

cotton, so as to protect it from too much pressure upon certain points; 5th. To tighten it only moderately; the effects of too great constriction would undoubtedly not be so bad as during the first period of the fracture, but yet this excess of constriction might cause pain and oblige the surgeon to remove the apparatus the next day or the day after. Of course it ought to be examined after it has become dry, to see if it threatens to cause excoriation or gangrene of the skin at any point, and to prevent this complication, either by putting some more cotton between that part of the skin and the apparatus, or by cutting away the offending part. These precautions are especially necessary in persons, such as women and children, whose skin is thin and easily irritated or broken.

LECTURE XII.

FRACTURES OF THE LEG—CONTINUED.

Fractures of the leg in the lower third, continued—"V" fractures with displacement which is reducible, but difficult to maintain reduced, and fractures with irreducible displacement (3d and 4th clinical varieties)—Fractures with incomplete perforation of the skin (5th clinical variety).

GENTLEMEN: I. At No. 26, Ward Sainte-Vierge, is a man 35 years old, of habitual good health, who was brought to us ten days ago with fracture of the lower third of the right leg, caused by a fall down a staircase, but which still seems to have been indirect.

I shall not occupy your time with the question of diagnosis. As in the other cases of which I have had occasion to speak, the diagnosis was easy; inability to walk, pain, swelling during the first few days, mobility, crepitation, left us no doubt of the existence of a fracture of the two bones.

I showed you, from the first, that there was an angular displacement, for the leg described a curve the concavity of which was directed upwards, and a rotatory displacement, for the foot rested on its outer portion, and had turned outwards with the lower fragment. I told you that we had easily corrected these two displacements. But in addition we had the most common variety of transverse displacement, that in which the upper fragment projects in front. You were able to feel the first day, when as yet there was no swelling, that this projection of the upper fragment, instead of terminating in a sharp point corresponding to the crest of the tibia, as is the case in oblique fractures, had its point placed upon the antero-internal face, and at the extremity of two lines of equal length, so that the edge of the upper fragment had the form of a projecting V.

I reduced this displacement, as I did the other two, the first day by

the classical manœuvre of reduction, then placed the limb in a wire trough, and completed the dressing with the bag, the anterior splint, and the straps with which you are already acquainted. But when I examined the leg the following morning, I found, that, although the angular and rotatory displacements were not reproduced, the transverse one had reappeared, and that the point of the projecting V exerted quite a strong pressure upon the under surface of the skin. I reduced it again, and then, replacing the limb in the trough without completing the apparatus, I observed what took place. We saw the upper fragment resume almost immediately its vicious position and project under the skin. Again reducing it, I tried to maintain the reduction by means of a layer of cotton and two longitudinal graduated compresses, which I placed along the whole length of the upper fragment from two finger-breadths above the point of the V, so as not to make compression over the point itself. My intention was to distribute a moderate compression all along the upper fragment. Above the graduated compress I placed the bag and anterior splint, which I bound down with three straps about the upper fragment, and one about the lower one. The foot was also fastened to the sole of the trough with a band.

The next morning, by slipping my finger underneath, I felt that the point did not again project, and thence inferred that the displacement had not been reproduced.

But the following morning it was not the same. The projection had again become very notable. I again reduced it, and renewed the compression all along the upper fragment by means of a triple graduated compress and a layer of cotton.

The apparatus has now been five days in place, and the displacement has not reappeared; I therefore hope that it will remain reduced. Of course, if it should reappear after a few days, I should again reduce it, and try to make a more efficacious compression along the upper fragment.

Two peculiarities here require attention: 1st, the V-shape of the upper fragment; 2d, the difficulty of maintaining the reduction.

1st. The V shape of the upper fragment has not in itself a very great importance. But it has the advantage of indicating some anatomo-pathological details of a certain clinical value, which without it we could not suspect.

I have made several autopsies of fractures of this kind while they were quite recent, and found that when the upper fragment showed this projecting V in front, its posterior surface was very irregularly divided, and showed also two lines of fracture forming a re-entrant V with its point directed upwards, that at the same time the inferior fragment presented in front a hollow V corresponding to the projecting one of the upper fragment, and on the posterior surface a point fitting into the re-entrant V of this latter. Hence an irregularity in the main line of fracture, which cannot be included in the anatomo-pathological divisions, heretofore admitted, of transverse and oblique fractures, and which was better described by Gerdy under the name of *toothed or pointed fractures*. It is a curious and inexplicable thing,

this irregular and complex direction of the line of fracture in a bone so voluminous as the tibia, and under the influence of the indirect causes which I have had occasion to explain (page 80). But this is not all: when the fragments present this alternation of large V-shaped

