EXCISION OF JOINTS,

By

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Excision of Joints

When we reflect that scarce forty years have elapsed since Amputation was the only alternative from Death in cases of incurable disease of the Joints, we cannot fail to consider Excision a splendid triumph of modern Surgery whether as a substitute for the so-called opprobrium of Surgery, or as an operation of complaisance in some cases of tedious and exhausting disease in which Amputation would scarcely be warranted—

I propose to consider the subject under the following divisions

I. To mention shortly the guiding principles in operations for the removal of Joints.

II. To consider the nature of repair after Excisions

III. To consider in succession the Excisions of the various Joints,— their advisability and the modes of operating and treating them.—

I. The Guiding Principles in Operations for the Removal of Joints.

It may, I think, be laid down as a rule that, in cases where Excision affords equal facilities for the Removal of the Disease, without greater danger to life than from Amputation, and with promise of a useful limb, it is the preferable operation.

The advantages are manifest:—

1. Motion is retained in the joints of the limb beyond the point of Resection
2. Motion may, if desired, be retained at the point of Resection.
3. Excision leaves little or none of the deformity which must ever follow Amputation.

In the Excision of Joints the Surgeon requires not only a ready hand, but sound anatomical knowledge, and caution in the performance, for the ~~parts~~ textures are often morbidly displaced, condensed, or otherwise altered. He must remember that often he is cutting in the neighbourhood of important parts where "Death surrounds his knife, as he is endeavour-

"Endeavouring to convey all his knowledge "to its point." — Complete removal of the articular Ends, and as much more of the bones as may be found expedient is Essential to success. Where a moveable joint is desired, it may be necessary to remove more of the sound textures than when anchylosis is the object.

Excision may with advantage be practised

a. Where a joint is so Extensively diseased that unless the seat of the disease be removed, the patient may sink under the pain and discharge.

b. As an expedient to hasten cure.

c. To restore the utility of a joint in which Anchylosis has occurred. —

d. In some cases of extensive injury to a joint where we can apprehend nothing but disorganization and anchylosis.

The chief points to be attended to in an Excision may be summarized —

1st That the textures surrounding the joint are not too Extensively diseased.

2nd That the disease be chronic, for operations performed during the acute stage are apt

apt to be followed by inflammation of the medullary canal of the bone and Pyæmia:

3rd "That the disease do not too extensively involve the bones: if this be not consid-ered, the patient may be left with a useless flaillike limb, which swings there attached indeed to his body, but beyond his control.

4th "The state of the patient's constitution is very important, also his previous habits of life — as to whether he be able to bear up through the long convalescence.

5th "The age of the patient.

(a) If old he can ill stand the long continued drain on his powers; while

(b) if young, nature in the diseases of the joints generally effects a cure by anchylosis, where she does not the patients constitution is rarely fitted for an Excision; moreover it has been found that when the Epiphysis is removed development is checked and the leg of the child dangles from the thigh of the man. It may be said it is Easy to leave the Epiphysis, but practi-cally it is found that in very many cases

the

the epiphysis partakes of the disease and requires removal.

6th The Situation of the affected Joint.

In the Joints of the upper limb there cannot exist a doubt that Excision is a preferable procedure to Amputation, for in all cases admitting of a choice, some degree of motion may be retained in the arm, fingers or hand if properly treated, and even the imperfect power thus retained is much superior to any mechanical contrivance. There is more room for discussion in regard to the joints of the lower limb. This point I propose to consider under the different joints of the lower extremity.

The cases most suitable for Excision are those of white swellings of the joints, Ulceration of the cartilages, and caries of the extremities of the bones, when not too extensive Mr. Price in his Essay on Excision of the Knee advocates its performance even when the patient is fatally affected with Phthisis, but certainly in such cases Amputation is to be preferred; for the call on the System is less, and the System is less likely to respond even to that call, who no ulterior or counterbalancing advantage can be

expected

from preserving the limb of a dying man.

Excision is not suited for the removal of tumours of the articular ends of bones, especially when the growths are cancerous.

In performing an excision attention should be paid to the following points

1. Free external incision.
2. To cut well on the bone, in order to avoid the important structures whose relations to the joint may be more or less altered by disease.
3. Clean transverse section of the bones: Otherwise nodules of bone may be left, these exfoliate, and by their irritation give rise to sinuses and long continued ~~irritation~~ discharge. Besides if the section is made obliquely it is unfavourable to anchylosis
4. Attention to position after the operation – where Anchylosis is desired the limb should be kept in the position most likely to be useful.
5. Only a few sutures should be put in, for if the wound is laced up tightly like a boot, the inflammatory products cannot get free vent and, far from promoting union the sutures thus give rise to bad consequences.

The principal objections urged against Excision as a substitute for Amputation are that

that the mortality is greater, and that Recovery is 'ceteris paribus' much slower after Resection than after the corresponding Amputation. The first of these objections comes under consideration in reviewing excisions of the different joints.. As to the second statement there can be no doubt of its truth and we have only to determine if it be an objection.

It has been ever taught that heroic measures are to be resorted to only when less violent and less dangerous means have failed; and it must be granted seeing the life of the patient is the Surgeon's first care that where Excision is safer, or Equally safe and from other reasons preferred by the patient or his attendant, it should certainly be performed rather than Amputation. And conversely the surgeon is not justified in recommending a more perilous operation merely to pander to the vanity of some Adonis, unless he can offer some solid compensating advantage.—

II. The

II. The Nature of Repair after Excision

Too little attention has, it appears to me, been directed to this very interesting and instructive subject. In Surgical works we find most minute directions as to how and in what cases Resection of Joints should be performed but very meagre are the details of Nature's process of repair. And yet a knowledge of that process must aid us in the selection of cases proper for the operation.

But little has or can be drawn from observation of the Symptoms during the process of healing, yet surely results might be more fully stated than by stating that a false joint or anchylosis was the result.

The best means of obtaining information is by 'post-mortem' examination, but it is seldom that such an opportunity is afforded, except soon after the operation and in cases requiring Subsequent Amputation. The latter class of cases yields but little information, for they probably exhibit evidences of destructive action rather than of reparation

It is to the experiments of Steinlin, Voetsch, and Wagner, and to the records of a few post-mortem

Vötch. Die Heilung der Knochenbrüche per primam intent: Heidelberg 1847

Steinlin. Ueber den Heilungs-prozess nach Resection der Knochen Zürich 1849

Vermandois made the experiment of excising the upper part of the femur just below the trochanter minor, in the dog.—

vid. Journal de Médicine 1786.

