/8 × 1 inch
	nearly all removed by poultice.	D°	3 "	61 "	D° greatly improved.
	1/3 removed.	D°	16 "	——	Rest organised – More vigorous growth.
20.	?	D°	16 "	——	No notes – I left for America 3 weeks after
	1st part came away.	D°	17 "	——	All organised – More active growth.
	0.	D°	17 "	——	
		D°	17 "	——	Died – P. Notes of Post-Mortem given.
	All	D°	3 "	28 days	
3.	13.	D°	4	?	Readmitted 22.11.82 leg sound.
	over granulations.	D°	7 days burnt	41 "	
	3 grew slightly.	D°	?	21 "	
	Grafts passed.	Carbolic	3 years	47 "	All organised – More vigorous action.
	6 grew slightly	D°	3 years	Grafts grew slightly.	
	Grafts passed.	Sanitas	?	110 days.	
	3 slightly.	D°	3 years	23 "	
	None satisfactory.	D°	6 years	not healed.	
	" "	D°	28 "	" "	
	all "	D°	"	" "	reduced to 3/4 in by 1/2 inch
	No satisfactory account. Ten days after I had a month's holiday, so no notes.	D°	"	" "	" 1/2 in by 3/8 " afterwards broke down again.

Continued from over.

No.	Name.	Age.	Size.	Site.	Graft.	Number placed.
31.	William K	55.	1/2 in above M 3/4 in	1/2 in above M.L.	Derm	5.
32	Thomas B.	43.	6 1/4 in by 1 3/4 inches	3 in above M.L.	Sponge.	3.
33.	" "	43. (same)	4 × 9/8, 15/4	Do	Derm	11.
34.	William C.	59.	3 1/4 × 2	Lower 1/3 of R shin.	Do	14.
35.	James E.	55.	6 × 3.	Lower 1/3 of R leg.	Do	20.
36.	Thomas R.	61.	3 × 2.	1/2 in above M.L.	Sponge	1/2 covered
37.	Michael G.	38.	4 × 13/8	4 in above M.L.	Skin	9.
38.	Catherine H.	56.	6 × 2 5/8	2 in above M.L.	Do	15.
39.	Emily H.	16 No 14	1 1/8 × 5/8	Burn on arm.	Do	1 large
40.	David McL.	47	2 1/2 × 4 1/2	3 in above M.L.	Do	10.
41.	" "	47 (same)	?	Do	Do	3.
42	Alfred V	42.	Nearly round the leg × 5	1 in above M.L.	Derm.	14.
43.	" "	42 (same)	2 × 1 1/2	Do	Skin	6.
44	Timothy C.	53.	2 × 2	over R external Malleolus	Derm	6.
45	George W.	45.	6 × 4 1/2	1 in above M.L.	Do	14.

Summarised Result -

Derm. 4 grew. Ulcer cured in six weeks.

Sponge. All transformed producing great vascularity.

Derm. grew very well.

Derm. 3 4 days removed from body. None grew.

Derm. 2 grew well - wound afterwards broke down.

Sponge grafted, All transformed and no bad symptoms.

No clot, some grafts shifted - Independent growth the 13th day.

Clot - Grafts grew well - Gutta Percha produced erythema.

No clot. Small wound with little discharge. Little sloughing of epidermis. Cured.

4 grafts were incorporated with the margin, and one centre island.

Same patient, No clot. Nearly well - Under treatment

very troublesome wound, wonderfully improved by Derm grafting.

4 grafts grew well - great improvement of the sore. Nearly well. Under treatment.

Derm. Healed very well indeed.

