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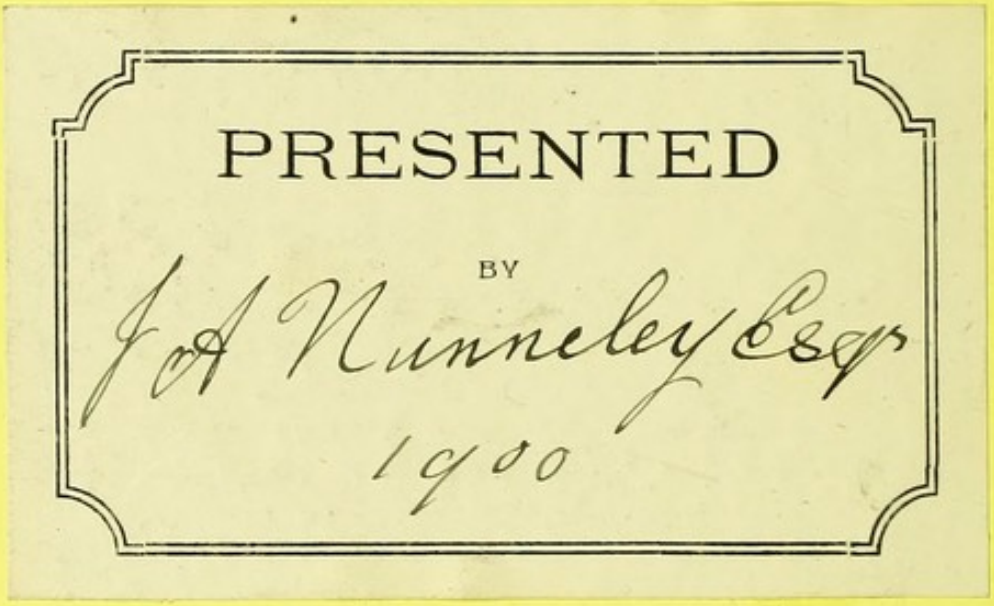
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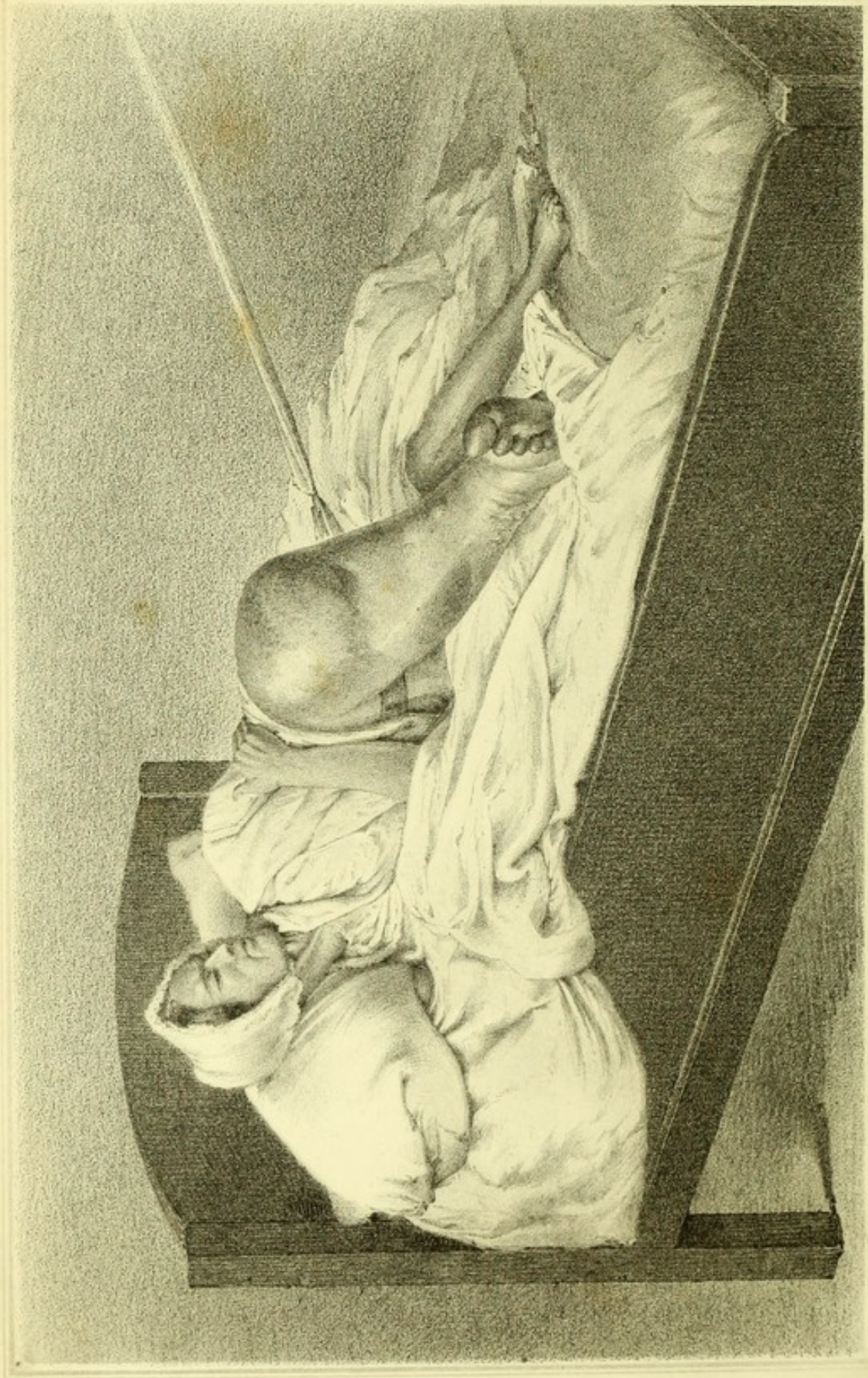

ON

AMPUTATION AT THE HIP-JOINT.

BY

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ON

AMPUTATION AT THE HIP-JOINT.

ENORMOUS OSTEO-SARCOMATOUS TUMOUR INVOLVING THE LEG AND THIGH EXTENSIVELY; AMPUTATION AT THE HIP-JOINT.

Amputation at the hip-joint is deservedly ranked amongst the most formidable operations in the whole range of surgery. The risk from hemorrhage, primary and secondary, the peril from shock, the danger from phlebitis, from blood-poisoning from so extensive a suppurating wound, make the surgeon pause ere he adopts it as a last and necessitous resource for the salvation of life. When once the propriety of the measure is admitted and settled upon, no time should be lost; hesitation and delay should never take place, lest the favourable time should pass away, the operation be performed too late, and the patient's doom more quickly sealed; besides, by such imprudence, practitioners may be intimidated, science retarded and severely injured.

On the 20th of August, 1819, the late Mr. Richard Carmichael removed the lower extremity at the hip-joint, for a large osteo-sarcomatous tumour, in the Richmond Hospital. On the fifth day the patient expired.

This is the first instance in which the operation was performed in

Ireland—forty-seven years ago—and from that date until the present it has never been repeated. I am therefore anxious to draw attention to the operation, and lay before my professional brethren the history of a case upon which I recently operated, with such observations as I think best suited to the subject.

The necessity for amputation has always existed, and ever will continue, so long as the destructive effects of injuries and diseases of the limbs cannot be obviated in any other manner. Happily for science and humanity conservative surgery has done much in the present century to lessen mutilation and, at the same time, to preserve for the sufferer a limb far better for the performance of its functions, be it the upper or lower extremity, than any mechanical contrivance, no matter how admirably devised and executed, could possibly accomplish; and the surgeon who would now amputate the lower extremity for disease of the knee-joint, when excision was applicable, or who would lop off the upper extremity for disease of the elbow-joint, when excision was suitable, in my mind should be considered just as censurable as the surgeon who would peril a patient's life by tying the femoral artery in an ordinary case of popliteal aneurism, without first having submitted the patient to a trial of the treatment by compression, so carefully taught and inculcated in the truthful statements published by the late Dr. Bellingham.