'post-mortem' dissections in the human subject after Excision that we are indebted for what little we do know of the Process of Repair.

Weigner gives an elaborate account of the Process founded on his own researches*: all I can do is to give a brief abstract of his and other monographs.- The observations were chiefly made in the rabbit by excising the head of the humerus.

*: Wagner on Resection Syd: Soc. Trans:

In from 12 to 48 hours after the operation the parts become swollen, painful, and fluctuating. The swelling is chiefly due to the Exudation of serum tinged with blood, and quickly subsides if afforded free exit.

The swelling may subside and absorption take place, but more generally pus is formed The muscles, at first loosely connected, become at the end of 6 or 8 days more closely united and become inserted into the bones above and below the points of section thus forming a capsule, which, as the edges of the superficial part of the wound unite, becomes a closed sac.

At first the cavity caused by the operation is filled with a clot of blood. This coagulum slowly shrivels into a reddish-yellow, or

brownish

brownish solid mass, which gradually disappears during the process of suppuration

Granulations now form on the inner ~~surface~~ surface of the capsule formed by the soft parts, and in proportion to the luxuriance of these granulations, the cavity is either completely filled up with firm solid cellular tissue, or a membranous layer only is deposited, forming a new articular capsule upon which the muscles are inserted. Sometimes a meniscus of fibrocellular tissue is formed, - attached to the inner surface of the capsule —

The granulations consist of nuclei with a dark contour, and of delicate cells with nucleus and nucleolus. When an articular capsule is formed it is but rarely lined with pavement epithelium -

Wagner lays great stress on preserving tendons which, he says, take new attachments to the articular capsule, as well as do the muscles.

Important changes take place in the bones. The periosteum near the section increases in vascularity and a thin layer of yellowish highly-nucleated exudation is poured out

between

between it and the bones. This exudation proceeds from the periosteum to which it is closely adherent, while readily separable from the bone. This exudation increases, and is found to consist of two layers; of which that nearest to the bone is bluish-white, of the consistence of cartilage; it consists of cells and nuclei with a small quantity of fibrillated intercellular substance; the cells are small and shew no tendency to endogenous cell formation.

The outer layer of exudation is yellowish and consists of the elements of immature cellular tissue. The transition between these two layers is rather abrupt. The outer layer becomes blended with the periosteum, which is thus thickened; while the inner or cartilaginous layer quickly develops into bone.

While these changes are taking place the medullary canal becomes closed by concentric deposits of bone; this change begins so early as the sixth day. Usually more or less of the circumference of the bone at the level of the section exfoliates, leaving a more or less pointed extremity formed by the medullary plug. The loss of substance

caused

caused by the resection is not restored by new formation of bone. This is practically valuable, shewing us that we must be chary of trusting Nature to fill up any gap where we aim at anchylosis.

"The muscles are inserted into the bone only by means of the fibrous capsule, or by the new fibrous uniting material. "The upper end of the bone is covered with a layer of fibrous tissue: either connected by its edges to the fibrous capsule or on its whole surface with the solid cord which unites the opposite surfaces of bone. "The new bone becomes more solid, and by absorption of the wall of the old bone the end of the bone presents finally a very finely reticular tissue covered by a compact lamella. Wagner found that the first changes relative to the formation of bone occur in the periosteum and that from it the formative Exudation is poured out. He also found that the degree of injection and tumefaction of the periosteum bore a direct relation to the amount of Exudation poured out and new bone formed—

"Towards the end of the healing

process

process the adhesions between the muscles are re-absorbed so that they are readily separable from one another at some distance from their insertion into the new-formed capsular fibrous uniting material.

As a consequence of this liberation of the muscles, or at least simultaneously with it a recurrent shortening of the extremity operated on takes place though in a less degree than immediately after the operation —

Only a few cases of dissection in the human subject have been recorded — I can only find 8 of the Shoulder, 9 of the Elbow, 5 of the hip, and 6 of the Knee and of these several are very loosely reported.

One of the most illustrative of these is a case of Railway-guard whose Elbow Mr. Syme excised for disease. The man was able to resume his duties, could lift an equal weight with both arms, and in every way trusted them equally. The amount of motion was rather impaired, but flexion supination and pronation were perfect enough for all useful purposes. The

man

man died 9 years after the operation from the effects of an accident. Mr. Syme gives the account of the dissection and I shall just indicate the chief points - The bones were found to form a hinge joint, the forked end of the humerus receiving the ulna & radius: the former is merely united to the humerus by a lax ligamentous union but the latter bone forms a true articulation lubricated by synovia. A cavity is provided in the ulna for the reception of the head of the radius, which is restrained by an orbicular ligament allowing however of free rotation. Lancet. 1855 Vol I. p. 231.

The new Elbow-joint has two strong lateral ligaments join the humerus to the orbicular ligament on the outside, and to the ulna on the inside. The anterior ligament was very thick and strong to compensate for the loss of the olecranon in checking backward movement of the forearm beyond the limit of complete extension. There was also a strong posterior ligament.

Yeatman* found in a case he examined that there was a "lengthening of the ulna to the extent of 1/4 inch on which the radius

* Never thinner: Vol I. Pct 1. 3.

radius moved as in the natural state, and the trochlea of the humerus appeared as perfect as if none of it had been taken away." The last statement seems to imply the presence of a crust of cartilage.

In a case of Excision of the knee by Mr. Fergusson*, he found the limbs after recovery seemed of equal length, but on measurement there was a difference of half-an-inch. At the operation he had removed from the femur a slice half-an-inch thick, and from the tibia two portions together about 1¼ inch in thickness—

"This may I think be Explained by the fact that the knee was not anchylosed, but possessed considerable extent of motion: probably too some compensation was made by the pelvic ligaments.—

* Brit: Med: Journ: 1858 p. 1001

III To consider 'seriatim' the Excisions of the various Joints :- the modes of operating ;- and the after treatment. —

In considering this division of the subject I must necessarily touch on the vexed question of the value of statistics. We undoubtedly meet with glaring exceptions in some cases to the average result of statistics, thus Professor Spence had upwards of 50 cases of Excision of the Elbow without a death, the average mortality on 137 cases being 1 in 12½.[†] Again we find that the average mortality of ~~xxxxx xxxxx~~ amputation of the thigh for disease[1] in 500 cases is 1 in 5 while Malegnigne in the Hôtel Dieu lost 92 out of 153[2] or more than 1 in every 2. Still, notwithstanding these discrepancies, I am inclined to think that an average on a large number of cases must be useful in determining the value of an operation and sufficient to settle the question where the difference of mortality between two operations is great

Hosp. Reports in Edi: Med: Jour: 18

† p. — of Thesis

1. See p. — of Thesis

2. Erichsen p. 30. System of Surgery

Excision of the Shoulder-Joint

Mr. White of Manchester is usually said to have performed this operation for the first time in 1768 but from the published account of his case† it would appear that he had merely removed a large piece of necrosed bone without interfering with the joint

† Cases in Surgery Chas. White 1770 See p. 57.