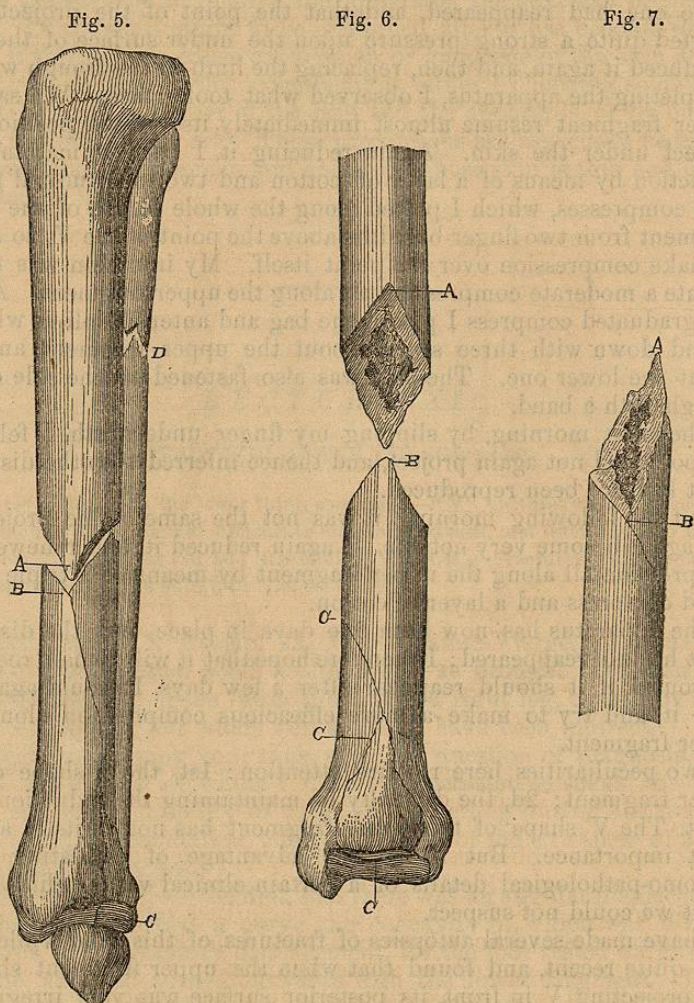


Fig. 5. V-shaped fracture of the right leg, with spiral fissure of the tibia, inner face. A, projecting V of the upper fragment, inner face; B, re-entrant V of the lower fragment and beginning of the fissure; C, articular portion of the fissure; D, concomitant fracture of the fibula.

Fig. 6. V-shaped fracture of the right leg, tibia, posterior face. A, re-entrant V of the upper fragment, seen from behind; B, projecting V of the lower fragment, seen from behind; C C C, fissure, extending to the articulation.

Fig. 7. V-shaped fracture of the right leg, inferior fragment, with its anterior re-entrant and its posterior projecting V; B, origin of the fissure at the angle of the re-entrant V.

points and indentations, we find also the marrow considerably bruised, and in the lower fragment a fissure which, starting from the point of the re-entrant V, winds in a spiral about the inner face of the tibia, then the posterior face to the tibio-tarsal articulation, traverses this

articulation near its posterior border, and rises again along the posterior face, thus circumscribing upon it a lamellary fragment.

The first time I saw this long fissural prolongation, causing the seat of the fracture to communicate with the ankle-joint (it was in 1854, at the Hôpital Cochin), I supposed it to be a very uncommon lesion, and although I had occasion to see successively two examples (Figs. 5, 6, 7, 8, 9), which were described in a note¹ and in the thesis of Dr. Bourcy,² I could not believe that a fact so curious could, if often met with, have escaped the investigation of surgeons so completely that no author, up to that time, should have spoken of it.

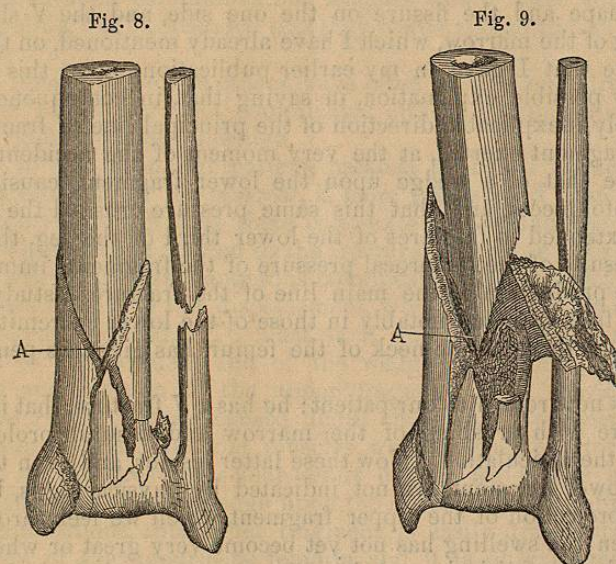


Fig. 8. V-shaped fracture of the leg, with splitting of the inferior fragment of the tibia-pieces in place; A, the V of the upper fragment.