There are certain cases, however, where amputation affords the only chance of saving or prolonging life; amongst these may be classed, where incurable disease seizes upon an extremity, and involves its destruction to a greater or less extent, far up, near to its articulation with the trunk; then, be it upper or lower extremity, as a *dernier ressort* it must be taken away. Mr. Hennen, in his valuable work on military surgery (p. 251, Ed. 2.), makes this excellent observation, founded on the purest humanity, and justified by the soundest professional principle, that *to save one limb is infinitely more honourable to the surgeon than to* have performed numerous amputations, however successful; but it is a remark, notwithstanding its quaintness, fully as true, that "it is much better for a man to live with three limbs, than to die with four."

Mr. Samuel Cooper justly states that the very idea of this formidable operation—amputation at the hip-joint—for a long while checked the hand even of the most ready advocate for the amputating knife, and every mind shuddered at so extensive a mutilation—

yet it could not be denied that the chance of saving life occasionally depended upon a submission to the greatest temporary suffering, and that without the most cruel of sacrifices the preservation of the patient was totally impossible. Dreadful as amputation at the hip appeared, both in respect to the magnitude of the part of the body to be removed and the extent of the wound caused by such removal, the desperate nature of some cases at length began to incline surgeons to view more dispassionately a scheme at which the mind at first naturally revolted. But yet, to show how the love of life—impressed, I believe, on man as his great safeguard—will protect him and regulate his actions to insure that security, I will just describe what Morand, the great French surgeon, the earliest practitioner who made this severe operation the subject of attention, has stated in his work on surgery (*Opusc. de Chir. p.* 183). He reminds the reader that in the Hotel des Invalides, at Paris, mutilated objects are in recollection who had lost all their thighs and arms, so that, unless assisted, they could not stir, and it was necessary to feed and wait upon them like new-born infants. Let it not be wondered at, then, how some are influenced by a relish for life. This same great surgeon, it would appear, was the first who ventured to express an opinion on the possibility of the success of the operation. This question was taken up with much assiduity by the Academy of Surgery, and a favourable report was returned by Ledran and Guerin. It became then a prize question in the French Academy, at the instance of Morand, in 1756, and again in 1759; none of the essays on the first occasion were found worthy of the prize, which on the second was awarded to Barbet, who forcibly advocated the propriety of the operation, and pointed out the cases to which he considered it rationally applicable. If, for instance, a cannon ball, or any other violent contusing cause, had carried off or crushed the thigh, so as to leave only a few parts to be cut to make the separation complete, he thought a surgeon ought not to hesitate about doing it. Other instances are cited, but I do not think they bear upon the question—the propriety of the operation, with its attendant dangers; the cases portrayed cannot be considered as amputation at the hip-joint. The proceeding, as detailed by this author, seems to me to have no analogy at all to the bloody operation of taking the thigh bone out of the socket; it is quite a different thing when the operator has to cut through parts which bleed profusely, and are endowed with life and sensibility.

Though the operation was first considered in France, and numerous essays were written for the several prizes offered year after year, it is a remarkable fact in the history of surgery, that the operation should have been first put in practice in England—the operator being Mr. Henry Thompson, surgeon to the London Hospital. Larrey tells us he performed the operation twice in Egypt, and once while he was serving with the French army on the Rhine. He was encouraged to make these attempts to save his patients by the consideration that he had already preserved some lives by amputating either both thighs, both legs, or both arms, or removing the humerus at the shoulder-joint. Larrey has also the merit of having first done the operation in this description of cases in which (with the exception of bad cases of necrosis, or of incurable disease of the higher part of the femur) it is more decidedly proper than any other, viz., gunshot injuries of the head, neck, and upper parts of the femur, with or without injury of the femoral artery, or, when the limb has been carried away by a shell or cannon ball too high up to admit of amputation in the ordinary manner. However, he also regards as fit occasions for amputation at the hip-joint, circumstances in which from gunshot violence the limb is seized or threatened with gangrene nearly up to the hip.—*Mem. de Chir. Mil.*, T. ii., p. 185.

Severe as the operation is, Larrey contends that if it ever proves the means of saving lives which are in danger it is an act of humanity. After this period many successful cases followed—by Millingen, Brownrigg, Guthrie, Delpech, Orthon, Mott of New York, Wedomyr, Syme, Brice, Sir A. Cooper, and others; and taking the converse, the operation, even in the course in which it is indicated, has failed in the hands of some of the most eminent surgeons, amongst others Sir A. Cooper, Sir B. Brodie, Dupuytren, Mr. Guthrie, Baron Larrey, Blick, Cole, Delpech, Dieffenbach, Emery, Gensoul, Clot-Bey, Roux, Carmichael, and Pelikan of Wilna.—*Cyclopædia of Practical Surgery*, p. 182.

The successes of the operation in later years, I am persuaded, must in a great measure be attributed to the effects of chloroform, in averting the shock, and likewise to a careful selection of the cases operated on; no one now would think of removing the limb from the socket in scrofulous disease of the joint, yet it might be perfectly justifiable to excise the diseased head of the bone.

Mr. Erichsen (*Science and Art of Surg.*, 4th Ed., 1861, p. 59.), availing himself of the labours of Dr. P. Smith, and also of those of

other writers, has given the result of one hundred and twenty-six cases of this operation, of which seventy-six proved fatal; of forty-seven cases in which it was performed for injuries, thirty-five died. According to Mr. M'Leod, of the ten cases that occurred in the Crimea, not one recovered. Mons. Legoust, who served with the French army in the Crimea, collected thirty cases of this amputation, primarily performed for gunshot wounds, which all terminated in death:—" Some died during the operation itself, others soon after they had been carried to their beds, and all within ten days, except two cases mentioned by Larrey, one of whom lived twenty-one, and the other thirty days."

I find in the very beautiful book issued from the War Department, Surgeon-General's Office, Washington, 1865, (at page 48,) the following satisfactory report:—"At the commencement of the war the uniform fatality of amputation at the hip-joint in the Crimean war was impressed upon the minds of surgeons, and many believed that the operation should be discarded altogether; still it has been occasionally performed, and several lives have been unquestionably saved by it." Then follows the details of a very interesting case of primary amputation, performed, April 29th, 1863, by Surgeon Shippen. A letter, dated January 12th, 1865, was read from the patient, and represented him as in excellent health and spirits; a beautiful photograph, taken from the man a year after the operation, accompanies this description. Another successful primary case, by Dr. Fenner, is likewise mentioned in this valuable book; operation performed twenty-four hours after receipt of the injury. A table shows a return of twenty-one cases—nine were primary, and twelve were secondary operations.

The conclusions arrived at by the writer as to the advisability of early amputation at the hip-joint, after gunshot injury, is thus put. There seem to be but three conditions under which early amputation at the hip-joint is admissible in military surgery, viz.: when nearly the entire thigh is carried away by a large projectile; when the totality of the femur is destroyed by osteo-myelitis; and, possibly, when, with comminution of the upper extremity of the femur, the femoral vessels are wounded.

The experience of M. Jules Roux, in the Italian war, seems to prove conclusively, that secondary amputations at the hip-joint are less dangerous than primary ones; he has practised it four times, and in all cases with success. Dr. Gross, in his magnificent work

on surgery (Gross's *System of Surgery*, Vol. II., p. 1044, 3rd Ed.), cites a most interesting case, operated on successfully by Professor Pancoast, on account of a large encephaloid tumour of the upper part of the thigh; patient thirty-eight years old. The operation was performed in the Pennsylvania Hospital, in June, 1860; pressure was made upon the abdominal aorta, by means of a tourniquet encircling the body at the umbilicus.