Chelius° states that the shoulder-joint was first excised by Vigoroux and David so early as 1763. A few years after Mr. White's case the shoulder-joint was really excised by Mr. Bent*1 of Newcastle and by Mr. Orred*2 of Chester.

° J. M. Chelius System of Surgery Trans: in 2 Vols. p. 75 South. 1847

*1 See Philos. Trans. Vol LXIV *2 LXIX.

The elder Moreau performed the operation in 1786 and his example was followed by the surgeons of the Imperial Army in cases of gunshot wounds. This excision was almost disused till revived by Mr. Syme in 1826 – It is almost needless to say that since then it has been generally adopted as a substitute for Amputation in all cases of chronic disease of the shoulder-joint and in cases of gunshot or other compound injuries where the laceration and comminution are not very extensive.

Many

Many modes of external incision have been employed for obtaining access to the articulation. Of these the principal are

1. A U-shaped or elliptical incision flap, 3 inches in length, commencing at the posterior part of the acromion cutting across the insertion of the deltoid and carried up to the inner side of the ~~acromion~~ coracoid process—
2. A T-shaped incision
3. A longitudinal incision with a single transverse incision carried from its upper end thus ⊤.
4. Two parallel united by a transverse incision ⊓
5. By a single longitudinal incision.

Of these methods the last appears to me at once the best and simplest in the majority of cases. But many cases present themselves, where from the situation of sinuses, or from the way in which the tissues have been torn by an injury, one of the other methods may appear preferable.

By this method of straight incision too fewer muscular fibres require division. The incision is commenced under the coracoid process, and carried nearly to the insertion of the deltoid; the joint is thus

Exposed.

Exposed. Then under the guidance of the forefinger of the left hand the tendons attached to the tuberosities of the humerus are divided, being rendered tense by rotating the arm. The long tendon of the biceps should be preserved, for Wagner found in his experiments that it did not slough but either takes attachment to the new capsule, or is received in a duplicature of it, and retains considerable power of motion

The head of the bone is next protruded, by drawing the arm backwards, and is sawn off. The cartilaginous surface of the glenoid surface may be removed and if the subjacent bone is carious the disease may be removed by gouging, or with bone-pliers. Removal of the whole glenoid surface will be facilitated by a free incision along the posterior border of the deltoid, somewhat analagous to that made in front—

Some surgeons arguing that the facility for removing the glenoid fossa is increased by a posterior incision have proposed to use that incision alone. This is bad because " the glenoid does not require

removal

Excision.	Cases	Died	Unsuccessful	P. C. Mortality.
Disease	50	8	4	16.
* Injury	28	3	-	10.5

* Baudens Method & Crimean Surgeons

Amputation	Cases	Died	P. C.
for Disease	26	4	28
for Injury	123	50	40.7
	149	54	36.

removal; 2) the muscles must be unnecessarily weakened by division in their continuity instead of at their tendinous insertion: 3) the wound is deeper and more considerable branches of arteries are divided, by which healing is retarded and the dangers of hæmorrhage increased. The only advantage is the free drain it affords for the pus —

Unnecessary removal of the whole glenoid cavity shbuld be avoided as it appears to increase the risk of the operation for out of 50 cases collected by Hodges of Boston 8 died and in 4 of these the glenoid cavity had been removed. In addition to the 8 deaths there were four cases out of the 50 unsuccessful.

The above statistics give a mortality of 16 p.c. On comparing them with statistics of Amputation at the shoulder-joint there is a great difference. Out of 149 cases of the latter operation mentioned by various authors 54 died giving a mortality of 36 p.c. — or rather more than double that of Excision — Amputations for Disease have a Death-rate 1 2/3 for Injury 4 times that following Excisions for both.

Erichsen Lond: Hosp: Crimea James Hussey Guthrie &c.

P.T.

It is seldom that a vessel ~~is~~ of any size requires to be tied after operating by the single linear incision as recommended

Sutures should be applied and some light dressing applied to the wound.-

After the surgical fever has subsided the patient may be allowed to get up, care being taken to support the Elbow. A pad in the axilla will be found serviceable to prevent displacement by muscular action

As soon as the wound begins to heal passive motion must be commenced to prevent the occurence of a stiff-joint. Considerable shortening of the arm is a consequence of the operation, and though a very useful limb is ~~always~~ left, the patient generally finds the power of abduction considerably diminished -

"The average length of time" says Dr. Hodges "before some use of the limb was commenced, as calculated from thirty-one cases of my table was over four months, a much longer period than this was required however to elapse before the limb could be said to be really serviceable."

Here

Here however the length of treatment is justified and more than justified by the great immunity which it gives from Death.

We saw above that the mortality was less than half that after Amputation at the Shoulder-joint, and that in most cases, (in a larger number than of mere survival after the Amputation,) a useful limb was left, though that of course is of trivial importance compared with the diminution of danger to the patient's life.—

Excision of the Elbow-joint.

The majority of surgeons are so much at one both as to the propriety and the methods of Excising the Elbow joint, that its consideration need not long detain us.

Wainman of Shipton in 1758 removed the articulated Ends of the bones forming the Elbow-joint for a compound luxation.

Jeustamond in 1762 cut out the olec-ranon and two inches of the ulna for disease of the Elbow joint.

Mr. Park tried the operation of Excision

of

of the Elbow on the dead subject, but he never applied it in practice. The Moreaus father and son, however, adopted his suggestion in good earnest and practised the operation with success at Bar-sur-Ornain, and the younger Moreau* in his treatise published five of these cases—

*P.F. Moreau on Carious Joints Liverpool 1806.

Owing perhaps to the apparent difficulty of extirpating this joint from its strong ligaments and intimately articulating surfaces the operation met with no favour in this country till its claims were advanced by Mr. Syme in the year 1828, when he removed the elbow-joint for the first time in this country in presence of Professors Russell and Sir George Ballingall. This may be looked upon as the first real Excision of the Elbow-joint; for Wainman's operation appears to have been performed merely to facilitate reduction of the dislocation.

Excision of Joints Syme. p. 72.