Fig. 9. Same fracture, with the upper fragment replaced in the medullary canal.

But soon new observations collected by my colleagues, especially by MM. Chassaignac, Houel, and H. Larrey, and myself, showed us that indirect fractures of the lower third of the leg very often presented this irregular main line in form of a V, and the long accessory line in form of a fissure, extending to the articulation of the foot, and that consequently it was necessary to admit three principal anatomical varieties of fracture of the leg in the lower third, corresponding to as many clinical varieties: *toothed fracture* (transverse of the old authors), *oblique fracture*, and *V fracture*.

I see among our contemporaries a certain tendency to suppress this latter denomination, and to replace it by that of *spiroid fracture* given by Gerdy to some which, though analogous, differed in many respects,

¹ Gosselin, Leçon clinique faite à l'Hôpital Cochin sur les Fractures en V du Tibia, Gaz. des Hôpitaux, 1855, p. 218.

² Bourcy, Thèses de Paris, 23 June, 1855.

and which he had described for the thigh. For my part, I reject the name spiroïd, because it indicates only the secondary lesion, the fissure which cannot be discovered in the living patient by physical signs, while the denomination *V fracture* is based upon the direction of the principal line of the fracture, and indicates a distinction which can be recognized, at least in part, through the skin. We should, however, remember that this name indicates not only a particular form of the principal line of fracture, but also a spiroïd fissural prolongation extending to the articulation. It is unfortunate that a single word cannot express these two facts.

Before going any further, let us see what relation exists between the V shape and the fissure on the one side, and the V shape and bruising of the marrow, which I have already mentioned, on the other. I believe that I gave, in my earlier publications upon this subject,¹ the only possible explanation, in saying that, in consequence of the absolutely inexplicable direction of the principal line of fracture, the upper fragment exerted, at the very moment of the accident, a pressure like that of a wedge upon the lower fragment, causing it to burst into pieces, and that this same pressure crushed the marrow. I thus extended to fractures of the lower third of the leg, the study of the results of the reciprocal pressure of the fragments immediately after the production of the main line of the fracture, a study which, in other fractures, and notably in those of the lower extremity of the radius and those of the neck of the femur, has given us penetrating fractures.

Let us now return to our patient: he has a V fracture, that is to say, a fracture with crushing of the marrow and fissural prolongation towards the articulation. Now these latter lesions, and even the form of the lower fragment, are not indicated by physical signs, but only by the projection of the upper fragment which we feel through the skin when the swelling has not yet become very great or when it has sufficiently diminished, and by our anatomo-pathological studies which have taught us (the pieces in the Musée Dupuytren prove it) that, in those cases where the upper fragment presented this form, the other lesions mentioned were not lacking. What conclusions should we draw from these notions with reference to the ultimate course and prognosis of the fracture? The patient will have a tibio-tarsal arthritis, and this arthritis will leave behind it for a longer or shorter time a semi-ankylosis or stiffness. Unquestionably this is not a coincidence which belongs exclusively to V fractures, for we often see the articulation inflame by simple proximity, but that which is possible in other cases is almost inevitable in those where the fracture extends to the articulation. As to the subsequent stiffness and difficulty in walking which it occasions, I should fear its long duration if the patient was a little older or subject to rheumatism or gout, for, as I have often told you, the duration of this painful stiffness and loss

¹ Gosselin, Mémoires de la Société de Chirurgie, tome v. 1855; and Bulletin de la Société de Chirurgie, tome vi. p. 262, 1855; tome ix. p. 148.

of function following spontaneous arthritis and long immobility depends upon the age. The older the patient, the longer the duration.

We draw from the above-mentioned notions this other conclusion, that the patient is a little more exposed than others to suppurating osteo-myelitis.

Upon this point I was led into an error by a singular chance at the beginning of my labours upon this subject. My first two patients affected with V fracture had, the one a compound fracture, the other a simple one, and both died of purulent infection following suppurative osteo-myelitis. I did not infer that all those who should have V fractures without communicating wounds would have suppurative osteo-myelitis, but I concluded that they were exposed to it in a certain measure.

Since then I, as well as others, have often seen simple fractures of this kind which were not complicated either by suppuration of the marrow or by purulent infection.

I say to you then, our patient, because he has a V fracture, and with it a crushing of the marrow, is more predisposed than others to an osteo-myelitis. But as there is no external wound, the suppuration of which might extend to the fracture, it is more than probable that he will escape this dangerous complication and will get well.