Professor Gross likewise gives the details of a case upon which he successfully operated; the patient, although exceedingly anemic and exhausted at the time, recovered without any untoward symptoms. Engravings from photographs of both these cases, after cure, are given, and are in every way highly creditable to surgery.

In the *Lancet*, Vol. II., 1864, p. 551, Dr. Frazer, of Calcutta, gives the details of a successful case of this chief of amputations which was, however, secondary to an amputation of the thigh twelve days previously; this was stated to be the second successful instance in India, the first having occurred to Mr. Wigstrom of the 24th Dragoons; the details of this case will be found in the *Lancet* for 1850. In the *Lancet* for June, 1865, a case is recorded where Mr. Lane, of St. Mary's Hospital, operated on a woman, aged twenty-one, for malignant disease of the thigh, of rapid and painful growth; she recovered from the operation, but death followed in eight weeks afterwards, from pus in the femoral artery. In this same number of the *Lancet* we have the following table (page 9) showing the results of the operations in the metropolitan hospitals. All severe injuries requiring it, terminated fatally.

The operation has been performed unsuccessfully by Mr. Wheatcroft of Cannock, on a woman, aged forty (*Lancet*, May 21st, 1853); fatally also by Mr. W. Swain, of Devonport, on a man aged thirty-six years, for encephaloid tumour of the left thigh (*Lancet*, May 27th, 1865); and at the Jersey Hospital, successfully, by Mr. Godfray, on a boy aged fifteen, for extensive necrosis of the femur. I have pleasure in drawing attention also to Mr. J. J. Gamgee's successful case operated on in the Birmingham Hospital, and published in a separate memoir, illustrated with four very beautiful photographic pictures, and reviewed in the *Lancet*, November, 1865; and it should not be forgotten that Mr. Sands Cox's interesting case and essay on the same subject, emanated from the same town thirty years before.

Table showing the Results of Amputation at the Hip-joint, in the London Hospitals.

No.	Reference to the *Lancet*	Date of operation	Operator	Hospital	Sex	Age	Nature of Disease	Result
1	Vol. I., 1857, p. 31	1852	Mr. Hancock	Charing-cross	M.	32	Severe compound fracture of leg, thigh, and arm; erysipelas and gangrene on seventeenth day	Death immediately afterwards from shock.
2	Vol. I., 1853, p. 405	1853	Mr. C. Guthrie	Westminster	M.	50	Malignant disease of femur . .	Death on second day, from exhaustion and hemorrhage.
3	Vol. I., 1854, p. 442	1854	Mr. Adams .	London .	F.	26	Fibro-cystic disease of leg and thigh	Death on twelfth day, from diarrhea.
4	Vol. I., 1855, p. 363	1855	Mr. Erichsen	Univ. College	M.	26	Severe compound fracture of thigh, high up	Death two hours after.
5	Vol. I., 1857, p. 444	1855	Mr. Tatum .	St. George's .	M.	17	Medullary cancer of femur . .	Recovery.
6	Vol. I., 1856, p. 6	1856	Mr. Curling .	London .	F.	40	Medullary cancer of thigh . .	Recovery; death in ten months, from internal disease.
7	Vol. I., 1857, p. 31	1856	Mr. Hancock	Charing-cross	M.	24	Extensive disease of thigh and entire femur	Recovery.
8	Vol. I., 1857, p. 343 and 380	1857	Mr. Stanley .	St. Barthol. .	M.	52	Medullary cancer of femur . .	Death two hours after, from hemorrhage.
9	Vol. II., 1857, p. 443	1857	Mr. Lane .	St. Mary's .	M.	29	Extensive injury to thigh, groin, and perineum	Death in five hours, from shock
10	Vol. I., 1860, p. 319	1860	Mr. Hancock	Charing-cross	M.	35	Disease of stump in thigh, after two previous amputations	Death in twelve hours.
11	Vol. I., 1865, p. 651	1862	Mr. Lane .	St. Mary's .	F.	21	Malignant disease of thigh . .	Recovery; death in eight weeks, from pus in the femoral artery.
12	Vol. I., 1865, p. 652	1862	Mr. P. Young	St. Mary's .	M.	21	Extensive fracture of both limbs .	Death, a few hours after, from shock.
13	Vol. I., 1865, p. 652	1862	Mr. Wells .	Samaritan .	F.	26	Malignant tumour of the thigh .	Recovery; death a year after, from cancer.
14	Vol. I., 1865, p. 566	1863	Mr. Lane .	St. Mary's .	M.	17	Malignant disease of femur . .	Recovery; death in two months, from chest disease.
15	Vol. I., 1865, p. 566	1863	Mr. Curling .	London .	M.	7	Necrosis of shaft, head, and neck of femur	Death in five weeks.
	I shall add to this Table the following three cases, which occurred in the London Hospitals, and were reported in the Lancet.							
16	Vol. I., 1866, p. 222	1865	Mr. Erichsen	Univ. College	M.	27	Encepahloid tumour of the femur .	Immediate effects of operation recovered from; wound still discharging when report closed.
17	Vol. I., 1866, p. 367	1865	Mr. Holmes .	St. George's .	F.	36	Recurrent fibroid disease of thigh .	Recovery.
18	Vol. I., 1866, p. 386	1865	Mr. Lee .	St. George's .	M.	14	Disease of hip-joint and pelvis .	Recovery.

Table showing the Results of the Cases of Amputation at the Hip-joint, which have occurred at Philadelphia.

No.	Operator	Time of Operation	Sex	Age	Disease	Interval between First Appearance of Disease or Injury and Operation	Operation	Result	Cause of Death	Remarks
1	Duffy .	1840	Female	6	Morbus coxarius .	—	—	Recovered	—	Seventeen years afterwards the patient was successfully delivered in the Lying-in Department of the Alms House. Stump well.
2	Pancoast	1860	Male .	32	Medullary sarcoma .	One year . .	Integumentary flaps and circulars of muscles, accupression and ligatures	Recovered	—	Died two years afterwards from a return of the disease in the lymphatics adjacent to the stump.
3	Gross, .	1862	Female	12	Loss of integument, and suppuration following a burn	Fifteen months	—	Recovered	—	Remained well, 1864.
4	Hewson .	1864	Male .	6	Railroad injury .	Within twenty-four hours	—	Died .	Renewed shock	Lived twelve hours.
5	Pancoast	1865	Female	30	Huge osteo-chondromatous tumour	Seven years and eight months	Integumentary flaps and circular of muscle	Recovered	—	Remains well.
6	Gross .	1865	Male .	54	Encephaloid . .	Four years .	Integumentary flaps and circular of muscles	Recovered	—	Remains well.
7	Hewson .	1865	Female	28	Enchondroma . .	Several years .	Flap operation, accupressure	Died .	Shock .	Lived fifteen hours.
8	Packard .	1865	Male .	21	Re-amputation of stump of diseased bone	Five months .	Flap operation .	Recovered	—	Remains well.
9	Morton .	1866	Male .	21	Re-amputation for osteo-myelitis	Sixteen months	Integumentary flaps and circular of muscles	Recovered	—	Remains well.
10	Agnew .	1866	Male .	48	Disease of femur and soft parts following a gunshot wound	Three years .	Integumentary flaps and circular of muscles	Died .	Hemorrhage from the femoral 12 days after operation	
11	Forbes .	1866	Male .	—	Diseased femur following gunshot wound	—	Integumentary flaps and circular of muscles	Died .	Lived sixty hours	

In the *American Journal* for the month of July, 1866, will be found an interesting paper by Dr. Thomas Morton, one of the surgeons to the Pennsylvania Hospital, with an account of a case in which he amputated successfully at the hip-joint; and in this memoir he likewise details the histories of all the cases, eleven in number, which have occurred in Philadelphia.

The table (on page 10), which is appended to his observations, is very interesting, conveying much information, and showing at a glance the results of these several amputations at the hip-joint.