The practice of Excising the Elbow joint is followed in cases of 1/ Chronic Disease of the Joint, Especially Caries; and 2/ Spurious Anchylosis; and 3/ Injury to the Joint.

In

In all these cases the favourable result of a shapely and useful limb may be confidently looked for – if suitable cases are chosen for operation; if sufficient bone be removed; and if the after-treatment is properly conducted. The mortality is less than half that from Amputation of the arm.

Excision	Cases.	Deaths.	Subsequent Amputation.	Mortality P.C.
	137	16	15	11·7.

Amputation	Cases	Deaths	Mortality P.C.
Injury	463	134	28·94.
Disease	165	44	26·66.
for Injury and Disease combined	628	178	28·34

Or the mortality after Amputations, even for disease alone, as compared with Excision is as 2·3 to 1. ——

Ré-excision of the Elbow may often be practised in lieu of Amputation where the result of Excision is unsatisfactory.

The operation may be performed in various ways, of which I think the best are "by a single linear incision over the olecranon or 2) by an H incision. The first of these requires no description: the latter is thus performed:—

performed:- The ulnar nerve is held aside by the thumb of the left hand while the knife is thrust ~~inwards~~ perpendicularly into the joint with its back directed to the nerve. A cut is made transversely outwards close above the olecranon to the External condyle of the humerus. From the Extremities of the transverse cut incisions are made upwards & downwards, an inch & an inch and a half in length. The flaps thus formed are reflected: the tip of the olecranon is cleared with the knife, and removed by cutting pliers, so as to afford access to the joint. The ligaments are then put on the stretch and by a light application divided: the head of the radius is next snipped off, and the ulna is cut through at a corresponding level: The attachment of the biceps to the tubercle of the radius should be left.
A section of the lower End of the humerus being now made, the operation is complete

If an unhealthy osseous surface is left by any section, a fresh section may be made or the bone may be gouged.

There

There is frequently smart hæmorrhage from the articular arteries, and some of these may require to be secured. A few sutures are put in to bring the wound together, and a light dressing is applied—

Mr. Syme merely flexes the arm and applies a roller; and many surgeons follow his Example; but I think the application of a splint (of paste-board or other material), gives to the patient a feeling of security, and prevents spasmodic twitchings of the muscles and consequent displacement of the bones.

It is of the utmost importance that union of the transverse bar should take place Early when the H-incision is employed, in order that passive motion may be Early begun. Passive motion is a most Essential part of the treatment - to prevent anchylosis.

Excision of the Wrist Joint.

Until very lately, though the operation had been several times performed, Excision of the Wrist was viewed with more or less distrust

The chief objections to the operation are its close connection with the flexor and extensor tendons, the consequent danger of their being involved in the cicatrices of the wound, and the great difficulty which it presented from the complexity of the articular arrangements.

The first Excision of the Wrist was performed by the younger Moreau at the close of last century; but few details of the case are given of the case. In 1839, a German surgeon named Dietz is said to have removed all the carpal bones together with the Ends of the radius and ulna for caries.— It was not repeated till 1849 when Heyfelder of Erlangen Excised the wrist-joint for disease.

Since then it has been performed by many surgeons but opinion was on the whole unfavourable to the operation:—

thus

thus we find Mr. Holmes saying of it" In the very rare event of limited disease existing "in this part, it might be proper, after "bestowing a patient trial on the usual "methods of cure to enlarge the sinuses and "gouge out the affected bones; but no operation seems advisable when the whole "carpus is involved in chronic disease". Professor Miller in his 'System of Surgery' says "the operation has not been found "so satisfactory as to commend itself to the "confidence of surgeons generally. And "consequently when the joint is deemed "incurable Amputation is preferred" and Mr. Erichsen so late as 1864 after mentioning a favourable case of his own, calls it an Exception and adds "in the "majority of the few cases in which the "operation has been done of late years "either a useless hand has been left, or "secondary amputation has been required."

Holmes' Surgery Art: Excision

In 1863 Mr. Lister of Glasgow performed a partial Excision for a compound dislocation of the radius and ulna accompanied by the laceration of soft parts.

At

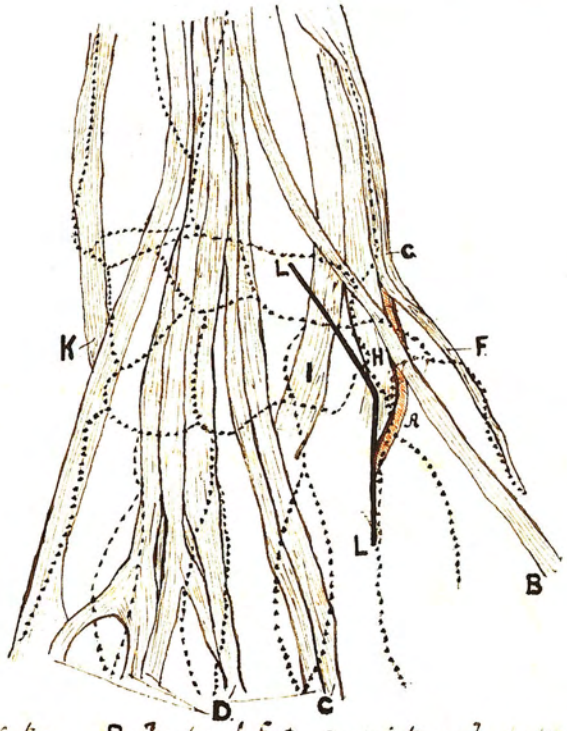
At the end of five months by great care and attention the injured wrist and hand were nearly as strong as those on the sound side. Yet this case was unfavourable for operation: for the bones of the forearm protruded through the flexor tendons and the extensor tendons were torn from their sheaths. Encouraged by such marked success Mr. Lister was led to believe that in cases of caries of the wrist-joint its excision might be followed by equally good results.

"The wrist joint is particularly liable from its construction to a recurrence of disease after partial resection, hence Mr. Lister concluded that it would be better to remove the joint entirely, that is to say, the whole of the carpal bones, the ends of the radius and ulna and the bases of the five metacarpal bones. The success which has attended Mr. Lister's operations fully bears out his anticipations.

Since 1863 he has improved his mode of operating: he describes it at great length in the Lancet but it would occupy too much space to copy it— Lancet 1865 p. 336.

I will

Copied from Lancet for 1865. Pr. 336.