Derm. Placed in Canopy got covered with Manganese Oxide and all sloughed -

	Name.	Occupation	Cause of Ulcer.	If blood clot.
1.	Joseph F.	Dock Labourer.	?	?
2.	Elizabeth T	Seamstress.	?	No.
3.	" " (second time)	"	?	Yes.
4.	James W.	?	?	?
5.	Robert L.	Shoeblack.	Bite of dog.	Yes.
6.	Jeremiah S.	Dock Labourer.	Leg incised.	Yes.
7.	Ann M.	Seamstress.	Frost bite.	Yes.
8.	" "	"	" "	Yes.
9.	John C.	Blind Beggar.	?	Yes.
10.	Mr. S.	Private Patient.	Burn.	Yes.
11.	Julia B.	Hawker.	Kick.	Yes.
12.	William E.	Cutler.	Struck by a brick.	Yes.
13.	" "	"	" " .	Yes.
14.	Emily H.	Wife.	Burn.	Yes.
15.	Joseph M.	Driver and	Kick by a horse.	Yes.
16.	" "	Soldier.	" "	Yes.
17.	" "	"	" "	?
18.	" "	"	" "	?
18 A.	" "	"	" "	Yes.
19.	Ellen C.	Charwoman	Scratching the skin.	Yes.
20.	John C.	Blind Beggar.	?	Yes.
21.	John G.	Dock Labourer.	Burn.	Yes. slightly.
22.	George H.	" "	Burn.	Yes.
23.	Mary D.	Widow	Fell down stairs.	Yes.
24.	" "	"	" " "	Yes.
25.	William B.	Dock Labourer	Erysipelas.	Yes.
26.	Joseph T.	" "	Cutting of a boot.	Yes.
27.	Thomas B.	Clerk.	Kick.	Yes.
28.	William K.	Hawker.	Pimple injured.	Yes.
29.	" "	"	" "	Serum
30.	" "	"	" "	Serum.

Modified. II.

Summarised Result.

Broke down when has returned to work, the centres disappeared last.
Broke down two days after a Martins bandage was applied.
Healed after 5 years treatment.
Discharged cured three months after.
S. S. 8 grafts, 6 grew.
Very small grafts, none grew. Increased vascularity and activity followed.
Epidermis of graft sloughed. Margins invaded and
blended with the graft. Not stated how many grew.
Sponge came away considerably, no putrefaction.
Private Patient. Carefully and intelligently tended himself. Best result.
Satisfactory
Sponge very thick. No pyogenia. A film took the place of sponge.
Dark patches of Nyro's stain in the Ulcer seen. How Sponge grafted.
Sponge grafted on intractable burns. Pyogenia followed. Most sponge removed.
S. lined eight pyogenic. All transformed.
Derm all disappeared. 4 grew slightly.
Sponge Good irrigation burns no inflammation followed.
Fourth attempt with early marginal epidermis, not grew stain. All sloughed.
Derm 18 grafts from a patient all quickly sloughed away.

Sponge All organised in 28 days. no bad symptoms.
Derm few when sponge would not.
Derm Film followed and rapid cure.
Derm Film produced and poor healthy granulations.
Sponge. 4/4 organised without a bad symptoms.
Derm. Grew well. Sloughed after.
Sponge. Organised in 35 days. no malaise.
Derm. 3 grew fairly.
Derm. All sloughed in 17 days. no bad symptoms.
Derm. S. S. Repair was actively promoted.
Sponge. All transformed. with any bad symptoms.

	Name.	Occupation.	Site of Ulcer.	Is blood clot.
31.	William D.	Hawker.	Pimple Injured.	Yes.
32.	Thomas B.	Dock Labourer.	" "	No.
33.	"	" "	" "	Yes.
34.	William C.	Horsekeeper.	Kicked by Horse.	Yes.
35.	James E.	Postman.	Kick.	Yes.
36.	Thomas R.	Hawker.	Struck by Policeman's baton.	Yes.
37.	Michael G.	Dock Labourer.	Struck step of Engine.	No.
38.	Catherine H.	Ex Single.	Kicked.	Yes.
39.	Emily H.	Nil.	Burn.	No.
40.	David McL.	Fishmonger.	Sore scratched.	No.
41.	" "	"	" "	No.
42.	Alfred V.	Dock Labourer.	Struck by keg of butter.	No.
43.	" "	" "	" " "	Yes.
44.	Timothy C.	" "	Pimple scratched.	No.
45.	George M.	Hawker.	Kick.	No.