I am not aware that any recently published case has escaped my notice, so now shall detail the history, operation, procedure, and management of one recently under my charge in Mercer's Hospital.

Enormous Osteo-Sarcomatous Tumour Involving the Leg and Thigh Extensively; Amputation at the Hip-Joint.

Mary Keogh, aged fifty-one years, admitted to Mercer's Hospital, in November, 1856. Her occupation was that of a servant, being employed chiefly in scouring out rooms. More than four years and a half before her admission on the above date, she struck her right knee forcibly upon a stone step, having slipped when carrying up a pail of water; the pain was very severe in the stricken part, on the inner surface of the head of the tibia—so acute that she became weak, and fainted; she was compelled to stay quiet for some days, but within a fortnight resumed her ordinary occupation. When in the kneeling position she constantly felt uneasiness; and, though but resting little weight upon the part, yet she was very sensible of its inability to bear the burden equally as the other; and so struggled on, occasionally working, always pained, often laid up altogether, and totally incapacitated from either kneeling or walking; slowly and gradually an enlargement of the upper part of the tibia, on its inner surface, attracted attention; an oblong defined swelling, not discoloured or painful, except when pressed forcibly upon; in its most elevated part it did not exceed three-quarters of an inch, and gradually fined off to its circumferential limits. Shortly after this, pain left the part altogether, confidence in the movements of the limb was regained, and the patient followed her former avocations uninterruptedly for many a month—I may even say years; she was industrious, and constantly employed, and though occasionally pained a little in the part, yet never to such an extent as to interrupt her engagements, or confine her to bed.

Four months before the date of the patient's reception into the hospital, she slipped in coming down stairs, and was precipitated to the next landing, where she fell heavily, the right limb being violently twisted under her; after this accident she was unable to move the leg, or rest in the least degree her weight upon it, and had to be carried to bed, where she was treated for a period of six weeks; at the end of this time she was sufficiently recovered to get up and resume her business and duties. It was remarkable at this time that the swelling on the inner side of the tibia was not increased or rendered more sensitive, in consequence of the recently-sustained injury; for though the enlargement upon the tibia participated at first in the general uneasiness around, yet the joint suffered far more by the straining, stretching, and twisting of its ligaments; pain and tenderness forsook the swelling long before it was removed from the ligamentous structure binding the bones; the tumour seemed to suffer more from contusion—the joint from being forcibly wrenched; again the patient went about so far improved, as to walk and to be able to flex the leg upon the thigh, its dimensions being in no part increased, and the enlarged part of the tibia not in the least rendered more prominent or sensitive upon pressure; again, the woman met with an accident three weeks before her coming under my care: she slipped off the curb-stone of the pathway, and fell with violence on the affected limb; the leg was checked in the fall, and turned outwards, the swollen part of the tibia coming in contact with the sharp edge of the curb-stone, she suffered very severe contusion, accompanied with acute pain and attended with faintness and vomiting; she had to be lifted from the ground and conveyed home. When she was laid in bed, the limb was stuped, leeched, and placed in the most favourable position, constitutional means were likewise had recourse to, and, by the efficient combination of local and constitutional measures, the early inflammatory symptoms developed in a marked way, even in a few hours, were subdued, but not removed altogether, and at this stage of the affection the patient was admitted to hospital. Her condition at this period was as follows:—She was emaciated and greatly depressed, suffering much pain at intervals, and chiefly the severest paroxysms at night; restless and agitated by day; appetite gone, and even a loathing to nourishment of every kind; pulse feeble, yet steady in its beat, but rapid, averaging about 94. The limb at this time was but little enlarged above the knee, and the knee but little participated in the swelling or expansion of the inner side of the upper part of the tibia; the

integuments over the diseased region were not at all discoloured, and the osseous tumour bore pressure with impunity all over its surface, except at one part, that where the injury was directly applied, in front and towards the articular surface of the bone; the patient could not, of her own accord, flex the leg upon the thigh, beyond a very obtuse angle, the position in which she endeavoured to keep it, as affording most ease and rest; however, I could perform flexion at the joint to fully a right angle without inducing pain; at this time the joint structures around were thickened, and the internal condyle of the femur considerably more prominent than the outer one, yet pressure could be borne here also without eliciting much suffering; the circumference of the limb, both beneath, around, and above the joint, exceeded the sound one by three, two, and one inch, in each of these respective positions. At this time every means were employed to allay pain, to procure rest, to build up the enfeebled health, and, if possible, to check the progress of the affection. The case, however, went on, being but little restrained by treatment; this became quite apparent in about a fortnight, the additional enlargement being most manifest over and around the site of the original tumour upon the tibia; the pain referred to this part was most acute; no local application seemed to have much effect in either mitigating or lessening its duration; the most powerful sedatives—watery extract of opium and extract of belladonna, made into a thick paste, separately or together, and applied over the surface, soon lost their effect in diminishing the burning pain when at its height; another peculiar feature in the pain was its absence, sometimes for short periods altogether, when suddenly it would set in in its most aggravated form. The nature of the tumour, even at this early time, was accurately diagnosed, and lectured upon to a large class of students, and at this period the proposal of amputation at the thigh was urged upon the patient, but to this she would not listen.

Several weeks passed on, and the tumour steadily enlarged in all directions; the pain seemed less acute, often absent for many hours; with this release from intense agony, her general health assumed a better aspect, she ate considerably more, she often had quiet and refreshing sleep for some hours at a time, induced no doubt by the exhibition of sedatives, but only in such doses as that failed entirely at an earlier period of the case in suspending pain or procuring rest; so rapidly did the tumour increase, that from day to day the augmented bulk was perceptible to all; it seemed indiscriminately

to seize upon all surrounding structures; the ham soon became filled up, and almost bursting; the tension in this locality was extreme, and the strained integuments bright and shining; the whole leg and foot became enormously swollen, with hard, firm, œdema, and so great and unmanageable by its bulk as absolutely to cause extensive ulceration on its outer side, from its weight when supported and resting on pillows; as the disease progressed, no other position but that adverted to could be endured, so ponderous had the entire member become that the patient had to lie partially turned upon the right side, the limb partly flexed, the thigh upon the pelvis, and the leg upon the thigh, all equally sustained upon pillows; this was the constant attitude maintained up to the period of operation. At this date, a few days before operation, the measurements of the limb were as follows:—

1st. Around the knee, at the angle of flexure, thirty-five inches.
2nd. Around the thigh, at its centre, eighteen inches.
3rd. Around the leg, just below the joint, twenty-one inches.
4th. Around the leg, just at the calf, twenty inches.
5th. Around the ankle, thirteen inches.

The accompanying beautiful plate, executed by Foster from a photograph by Robinson, will give, at a glance, the proportions of the limb; it was sustained in the elevated position delineated, by a bandage tied above the knee, and fastened to a fixed support, on the other side of the patient.

So completely did the weight of the tumour chain the patient to the one position, that it was with great difficulty she was kept from stripping; the constant application of nitrate of silver, and of strong oak-bark washes, with alum and tannic acid, together with well adapted cushions, prevented so grave and distressing a complication; and now her pains became more marked, developed, and persistent, independent altogether of her movements being restricted—and faster and more rapidly she was overburdened and surrounded by distress, without any possible hope of amelioration or repose; and so, now, she fixed her whole hopes of relief upon operative interference—that refuge, which had been at an earlier period so pressed upon her for safety—when safety and security for a time at least was surely certain—for the same risks did not then hang around the case, and amputation might have been performed at the middle of the thigh, or as I should prefer to advocate higher up, with every prospect of success and recovery; but in the condition of the patient in this last stage, now, at this period, when she would only assent to

operation, when she absolutely pressed hard for even a chance of escape from her miseries, and her sufferings, and her impending fate; no operation was applicable, but the removal of the entire limb—the thigh bone, from the socket—the separation of the whole polluted member from the trunk—for the soft parts were contaminated, infiltrated, and diseased, far up beyond the knee; and the articular surface and lower part of the femur were extensively implicated; the consideration of these well ascertained facts settled the question as to disease of the thigh. The groin was free from any glandular enlargement, there was no puffing, or more correctly, infiltration of the integuments here, or morbid state of the veins or lacteals of the region. The chest was subjected to the most careful stethoscopic examination; the lungs were remarkably healthy, resonant, and clear throughout; the heart normal in its proportions—vigorous, steady, and equal in its beat; the abdominal cavity was likewise submitted to careful inquiry, and no change could be discovered either in the solid or soft viscera; and, I need scarcely add, among the former the liver was subjected to the strictest scrutiny and most delicate manipulation. As no aberration from a healthy state in any of these organs or regions could be detected, and as the woman's whole heart and confidence were centered in the expediency of operation, I willingly assented to her wishes, and, after a deliberate consultation with my able colleagues, determined to remove the limb from the hip-joint on the following morning.