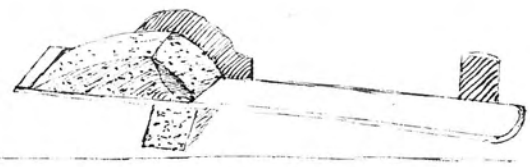
A. Radial Artery. B. Tendon of Ext: sec: internodi: pollicis
C. Indicator. D. Extensor communis digitorum —
E. Extensor min: dig: F. Ext: primi internodii pollicis.
G. Ext: ossis metacarpi pollicis. H. Ext: carpi radialis longior.
I. Ext: carp: rad: Brevior: K. Ext: carpi ulnaris.
LL Line of the radial incision —

I will therefore merely say that his first or radial incision is made posteriorly as shewn in the diagram so as to avoid cutting the radial artery: the ulnar incision is made anteriorly, it is commenced two inches above the styloid process of the ulna and runs down to the middle of the 5th metacarpal bone on its palmar aspect.

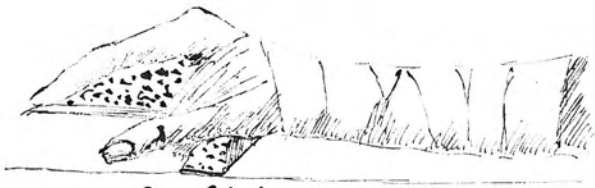
The carpus is removed Entire with the exceptions of the trapezium & pisiform bones. The ends of the radius and ulna and the articulating surfaces of the metacarpal bones are now cut off, and the trapezium having been carefully dissected out to avoid injury to the radial artery the operation is now complete. In stitching up the incisions the middle of the ulnar incision is left and Kept open by lint to allow free exit for discharges--

The after-treatment requires great care, and it is to this that Mr. Lister attributes the superior results obtained in his later cases. He says the great objects to be Kept in view are" to maintain flexibility of the fingers by

frequently



1. Splint



2. Splint in use.

Copied from Mr. Lister's paper in the Lancet of 1865.

K. M. D

frequently moving them, and at the same time to procure firmness of the wrist by keeping it securely fixed during the progress of consolidation. Mr. Lister commences passive motion so early as the second day in all the joints below the wrist, and continues it daily: care must be taken by steadying the metacarpal bones not to disturb the wrist.

Mr. Lister uses a straight flat splint, upon which is fixed a piece of cork to fit into and support the palm. The hand is thus in a position of semiflexion, the natural attitude of repose. The patient can in this position himself exercise the fingers, and it also affords the best opportunity for the extensors of the carpus to form new attachments. A transverse bar of cork is attached beneath the splint and on this the thumb rests in the position most serviceable for the movement of opposition. A pad should be placed between the thumb and first finger to keep the thumb from being drawn towards the index finger--

The

The use of the splint should be gradually abandoned, and passive motion should be continued till all tendency to contract fresh adhesions is at an end. After the hand is healed a support of some kind is ~~xxxxxx~~necessary for a short time: but only till the patient feels the wrist as strong without as with the support.

Mr. Lister has had 15 cases: of these two have died – one from Phthisis and the other apparently from Pyæmia; one was in an unsatisfactory though not hopeless state when the report was written, two afforded good hope of a satisfactory termination while ten had been completely cured..

Cases	Cured or in process of cure	Unsatisfactory	Died	Mortality P. C.
15	12	1	2	13·3.

The mortality on a number of cases of amputation of the forearm for disease was

Cases	Deaths	P. C. Mortality
78	10	12·82

There is thus an almost equal mortality after the two operations but I think that under Excision the death from Phthisis

should

should scarcely be counted against that operation for 1) the operation was merely undertaken to palliate the patients sufferings, not in hope of effecting a cure of the articular disease and 2) the man died 7 weeks after from Phthisis and not from the operation: - just in short when he would have died if the operation had not been performed. If this case were excluded the mortality would be 6·7 or only half that after amputation, and I think it must be allowed that where one case can double the death-rate there are scarcely sufficient data to warrant a judgement. - The results of Excision of the wrist are such as to encourage us in practising it even if we consider that so great an advantage as the use of a hand is to be obtained at the small increased risk of ·5 p.c. or 1 death in 200 cases; much more encouraging when we consider that the mortality is probably really less after the Excision than after the Amputation. -

We should be the more inclined

to

to give Excision of the wrist a fair trial when we know under what unfavourable circumstances Mr. Lister treated his cases.

I give his own words "On comparing "these results with those of previous practice, "bearing in mind that the cases include "all varieties of carious disease, sometimes in the "most aggravated form ever likely to be "presented, and also that they have "been treated under the disadvantages "of hospital atmosphere, so that I have "had to contend in no less than six "instances with hospital gangrene, and "in one with pyæmia it will, I trust, "appear that the principles which have "guided me are sound, and afford the "means of removing one of the greatest "opprobria in Modern Surgery."

No doubt the hygiene was bad; but the same may be said of the circumstances under which the Amputations were performed. I would rest the claims of the operation on the paucity of cases, being insufficient to warrant an adverse judgement while the results are so

Similar

similar to those of amputation and the advantages so manifest.—

Excision of the Hip.

The Excision of the hip-joint was proposed by White of Manchester in 1769; but the operation was not I believe actually performed till 1821 when Anthony White of Westminster Hospital removed the displaced head and trochanters of the femur from a scrofulous boy of Eight. The boy recovered.

The operation was not repeated in Britain till 1845 when Sir W. Fergusson revived it. It had in the meantime been performed abroad by Oppenheim, Textor, and others.

This Excision may be performed for Gunshot or other injuries and for Morbus Coxæ in incurable disease or where the patient is hectic.— It may be either a partial or a complete Excision: usually only the head of the femur is removed but if necessary the acetab-

-ulum

-ulum may be also excised.

Where partial excision is resorted to the head of the femur is found in very many cases to lie displaced or dislo-
-cated on the dorsum of the ilium: in such a case from the emaciation of the patient and the situation of the bone, but a slight incision is required in order to obtain access to the remains of the head of the femur.

In excision for injury the head of the bone is usually found in the cavity of the acetabulum, and it is difficult to turn it out when as frequently hap-
-pens the neck is fractured and no purchase can be obtained.

"When the joint is entire the operation may be performed thus :— An incision is made running behind and parallel to the posterior border of the trochanter and curving round its upper border: it should be long enough to admit of free access to the joint. From this a second incision may be made along the neck of the femur, so as to make a ⊢ shaped

incision

Sir W. Fergusson recommends that counterextension be made from the opposite thigh, round which a socket is fixed to which a band is attached.

incision. Some think it proper to remove the large trochanter, so as to avoid its displacement during treatment and interference with union of the wound.