February 12th.—The patient was brought down from the ward in which she lay to a small room beside the operating theatre, and used for the reception of patients after being operated upon.

I shall digress for a moment while I describe the arrangements I conceived necessary to be made in the theatre:—First, as to the table, it should be higher than for ordinary operations—I conceive about four feet high; such an elevation will afford the surgeon great facility in securing the vessels in the posterior flaps, and rapidity in this part of the procedure is of the utmost importance, and should never be lost sight of. Should the operator find it inconvenient to transfix the limb with accuracy, sustained at such a height, he should raise himself by standing on a solid wooden support, so that he should have full command over the parts, and not be restrained or checked in using the knife according to his will and judgment; again, the table should be narrow, so as to allow the operator and assistants to be near their work, and so act vigorously, and in concert together; a folded blanket should take the place of

the mattrass, and be evenly turned back upon itself, at the end of the table, so as to present a well-defined edge upon which the buttocks of the patient will rest without a chance of slipping; and a couple or three pillows will be requisite to sustain the head and shoulders of the person. Matters being so prepared, the patient was placed under the influence of chloroform before she was brought into the theatre, and placed upon the table, perfectly calm and insensible; she was brought well down to the end, so that the buttocks projected slightly over it; the affected limb being the right one, the assistants were placed, as follows:—One to make pressure on the femoral artery, standing on the left of the patient; one to take charge of the anterior flap, standing on the left of the patient; one to hold back the left leg, and to prevent the pelvis slipping forwards or to either side, standing on the left of the patient; two kneeling, one on either side, to grasp the posterior flap, as the limb was cut free; and one to support the diseased member, and to move it as required in the different steps of the operation; an assistant was also placed to restrain back the shoulders, and so effectually to guard against the patient gliding downwards and slipping off of the end of the table; so that, according to my arrangement, six assistants are required, independent of one, who must continue to administer the chloroform. Now, let me not be misunderstood, because I recommend so many assistants, and so accurately place each, that I would not proceed to execute the operation with half the number if the exigencies of the case demanded it, and that such confident support could not be procured; I have laid down the rule according to my judgment, when it can be carried out, and must of course leave room for the exceptions which will sometimes occur, and must be acted upon, and with great propriety; sooner than all hope in relieving the sufferer should be abandoned, I have before now with one assistant successfully amputated the right arm, high up, under great disadvantages, grasping the limb myself and suppressing hemorrhage with the left hand, while my assistant steadied the diseased member during its severance from the body and tied the vessels as I drew them out by the forceps or tenaculum. The assistants being arranged as already described, the limb was elevated high up for a few minutes, to diminish as much as possible its contained quantity of blood, and lessen the inferrent current; soon then a bandage was rolled very rapidly from the foot upwards, and applied very tightly above the centre of the thigh, as a preventative to guard against a rush of blood from below during the formation

of the flaps; then the limb was depressed to a suitable angle, the thigh slightly flexed upon the pelvis, so as to permit the fair travel of the knife behind the vessels. Standing on the right side of the patient, well over her—and pressure being *now* safely made effective on the main artery, just above the pubes, the assistant using a large key, well guarded with rolls of flannel round its handle, for the purpose—I entered a long double-edged knife, fully twelve inches in the blade, and three-quarters of an inch in depth, midway between the spine of the ilium and upper edge of the great trochanter, about three-quarters of an inch nearer to the former, the flat surface of the blade looking forwards, and a little downwards, parallel with the plane of the muscle; striking the knife steadily inwards, till it touched lightly the neck of the bone, high up, and so accurately giving evidence of its position, it was glided over the bone, and so safely beneath the great vessels; still onward the blade was passed till it appeared on the inner side of the thigh, and protruded about an inch and a-half between the point of junction between the descending ramus of the pubes, and the tuberosity of the ischium; the knife was then carried rapidly downwards, close to the bone, for four inches, and then obliquely forwards, cutting loose a flap about six inches long; as the knife made room I passed the fingers of my left hand beneath the flap, making steady pressure, and followed the knife until about to turn it forward to sever the femoral artery, and cut its way out, thus making certainty of effective pressure; the flap being so formed the assistant took charge of it, and in a similar way commanded its vascular supply. During the formation of this anterior flap, while the knife was traversing as it were in a semicircular course, the limb was not only slightly flexed but a little rotated inwards; after this the limb was forcibly abducted, and at the same time depressed. Then the heel of the knife was laid determinedly upon the capsule, over the neck of the bone, and its head unhesitatingly started from the socket of the acetabulum, and then as rapidly as thought, the blade of the instrument was carried behind the bone and great trochanter—severing the round ligament, and completing, by a slight downward movement and then backward, the posterior flap; as the knife formed it, and it became detached, it was firmly grasped both within and without by the assistants kneeling on either side. When the head of the bone was disarticulated, and the knife rapidly passing behind, the assistant who held the limb depressed the knee, and lifted at the same time the head of the bone forwards and

upwards, and so facilitated in a marked way the transit of the instrument in the course sought for and prescribed. My able assistants, Drs. Jameson, Bevan, Ledwich, and Mason, were so experienced and steady in all their duties and movements that they permitted me to execute the detailed steps of this operation, and so sever the limb from the body in the period of eleven seconds. The next step to be considered was the securing of the vessels. Now, the pressure upon the femoral trunk was so admirably and efficiently made by Dr. Jameson, and all the vessels of the anterior flap so perfectly controlled, that I at once set about securing them in the posterior; in this dissection, too, the hands of the assistants fulfilled their work: three large trunks were secured of the gluteal artery, one of them in the outside angle, remarkable for its size, retracted deeply, and had to be dissected out from its bed, and tied; the sciatic artery was likewise remarkable for its size, and carefully disentangled from its important nervous relations—and secured; four large arteries were drawn out, and tied, towards the inner side of the flap. During all this careful procedure not a spoonful of blood was lost, so efficiently did the manual pressure exert its control; finger after finger could be raised up, each giving special information of where a vessel demanded vigilance, and required to be ligatured. All behind being fairly secured, and a large sponge wrung out from hot water applied steadily to the surface, I proceeded to deal with the anterior flap, and first tied, with a strong silken ligature, the femoral artery; and afterwards three large vessels, branches of the profunda—and a fourth which I considered to be the obturator; three vessels of smaller size were likewise tied; though numerous the arteries requiring to be tied, it was very remarkable how readily the task was accomplished, and during the whole operation scarcely an ounce of blood was lost; in fact it was a bloodless operation so far as any hemorrhage on the cardiac side was concerned; of course some flowed from below the selected points for division, independent of the strenuous efforts which had been made to unload the doomed member of some of its contents, by maintained elevation, previous to operation, and then its sudden forcible constriction after the main supply was cut off by pressure at the groin, and before the knife was applied. During all this time the patient lay perfectly still and quiet under the influence of chloroform, and I let her rest upon the operating table for ten minutes, warm sponges being assiduously applied throughout the wound. At the end of this time reaction was fairly established,

and all pressure removed from the arterial supply to the stump, and as no vessels showed a disposition to bleed, I had the patient removed to her bed, in the small ward, beside the operating theatre, and when comfortably laid upon it, the flaps were evenly supported thus: a small soft pillow was laid beneath the posterior one, upon which rested a large piece of oiled lint, this pillow was so gradually insinuated behind that it evenly supported steadily forwards and upwards the pendent part; the anterior flap was gently turned upwards, and being of considerable length it rested so without constriction; in this condition the surfaces were left to glaze. During all this latter arrangement the patient was quite conscious; she was not aware that the operation had been performed, and never recollected having suffered any pain; it certainly was a wonderful sight to witness this creature, after so formidable, so terrible an operation—calm and undisturbed, and free from suffering—speaking cheerfully—the effects of the chloroform having entirely, at this time, passed away; she got wine liberally, and a full opiate; twenty drops of Battley's sedative.

At 4 o'clock, p.m., assisted by Drs. Jameson and Bevan, I proceeded to dress the wound; and I may now remark at this hour, six after the operation, the patient had well rallied; the pulse being up and steady, 96 in the beat; heat of skin healthily generated; the tone and volume of the voice good; and the patient, on being interrogated, stated she felt more comfortable than she had been for several months before, and was quite cheerful. I may remark that the stump lay upon the pillow, sustained just as we had left it; there was no tremulousness or wavering spasm of the flaps to distort it from its place; there had been no weeping of blood, and the entire surface of the flaps was well glazed; this favourable state of the parts may be assigned to wine and opiates, which she had freely partaken of, and to the occurrence of some sleep which had been early induced by opium. The precaution taken of having interposed oiled linen between the under flaps and the pillow upon which it rested, and between the integuments of the upper one and the surface upon which it lay—the base of itself and the lower part of the abdominal wall—cannot be over-estimated, as facilitating the ready approximation of the surfaces without violence; the withdrawal of the oiled linen at once set free the parts, and so allowed them, by the greatest gentleness, to be brought in contact. I may mention that the flaps were well glazed, and not a trace of oozing from them anywhere, and there were no dark clots in the interstices of contracted

fibres. Twelve points of the interrupted suture, silver wire, being employed, steadied all accurately together; the outer angle was not closed; a narrow strip of oiled lint was passed in deep, in this locality, to secure an outlet for any exuded fluids; a few broad straps of adhesive plaster were then gently applied from behind forwards, supporting a compress behind and before, bringing the parts accurately together, throughout the whole depth of the wound, surface to surface; a pillow was again placed beneath the buttock, with a gentle force, sustaining forwards and upwards, commensurate to counteract retraction, and the effects of gravity shortening the posterior flap; while the anterior one by this arrangement, this support, was effectually steadied, and its vascular supply neither impeded or interfered with; the several ligatures were brought out by the nearest route, through the edges of the wound, and protected by a few straps of plaster; the patient was dressed without pain of any amount, and without the least spasm or muscular twitchings, or effusion of blood; a good deal of this immunity from suffering must be ascribed to the gentle, efficient, and practised hands of those gentlemen who assisted me. Ordered some strong chicken broth to be given at intervals of every second hour, and a little cold brandy and water immediately after; also, every third hour, fifteen drops of Battley's sedative. 10 p.m.—Nothing could be more satisfactory than the condition of the patient at this time; she had refreshing sleep, often for an hour undisturbed, and partook freely of broth, wine, and brandy; the opiates allayed all pain; her pulse was only 96, steady in its beat; and with fair volume, she expressed herself as most thankful for the relief she experienced, and was quite bright, cheerful, and expectant of recovery; ordered to continue the beef-tea and chicken jelly whenever awake throughout the night, and the opiate every third hour.

February 13th, 9 a.m.—Had a remarkably good night, sleeping steadily and quiet; took a large quantity of nutriment and stimulants with eagerness and appetite; this morning she looks bright and happy, and says she is free from pain; occasionally a slight spasm in the stump, but it is not severe, and yields in a few moments; her pulse is steady, 96, and the beat of good volume; skin a little hot, but not burning; renal secretion abundant, but incapacity of voiding the vesical contents, effected by the catheter; no tenderness over abdomen, or in the right iliac region, upon pressure; the stump looks admirably; it is sustained and supported without the least

change from its position on last evening; it preserves a nice temperature, and along the whole track of the anterior flap the heave or beat of the femoral artery marks its course. A considerable quantity of sero-sanguineous fluid has escaped from the outer angle of the wound, and along the lint placed between its edges, to insure a ready egress; there is no puffing or tightness of the wound; the flaps seem just sufficiently full to show that the vascular supply is enough for repair, and the heat equivalent. I may here remark, nothing can be more dispiriting to the surgeon than to see, in twenty-four or thirty hours after amputation, a flaccid condition of the flaps; it shows a want of vitalizing power, and at the least is anything but salutary towards the speedy recovery of the patient; as to the treatment of the patient it practically speaks, too; such a condition demands a more rapid and abundant supply of stimulants and opiates; and I do, with confidence, say (not assert) from observation and experience, that I have seen many in this most critical position, rescued and saved by the means suggested; the two harmonize together—the one in arousing the sensibility of the nervous centres, and the heart's action, and so the proper supply of blood to the injured part; the other in quieting irritability and spasm of the muscles, and allaying pain. To continue wine, brandy, and nutriment, as already directed, and likewise the sedative draughts. 5 o'clock, p.m.—The patient is quite calm and free from pain, and has taken an abundant quantity of beef-tea and jelly; she has had quiet sleep since morning, and, on the whole, is wonderfully well; pulse 98; urine abundant, and still requires the introduction of the catheter for its escape; the stump lies perfectly at rest, the sedative influence of the opium averting all tendency to spasm; and it looks healthy, a quantity of watery fluid escaping at the outer angle. 9 o'clock, p.m.—No change to be recorded; nutriment, stimulants, and sedatives to be continued through the night.

February 14th, 9 a.m.—Slept well; countenance calm; free from all pain; pulse 98, regular and full in its stroke; tongue clean; bowels moved once, and urine flowed at the same time, by the efforts of the patient, and in considerable quantity. Readjusted the pillows under the stump, and gave the hinder flap a little more support forwards, by additional straps of plaster, those first put on having relaxed a little, from heat and moisture, owing to the persistent flow of pus and watery fluid through the outer part of the wound. Beef-tea, chicken jelly, wine, and opium to be given as before. 9 p.m.—Has had a quiet day, and consumed a large quantity of nutriment; it

tells well, for her pulse is stronger, more steady, and fuller in its beat, than before the operation; and altogether her appearance is far better; the anxious countenance, and the glazed eye are gone, and the expression is one of rest and peace; she speaks confidently of her recovery.

February 15th, 9 a.m.—The patient had quiet sleep, waking at intervals to take food and medicine; feels stronger; and took, for breakfast, some tea and toast with appetite; pulse 98, with full and steady beat. This day, the third after operation, I proceeded to dress the wound; the parts, being steadily supported behind and before, more particularly with a gentle force forwards; the adhesive straps were, with great caution, removed, and the oiled lint from the line of incision; to facilitate their removal a flannel stupe-cloth, wrung out of boiling water, had been laid over them for two hours previously; the external dressings being taken away, I very cautiously drew out the piece of lint laid within the outer angle of the wound; this came away readily enough, it being saturated with serum and pus from the beginning until now; a free escape of healthy pus followed, on pressure being made towards the bases of the posterior flap; three-fourths of the edges of the flaps were perfectly united, and lay beautifully together, no irritation or strain being in the least degree evidenced about the wire sutures, in any of their points; indeed this could scarcely be otherwise; the anterior flap was preserved in such full proportions; the parts all around the wound were well cleansed, and sponged with soap and tepid water; and the dressings readjusted as before. Caution was taken to sustain well forward the posterior flap, and compresses evenly applied, and gradually diminishing from behind forwards, laid on, to carry out efficiently this intention. The patient was next gently lifted from the bed, in the horizontal position, by a number of students, and fresh sheeting, pillows, &c., put upon it; upon these the creature rested most comfortably, expressing her gratitude for the relief she experienced. It was astonishing how little fatigue was consequent upon this trying task; the patient spoke well, and audibly; the pulse was not flurried; neither were the respirations embarrassed; she eagerly took a cup of strong beef-tea, and a draught of wine after, and then settled herself to sleep. 9 p.m.—Has had a good day, and seems much refreshed, after the removal of all soiled things from about her; the stump looks well, and she experiences no pain in it; purulent matter, healthy in character, is coming away abundantly from the outer angle of the wound. To continue broth, jelly, wine, brandy, and opiates as before.