It is however better, I think, to retain the point of attachment of so many great muscles and seek to obviate any inconvenience that may arise from so doing by ingenious mechanical contrivances.

The apparatus most commonly employed is a long splint whose continuity is broken at the seat of operation by a rod of iron to admit of dressings being applied. † This splint is secured with common bandages, or better with a bandage of Scultetus, or better still by plaster of Paris bandages.

The leg might ✠ be swung from a cage, (as after excision of the knee) with the knee slightly flexed, care being taken that the thigh be not too much flexed at the hip, or the patient will be left in the awkward predicament of a pointed toe

The patient would perhaps be

Easier

Easier with the leg suspended in a long sheet than by any other contrivance

The acetabulum has been successfully removed by Erichsen, Hancock and others. In one case Erichsen removed the upper part of the femur, the acetabulum, the rami of the Pubes and Ischium, part of the 'tuber ischii' and part of the Dorsum ilii !! This patient recovered and was dismissed with a limb only 2 inches shorter than the other.

Hancock has shewn how slight is the danger which we would expect 'à priori' from removal of the acetabulum: for the fascia and muscles lining the pelvis are much thickened so that unless there is a pelvic abscess the danger of inflammation spreading internally is very slight.

Excision of the hip is an operation of so great severity as scarcely to be warranted except where the disease threatens to be speedily fatal

The immediate aim is to save

the

the life of the patient: the ulterior object is anchylosis,— just what Nature would herself effect if the patient could hold out long enough.

In succesful cases a fibrous anchylosis is obtained with shortening of some 2½ inches: in short a limb in every way resembling that which results from a cure of the third stage of Morbus Coxæ. The patient can flex and adduct the thigh: the power of abduction is lost, but compensated for by the mobility of the lumbar portion of the spine. The mortality is great but the operation is only performed in desperate cases.

I find that out of

Cases	Recovered	Died	Unsuccessful Amp.ⁿ	Mortality P. C.
220	127	89	2	40·5

while in amputation at the hip-joint

out of	Cases for Disease	Fatal or	P. C.
	40	21	52·5

(Dr. Stephen Smith. New York Jour: of Med:—

Excision of the Knee-joint.

The first case of Excision of the Knee was performed by Mr. Filkin of Norwich in 1762, but the state of the limb on recovery is not accurately reported.

In July 1781, Mr. Henry Park of Liverpool without any knowledge of Mr. Filkin's case, after previously trying the operation on the dead subject, removed the Knee of Hector McCaghen, an able-bodied seaman, on account of caries of ten years standing.

This case was most successful: the man afterwards made several voyages to sea, "in which" writes Mr. Park "he "was able to go aloft with considerable "agility, and to perform all the duties "of a seaman: he was twice shipwrecked, "and suffered great hardships without "feeling any further complaint in "that limb, but was at last unfortu-"nately drowned by the oversetting of a "flat on the river Mersey."

Eight years afterwards Mr. Park again performed excision of the Knee, but

but his patient died within four months after the operation, from Exhaustion

The operation met with no favour from British Surgeons, but abroad Mr. Park's Example was followed by the Elder Moreau, who Excised the Knee in 1792: the man died 3½ months afterwards during an Epidemic of Dysentery, when virtually recovered from the operation.

Excision of the Knee was repeated by Mülder[1], Brampton[2], Roux[3], Fricke, Textor and others but not with signal success.

1. Wachsten de Art. Ext: p. 30
2. Dublin Hosp: Reports Vol. IV. p. 196. 203.
3. Revue Medicale January 1830.

Till the year 1829 the only cases of Excision of the Knee performed in Britain were those of Filkin and Park.

In 1829 and 1830 Mr. Syme twice operated in children:- one died, the other lived, but unfortunately as years rolled by, the limb did not develope. The operation was not again performed till 1850, when Sir William Fergusson revived it and his Example was speedily followed by Jones of Jersey, Mackenzie, Humphry & many others.

Mr. Butcher of Dublin in his rather unwieldy,

unwieldy and very partial work on 'Conservative Surgery' gives a table of cases operated on by British & Foreign Surgeons up to the year 1850: the results were certainly far from Encouraging

Out of 31 cases, 16 died at a date varying from 11 days to 4 months after the operation, 5 had useless limbs, of which one was subsequently amputated the remaining 10 were "more or less" successful. This gives a death-rate of 53 p.c besides which a number had useless limbs.—

These figures however, it must be admitted only shew the operation where it was often improperly & sometimes unskilfully performed; and they cannot be held by any candid critic to represent fairly the present success of the operation, and I shall therefore place them out of ~~the~~ consideration in regard to the question of the danger of Excision of the Knee, as contrasted with Amputation—

In

In making this comparison, undue weight has, I think, been given to statistics, and their fallacy is very apparent, for we find that surgeons occupying different vantage-grounds alike intrench themselves behind a file of statistics: the peculiar points of individual cases are lost sight of, and the opinion of the surgeon is enveloped in a maze of figures.

I cannot however omit mention and analysis of a point on which all writers have laid so much stress.

I find that Mr. Butcher has collected 80 cases of Excision of the Knee performed between 1850 and 1856 in this country alone. Of each case he gives a short clinical abstract and on very carefully reading these over I find that <u>in no case in that table was the operation performed for injury.</u> Yet that gentleman does not hesitate to compare with these cases the death-rate after amputation in the Paris Hospitals for cases alike of injury or disease: — and this while he is ignorant, or suppresses mention of the fact that Excision of the Knee has been

discontinued

discontinued there on account of the enormous mortality* and while two his table contains only the cases of 'British' Surgeons

Mr. Butcher, I say, while he devotes a few hundred pages to a consideration of Excision of the Knee, and to abuse of all who are blind to the incomparable merits of the 'Butcher' saw, cannot spare as many lines – scarce as many words to the settlement of the relative death-rate after Amputation of the thigh, and Excision of the Knee.

*Brit: & For: Med: Chir: Rev: January 1866.

The whole statistics given by Mr. Butcher are

I. University College Hospital (Erichsen)

	Cases	Died	P. C.
Injury	19	8	58.
Disease	34	27	20½

II. Malgaigne's

Injury	46	34	75.
Disease	153	92	60.
	252	144	57. 15

He adds "These tables set at rest for ever "the question of the comparative Danger "of the two operations" Yet we find that

of

of the 252 cases just given only 34 can fairly be compared with Amputation; & that they give almost the same mortality as after Excision ——

Besides the Error, so far as I have read universally committed of comparing Excisions performed in almost every case for disease with Amputations performed both for disease or injury, — in civil practice and in the field, another serious blunder has been that the comparison is always made with 'Amputation of the thigh', i.e. removal of the limb at any point between the knee and hip. Now the nearer to the trunk the amputation is performed, the higher is the mortality: but only in cases where the amputation is performed in the lower third of the thigh ~~could~~ could there ever be any choice between Amputation and Excision. Cases requiring amputation higher up would be manifestly unfit for Resection of the knee-joint.