February 16th, 9 a.m.—The patient was restless throughout the night, and this morning a good deal of fever present; respiration hurried; pulse 110, and hard; skin hot; a good deal of uneasiness referred to the chest, particularly beneath the clavicle on either side, together with a sense of tightness or constriction beneath the sternum. The wound free from pain, and discharge not arrested; pressed out an additional quantity on the hand being laid firmly towards the base of the posterior flap, and with the same power carried forwards. Ordered calomel, James' powder, and opium in small and repeated doses—the full opiates and stimulants still to be administered, with counter-irritation beneath the clavicles, and a blister over the sternum; also a diaphoretic mixture, with carbonate of ammonia, to be taken at intervals; the nourishment to be persevered in as before. 9 p.m.—The oppression beneath the sternum somewhat relieved; still the breathing remains considerably embarrassed; pulse still at 110, not so hard; skin cooler; no pain referred to the stump, and it looks healthy; to continue everything through the night as directed in the morning.

February 17th, 9 a.m.—The first glance at the patient told how critical was her position; the whole countenance was changed, sunken, and livid; hurried rapid respirations, imperfect; utter prostration, and almost inability to speak audibly; a staring vacant look, and an irritability on being roused to take either nourishment or medicine; with this fatal blood-poisoning, which the condition of the chest and accompanying symptoms too surely indicated, it was most remarkable how little abberration from a healthy state was yet manifested in the wounded part. Five hours had elapsed—the powers of life flagging lower and lower, though sustained as much as possible by the repeated exhibition of stimulants—and now only did the stump show any indication of the shock, the constitutional poisoning. To the educated eye the changes were now being characteristically developed; its full proportions became collapsed and even flaccid; the discharge, which up to this time was healthy pus and in full quantities, now changed its character to a more fluid, discoloured, and even reddish appearance, and materially altered both in consistence and quantity. 9 p.m.—All the poisoning influence of the introduction of pus into the system more clearly developed; pulse weaker—a mere thready beat; yet it is most remarkable the force and volume of voice with which the patient will suddenly scream out—I might almost say with an unearthly shriek. Eyes look vacant, staring, almost without motion of the lids; now

the capacity for swallowing is difficult, but upon a persevering trial fluids can be got into the stomach. Ordered that there should be no relaxation of efforts to convey nutriment and stimulants into the stomach.

February 18th, 9 a.m.—I was informed the patient died at four o'clock this morning; and even up to an hour before her death had swallowed some brandy and water. A careful *post mortem* examination was made of the body. First as to the condition of the stump: it was most remarkable the progress which was made towards repair; three-fourths of the extensive flaps were adherent, perfectly united together, and the outer edges of the wound were in a healthy granulating state as far as could been seen without violence to the parts; from this position, deep too, pus could be pressed out; but neither in quantity to excite apprehension, and but little changed from the marked healthy characteristics of the fluid; on forcibly separating the flaps—and to effect this it required more traction than I expected—the deep structures seemed quite healthy; all the surface of the acetabulum and the tissues surrounding it were coated over with organized lymph and incipient granulating surfaces—in short, nothing could present a more satisfactory appearance, tending to permanent repair.

On examining the ligatured main artery of the limb, a proceeding which I made with the most careful dissection, I found a demonstrative evidence of the facts so ably and clearly inculcated by Jones years ago—the division of the internal and middle coat of the artery—lymph now occupying the site of their division—lymph above and below the ligature, as it rested in its constricted bed of the external coat of the vessel; there was also a solid, well-formed conical coagulum filling up the femoral trunk to within the eighth of an inch from where the profunda artery passed off; this coalgulum was absolutely adherent at its base, and fused into the lymph which had welled up from the internal divided coats of the vessel; it was likewise more firm and fibrous here than towards its upper part, which was softer in its consistence and conical in its arrangement. I found, on the most careful examination, the base or lower part of the column of the plug to be intimately incorporated and adherent to the lining membrane of the vessel for a little more than a quarter of an inch. From the most careful consideration of the condition of the parts I would most assuredly affirm that there was no risk of secondary hemorrhage—in fact the plug was very firmly adherent, and almost tissued in the line, where it was fused into the lymph exuded

from the wound in the internal and middle coats; and it is but reasonable to infer this sealing up of the calibre of the vessel would have been perfected long before the separation of the ligature; beside the tied end of the femoral artery hung collapsed the end of the femoral vein; it had not retracted; and though lymph was abundantly shed around these parts, and had to be torn through to expose them, yet the vein seemed, as it were, excluded from this vitalizing influence and effort at repair; no, the vein "hung collapsed," its edges softened, its coats bathed in purulent matter; on slitting up the vein its lining membrane was inflamed and coated over with pus; on proceeding about two inches upwards its calibre was distended with pus; it was also marked throughout the track of the external and common iliac vessels; pus was discovered, by the microscope, in blood taken from the cava, and pus was discovered in blood taken from the heart. The abdominal viscera were next carefully examined, but no abberration from a healthy state could be discovered—no increased secretion from the lining membranes, or trace of inflammatory action. The chest was next opened; the heart was healthy in its muscular structure and fatty arrangement, and the pericardium showed no evidence of change; more fluid than natural was contained within it—somewhat more than a drachm. The examination of the lungs revealed numerous small deposits of purulent matter; these taken in conjunction with the condition of the femoral and iliac veins, loaded with pus—with the fact of pus discovered in the blood of the cava and in the blood of the heart, can leave no doubt as to the blood-poisoning of the person; this case affords a most remarkable example—the most rapid, in my experience, of pyemia producing its fatal effects in an incredibly short period of time. The rapid improvement of the patient after the operation, the freedom from pain, the cheerfulness and the buoyancy, and the expectancy of recovery—these all combined and appeared to render more certain, day after day, a fortunate issue, and as it were showed that no constitutional symptoms embarrassed recovery; and this constitutional improvement harmonized with the condition of the stump—the extensive wound, which presented throughout its course the most rapid amendment; and yet in a few hours the case is irretrievably lost by a complication that no human watchfulness, skill, or foresight could guard against. The examination of the limb shortly after its removal from the body fully revealed the true nature of the morbid growth as diagnosed during life. The bones implicated were the tibia and lower

extremity of the femur; they suffered to about the same extent from the malignant action—clearly from the history of the case, having its commencement in the former and spreading to the latter, with the implication of all the structures intervening and around; the head of the tibia was largely expanded, the inner and anterior wall of the bone been all eaten away, and filled by a large fungous mass, a deep and fixed portion of the general growth. The femur suffered likewise in the same way—all its osseous material entirely disintegrated and removed—except a remnant of the external condyle; a kind of elastic cartilaginous structure replaced it to a great extent; this structure, too, being peculiarly modified in certain places; in some true encephaloid cancer being deposited—soft, elastic, brain-like; in others sharp spiculæ of bone radiating from certain points, and diffused throughout the growth in greater or less masses. The lower part of the thigh and in the upper part of the calf it was impossible to recognize the muscular tissue; all had either been absorbed by the pressure from within, or more probably seized upon by the morbid action, and converted into malignant structure; the tumour, where most prominent and in large masses, was firm in structure, and presented in many parts a lobulated arrangement varying in vascularity; in some parts brilliant with red vessels, in others of a dark modena colour, while here and there scattered throughout were some soft points, even fluctuating, caused by broken up vessels; and in others masses of hard spiculæ of bone structure; the deeper portions of the growth, and all in proximity with the bones, presented the greatest density and immobility, while the more superficial parts were softer, more elastic, and channelled for the passage of larger venous trunks.

Two of the greatest authorities in Surgery have accurately described this form of tumour—the one in France, the other in England—each by a different name.

M. Boyer illustrates his views by a remarkable case, almost similar to mine, in his great work (*Traite des Maladies Chirurgicales*, Tom. III., chap. XXI., Art., IV.), and observes:—"Nous réserverons la dénomination d'ostéo-sarcome pour la degénération du tissu osseux qui paroit se rapprocher le plus de l'altération et de la marche propres au cancer. Tout ce que nous avons dit precedemment sur le traitement du cancer, s'applique sans restriction a celui de l'osteo-sarcome: anisi l'art ne connoît aucun moyen d'arrêter les progrès de l'ostĕo-sarcome une fois qu'il est déclaré, et l'on ne peut opposer â cette cruelle maladie que l'amputation du membre, ou

bien un traitement palliatif." Sir Astley Cooper describes the disease in these words:—"By the fungous (exostosis) is to be understood a tumour of softer structure than cartilage, yet firmer than fungous in other parts of the body, containing spiculæ of bone; malignant in its nature, depending on a peculiar state of constitution and action of vessels; a disease somewhat similar to that which Mr. Hey has denominated fungous hematoides, but somewhat modified by the structure of the part in which it originates."—*Cooper and Travers' Surgical Observations*, Vol. I.

The formidable nature and dangerous tendency of the malady under consideration is borne ample testimony to by those celebrated men whose views I have quoted; and the case which I have detailed myself is perhaps as remarkable as any on record, for the rapidity of its growth and in assuming such huge proportions in a short time. Looking from the first upon the characters, the beginning, and growth of this disease as malignant, I applied the same rule of interference, the same law that should direct the surgeon as to operative measures when the same type of disease presents itself in other parts, namely—its entire removal, its severance from the body, through healthy, sound, normal structures. In malignant disease attacking the bones of the extremites the surgeon should always if possible, amputate *at* or *above* the next joint. I have said "at" if the condition of the soft parts will allow him; if not, then "above," away from the diseased contaminated parts, both soft and solid; under any circumstances I do not think it prudent to leave any portion of the affected bone behind; and though its lowest extremity be the part engaged I would urge the propriety of its removal *from* the joint above were even the integuments surrounding the bone above apparently ever so healthy. I have no doubt, from observation, experience, and even microscopical examination—the latter testified too by able hands, from specimens afforded by me for examination—that malignant disease once established in the end of a bone creeps through the bone structure, seizes upon and contaminates the medullary lining membrane, far away from the original seat of the mischief, long before the integuments show any indication of the pollution beneath; therefore, I repeat, the entire bone should be removed; I have laid down this point as an aphorism, and were it necessary I could adduce several instances, both in hospital and private practice, where such caution has acted efficiently, preservatively, in saving the patient for years from any return of the disease. From many facts accumulated I had no

hesitation in arriving at the conclusion of the propriety of the removal of the limb from the socket in this case; and though the patient did not survive, yet ample proof has borne testimony to the propriety of the measure; the release from suffering, the improved condition of the patient for several days—the increased strength, the inspired confidence of the sufferer, all point to the benefit obtained; again, and speaking far more forcibly in favour of its application, were the changes wrought in the wound, the greater part united by first intention, all the deeper parts agglutinated with adhesive organised lymph—pus from the granulating surface, healthy, and with ready access to the surface—the main artery of the limb sealed up, permanently and for ever—showing altogether a combination of circumstances and facts the most remarkable that could be adduced towards the salvation of the patient. The benefit derived from chloroform in this serious operation cannot be overlooked; all shock was removed both from apprehension of suffering, ineffectual struggles, and absolute pain; the patient was quite unconscious that the operation had been performed, and had no suffering at any time. A question has arisen as to the propriety of securing the main artery of the limb in the first instance; it is not at all necessary if the precautions such as I have laid down are carefully followed out; neither do I think the pressure on the abdominal aorta, no matter how effected, by tourniquet or otherwise, is at all to be depended on with the same trust as pressure at the groin, on the main artery of the limb, and the judicious arrangement of assistants to grasp the flaps, in front and behind, as the knife pursues its course; this practice is strictly enforced, as I would wish to inculcate from the case that I have detailed. I freely admit the horseshoe-shaped clamp or Professor Lister's tourniquet upon the abdominal aorta—and another, if considered necessary, even on the iliac vessel, may be advisable when trustworthy attendants cannot be procured—and where, in spite of all obstacles, a bold and dexterous surgeon is determined to give his patient the last advantage from his art; but I deny altogether the superiority of the mechanical contrivance to effect the object in view as contrasted with the educated hands of men trained in operative surgery. However, Professor Lister's clamp has acted most favourably in many cases, and I must not omit pointing out the high praise Mr. Erichsen bestows upon it (*Lancet*, Vol. I., 1866, p. 223); and I am quite convinced the instrument should be in the possession of every operating surgeon. Now there is one point to

which I have not referred in the division of the vessels, and the troublesome consequences that may follow if not attended to; I mean where hemorrhage is persistent from the femoral vein. In amputations of the thigh, high up, I have often been troubled with it; and when neither plug or adjustment of flaps would check it, have invariably pursued the practice, in the last few years, of passing a wire suture, by means of a tenaculum, with an eye near its point, through the skin, beneath and around the vein, and through the integuments in the opposite side of the vessel to where the instrument entered; thus the vein was pressed up by the ligature against the integuments, and a few twists of the wire perfectly controlled the flow of blood; the ligature was uravelled and withdrawn in twenty-four hours; and in no instances was there a return of this untoward complication. Should such a result take place after amputation at the-hip joint I would strongly advise the adoption of this simple method, which I have found so effective in other cases, much in the same class, rather than put a ligature on the vein. Throughout the whole history of this case it will be seen there was progressive improvement for several days; the shock was avoided by the exhibition of chloroform—the hemorrhage guarded efficiently against; scarcely an ounce of blood was lost; quickly and rapidly all vessels were safely secured; the stump was dressed with ease, and without pain in some hours after being left to glaze; the, flaps were adjusted, bound together with wire sutures, and retained more permanently and throughout in contact, with adhesive straps and compresses; days past by; the patient regaining strength and cheerfulness, with all hopes of recovery, when suddenly pyemia becomes developed, a complication that never could have been anticipated from the favourable course of the case, yet, surely and steadily, and without compromise, it pursued its unrelenting course, poisoning the springs of life; but fortunately for our science and our art, the changes produced upon the wound are conclusive as to the reparative efforts which may be looked upon and expected with certainty, even under such trying circumstances, in so fearful an operation. From what has been stated it will be seen that the soft parts were all nearly united together; that the main artery of the limb was sealed up and blocked, beyond any danger of secondary bleeding; that the discharge was very small, and the entire granulating surface was healthy; in fact all the dangers of this great operation were overcome, when suddenly a complication that may arise from the simplest wound presented itself—the absorption

of pus into the system; and so this woman perishes. This disheartening sequence to an operation, correctly conceived, judiciously carried out, and affording such demonstrative proof, from the *post mortem* examination, of the salutary changes brought about in the divided parts, can never militate against its advantages or lessen the ardour of true surgery, but must rather impress the mind of every thinking observer, of every practical man, with the powers of operative surgery to save, when all other powers are abortive in rescuing the sufferer from pain and death.

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