The comparison is then obviously unfair —

The

Price also gives some cases by Heusser, Roser of Marburg, Jaeger & Testes.

Cases	Recovered	Died	Amputation	Died	Recovered	Not healed
41	19	16	5.	2	1	1

This gives p.c. mortality of 44 but I do not include these cases, - Done by foreign surgeons -

Again too, it must, I think, be admitted that to a certain Extent cases have been selected for Excision, so that many favourable cases are included in the list i.e. cases well-suited to stand the tedium of a long illness — It is true that from the nature of the case a certain degree of selection must be allowed, but this is only another proof that the two operations should never have been placed in antagonism: but since the gauntlet has been thrown down by the champions it behoves us as candid inquirers to examine the grounds of their assertion.

We find them of Excision

Cases	Cured, or in process of cure	Subsequent Amputation	Precarious.	Died.	Mortality P. C
81	59	4	1	15	18·57.

(Mr. Butcher of Dublin)

Cases	Failed as shewn by Death or Amputation	Successful	Limb more or less useless	Doubtful
208	102	65	14	24.

(Dr. Richard Hodges, Boston.

Cases.	Successful	Died after Excision	Amputn.	Recurn. Died	Result not given
238	150	52	36	28 4	1.

give P. C. mortality of 25

(Mr. Price. K. C. London.

I next quote the results of Mr. Lane's table of Amputation of the Thigh.

Cases	Deaths	P. C. Mortality
552	100	18.17.

(Erichsen, Crimea, South, Guthrie &c—

Also 800 cases from various sources.

	Deaths	P. C.
Glasgow Hospital. (1840).	92.	19. 20
University College Hospital.	46	9 19
Hussey.	55	10 19.
Medical Times Gazette {collected by Sanson}.	54	9 18.5
Liston at Univ. Coll: Hosp: before 1841.	8	1 12.5
South (1840).	13	4 38.
Addenbrooke's.	92	17 18.2
St. Georgis Hospital (1856).	12	6 50.
James of Exeter.	119	10 8.3
Teale's Statistics; 1. London.	169	38 22.3
2. Provinces.	154	33 21.4

This table gives the following result

Cases	Deaths	P. C. Mortality
804	156	18.5

Now by adding together all the statistics in favour of both sides with the Exceptions of the Excisions by Baar foreign Surgeons & those performed prior to 1850, we get the following results.

Excision

Cases	Cured	Deaths or Amputation	Partially cured	P. C. unsuccessful.
527	269	212	49	40.23

Amputation

Cases	Deaths	P. C. Mortality
1356	256	18.9.

Or if we take the standard of success,

Amputation 81 p.c. successful

Excision 51 p.c. —

It may be objected that the actual P.C. Mortality is not shewn above in regard to Excision :— let us then discard the table of Dr. Richard Hodges who classes together the fatal and unsuccessful and we get the following result

Cases.	Successful.	Amputated.	Total Deaths.	P. C.
319	209	43	74	23.5.

We thus find that after Excision the amputations are 13 p.c. mostly successful, and the total mortality is 23.5 p.c. contrasted with a mortality after Amputation of 19 p.c. in other words an additional list of 4½ p.c.

And I would again state that this increased

increased risk is as contrasted with Amputation for Disease in all parts of the thigh

Having thus considered the question of the relative mortality after Excision of the knee and Amputation of the thigh, I next come to consider an objection to this ~~objection~~ Excision — viz. the time required before recovery is complete.

This objection was anticipated more than 30 years ago by Mr. Syme, and met by the remark that "though "recovery from Amputation of the thigh "is usually completed in three or four "weeks, it is generally at least as many "months before the patient can rest the "body on the face of the stump, so as to "use it in standing or walking."

Excision of Diseased Joints. Syme. p. 131

~~But~~ But it is not even three or four months that see the Excision case dismissed — far from it. In 94 cases which I have collected from various authors & journals the average time was 235 days or very nearly

nearly 8 months – and as Mr. Holmes Coote justly remarks, " in many after-
"wards very successful cases sinuses
"remain open, and the limb is in a
"state that cannot but cause anxiety
"for months after formal treatment is
"discontinued" i.e. for months over and
above the 235 days of average residence
in Hospital. Verily here the surgeon
well fulfils his indications 'curare,
citò, tutò, ac jucundè.!!

Taken singly the objection of length
of cure would perhaps be entitled to
very little respect but taken in con-
-junction with the next it is important
– whether the nature of the support
left by Excision is such as to repay the
patient for the long continued pain
and annoyance of an unhealed wound.

It must be conceded by the most
violent opponent of Excision of the knee
that, where a firm limb is left, and the
whole shortening on recovery does not
Exceed 2½ inches, and where this is
accounted for by the sections of bone
removed

removed, in such a case the limb is superior to any artificial apparatus.

But where we read of Shortening to the Extent of "9 inches without bony union (Mr. O. Pemberton of Birmingham)" or of "deficiency of growth of 5 inches in less than 6 years (Keith of Aberdeen)" few will agree in thinking with Sir Willm Fergusson that such limbs are superior to those furnished by an instrument maker. In such cases no benefit can be derived from the foot: the deficiency of length in the limb is supplemented by a wooden or iron peg: the deformity is as great and the limb in no way superior to a timber leg:— not nearly so good as a well-made artificial limb with joints.

Of a case of his own followed by shortening to the Extent of 6 or 7 inches Mr. Pemberton thus writes "The limb "cannot be deemed otherwise than an "incumbrance, and with the best appli- "ances to remedy the want of length, "proving after all little better than a

sad

"sad deformity". To such an argument as the preceding it is answered that stumps after Amputation are often unsatisfactory and require re-amputation for Neuroma, Necrosis, etc.- This argument I cannot answer further than by saying that in my limited Experience at the Edinburgh Infirmary such re-amputations are very infrequent.

It is sometimes alleged by the supporters of Excision that it is unfair to expect as much from this operation as from Amputation because the former is yet in its infancy while the latter has been improved by the Experience of centuries.

This specious argument is easily disposed of when we consider, that Excision has derived the benefit of all the improvements in the treatment of Amputations which have been suggested in modern times— and as it is in treatment that we have to look for improvement & progress the operations are in this respect on a par.—

One of the gravest objections urged against Excision of the Knee is that if the Knee-joint be removed from persons under adult age, the limb does not grow in proportion to the other -

Attention was early drawn to this fact by Syme, and later by Humphry Pemberton and others.

Dr Richard Mackenzie assigned as the cause of non-development that Anchylosis was absent in such cases. This may favour, but certainly does not cause the want of development; for we find anchylosis in some ill-developed limbs. Book of his Pamphlets 1852-3.

Mr Holmes Coote attributes it mainly to shock to the nervous system, and to the length of time required for treatment. But this does not account for arrestment of development in connection with the Removal of the Knee-joint rather than of the Elbow-joint. Bath. Rep: Vol. I. 1865.

Dr Humphry in some admirable papers read before the Medico-chirurgical Society pointed out that the femur grows in length chiefly at its lower

End,

* - an hypothesis borne out by the results of practice.

end, where it joins or is joined by the Epiphysis: and from this he deduced the hypothesis, that if in resection of the knee the Epiphysis and Epiphysical cartilages be cut away the femur will not grow in proportion to the rest of the body ‡ According to Ollier too the chief growth in the tibia goes on at its upper extremity —

It may be asked why this should be the case in the lower Extremity, while it is not mentioned with regard to the Elbow. Ollier gives the following explanation in one of his papers in the 'Comptes Rendus' :— "The two Epiphyses," he says, "do not affect the same proportion of the growth of long bones, and "those which achieve the most do not "correspond in the two Extremities"; and he adds, that "in the upper limb the "Epiphyses furthest from the Elbow grow "most, while in the leg the Epiphyses "nearest to the knee grow most." The Experiments of Mr. Anthony White bear out the views of M. Ollier —

This

"This arrestment of growth, which follows Excision in the young subject, naturally limits cases suitable for the operation to persons of adult age: and of these the best subjects are found to be healthy young females — i.e. young females whose General health has not been broken by disease.—

After reviewing the subject, I cannot but think that the advantages and applicability of Excision of the knee have been very greatly over-rated by its supporters, and though far from disposed to condemn the operation*, I yet think that the number of cases in which it may be practised with advantage is but limited.

"The operation may be performed by making a semilunar flap from condyle to condyle over the tubercle of the tibia. The ligamentum patellæ is then divided: the patella is turned out with the flap, the crucial ligaments divided, and any of the lateral attachments which may have

Escaped

escaped the knife. It has been a question whether the patella should be left or removed. It was found that in
48 cases where patella removed 225 days: in
38 — — — was left 255 days
were required on an average for treatment

If diseased, there can be no question that it ought to be removed, while if healthy there can be as little doubt that if left it will add to the stability of the limb & afford attachment to the Extensor muscle.

"The ligaments of the joint having been divided, and the bones separated sections are removed first from the femur, then from the tibia, the cut surfaces are examined for disease, and if present gouging or a fresh section may be resorted to—

Mr. Jones of Jersey recommended making a semilunar flap, displacing the patella with its ligament, opening the joint and sawing the bones, and it is worthy of remark that out of 19 cases he only lost three.

Some recommend an H incision,

while

while others make a single transverse incision - The best method must very much depend on the individual cases.

Mr. Holt proposed to make a drainage opening in the ham -

It is usual to remove a slice of as much as two inches from the femur, and of 1/2 to 3/4 inch from the tibia: but it may be necessary to remove more The smaller the amount however, the better; especially if it is ever deemed proper to operate in the young.

Excision of the knee should never be practised when the joint is acutely inflamed -

We now come to the after-treatment of Excision of the knee, and this is I think, the really weak point of the operation, and the particular in which we may look for the greatest improvement.

The great indication to be fulfilled is complete and absolute rest. We may therefore discard all apparatus that require to be frequently changed -

Mr Butcher of Dublin prefers a

box

box, while Heath of Newcastle and other surgeons all use splints or other contrivances of their own invention. I cannot of course undertake to criticize them all and will merely notice that apparatus which I have seen used with the best results in the wards of Dr. P. Watson in the Edinburgh Infirmary.

Immediately after the operation he lays the limb on a well-padded Gooch splint reaching from the buttock to a little beyond the heel, a hollow being cut to receive the heel. A little oilsilk is placed behind the knee.

On the front of the limb he places a long iron rod with an arch over the knee: this likewise is well-padded. A plaster of Paris bandage is applied from the heel to the knee, and another from the knee to the groin, the site of the operation being very lightly dressed. The limb is then swung from an iron cage by the said iron rod. The position of the limb is not altered for some weeks, sometimes not until union of the

bones

bones has taken place.

This apparatus appears to fufil very well the great indication of rest. A neglect of this all-important condition will lead to disastrous consequences – insufficient union, false joint, or irritation of the bones caused by movement and followed by long continued suppuration, Necrosis, Amputation, perhaps Death. So much for the mechanical treatment of the case, as to Therapeutic and Dietetic treatment, this must vary according to the special features of individual cases.–

Since writing the above I am credibly informed ~~that~~ by a gentleman who attended Sir W. Fergusson's Lectures last winter that the aim of that Surgeon now is to obtain a moveable joint.

This I think inexpedient because

I. There can be no doubt that if the uniting medium were too lax, it would not be depended on, but would ~~be~~ allow of lateral motion and of ante-flexion. It would be difficult to get exactly the proper degree of rigidity.

II. The

II. The result of experience has been, that limbs accidentally allowed to become moveable, are almost useless for locomotion.

Excision of the knee has not so far as I am aware been extensively practised by military surgeons. The great objection to it in military practice is the difficulty of obtaining the rest so necessary for its success. During the Danish campaign in 1850, Dr. Fohle performed the operation: the patient died from its effects 13 months later. Latin once performed the operation in the Crimea but unsuccessfully

Ankle-Joint.

Excision of this joint has sometimes been practised, but is hardly likely to be widely applicable, or to supersede Mr. Syme's admirable amputation at the ankle-joint, in any but a few Exceptional cases.—

I shall not therefore describe it, but merely quote Dr. Hodges' statement of its results "In 19 cases" he writes "Recovery was claimed: in all the cure lasted over 3 months, in the majority much longer, in one case three years"—

I find no statistics of Amputation at the ankle-joint; but it is unnecessary to say, in Edinburgh, that the Danger is very slight; while the cure is rapid, and the result most Excellent.—

In cases of compound luxation at the ankle-joint, it may sometimes be advisable to cut off the articular surfaces of the tibia or astragalus, either to favour reduction or to hasten the recovery—