2d. I now come to this displacement, which is reducible and difficult to keep reduced. To what is it due? To this, that at the moment of the accident and of the wedge-like action by vertical pressure and rotation of the upper fragment upon the lower one, extensive ruptures were caused about the first. Not only was the periosteum divided, but the muscles were extensively torn at the moment of the great muscular effort during which the bone was broken and acted like a wedge upon the lower fragment. Freed from all its connections, this upper fragment is easily drawn upwards by the action of the quadriceps femoris, and it is only by means of a considerable and constant pressure that we can keep it in place.

But what disadvantage would there be if we paid no attention to this displacement and did not correct it? First, its point might perforate the skin immediately or after the formation of a small eschar by its pressure, which would change the simple fracture into a compound one, and would expose the patient to the tedium and dangers of a consolidation after suppuration. Secondly, supposing that this unfortunate complication should be avoided, the patient would get well more slowly because the callus would be made by only a part of the contour of the fragments, that by which they touched one another, and all the materials poured out by the rest of the contour or between the fragments would not be utilized. Finally, the callus would be irregular in two ways, because an abnormal projection would persist indefinitely, and because the persistence of the transverse displacement would cause longitudinal displacement and a permanent shortening of the leg.

I know that in such cases it is more important to attend to the function than to the shape, and that notwithstanding the irregularities of which I speak, the limb would recover its usefulness in walk-

ing and standing. Nevertheless, patients, especially women, are always dissatisfied with being deformed, and if we do not wish to be accused of negligence or incapacity, we should make every effort to obtain a cure of fracture of the leg with a callus as little irregular as possible.

What means are at our disposal to correct this tendency to displacement? It is evident that ordinary restriction by the apparatuses with which you are acquainted is insufficient, and that it is necessary to add something to them.

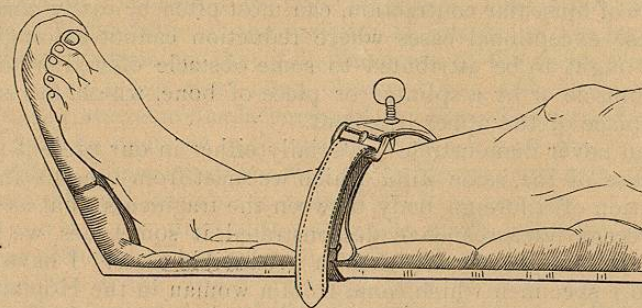
I told you what I did for our patient: compression all along the upper fragment except at the point where it might cause an eschar. Take care not to yield to the idea which at first presents itself of compressing the extremity itself of this displaced fragment by means of a cushion and a small splint. If you should do that you would run great risk of causing mortification. For the skin would be compressed at this point between the fragment which tends constantly to be drawn outwards, and the accessory apparatus which would press it backwards. It would be better, as I said, to distribute the compression above the point of the V, than to concentrate it at that point. It is, furthermore, necessary to tighten it a little more than usual, and relax it if the patient suffers. You remember that the limb has been attentively watched, and that I have renewed the reduction whenever the displacement has been reproduced. I do not advise you to have recourse in cases of this kind to the Scultet apparatus, because in order to make compression efficaciously along the whole length of the upper fragment it is well that the limb should rest upon a hard plane, and because it is indispensable to examine the fracture once or twice every day, and to repeat the reduction if necessary. Now it is not easy to make up your mind to open so often a complicated Scultet dressing; it is much easier with the trough, or Malgaigne's box, or Roux's polydactylic box. You understand, also, how necessary it is in such cases not to withdraw the limb from observation by enveloping it in an immovable bandage. The fracture should be constantly examined until at least the 25th day, that is to say, until the time when consolidation is so far advanced that, even if it should seem necessary, reduction could no longer be made.

Compression, such as you see me apply, is not the only means which we possess. We might use in this case Malgaigne's point, which consists of a metal rod attached to a steel hoop through which it can be raised and lowered by means of a screw.

I have twice used Malgaigne's point for fractures similar to this one. In one of them the final result was very good, but was obtained at the price of quite severe pain. In the second, the patient complained of violent pains which obliged him constantly to loosen the screw, and finally he had an erysipelas, of which he got well, but which caused the treatment to be suspended. In short, I find that compression is preferable because it is less painful and can produce the desired result without any lesion of the skin, and I should use Malgaigne's method only in case this compression did not prevent displacement.

I advise you also to accustom yourselves to do without these special apparatuses. The fractures for which they can be used are not frequent, and when they are met with, these apparatuses are not always at hand or are in bad condition, as are always those instru-

Fig. 10.



ments of which we do not make daily use. Keep them, if you choose, for hospital practice and the large cities, but in ordinary practice use the means which are always at hand, such as cotton wadding, oakum if you have no cotton, or pieces of linen folded into long and narrow compresses.

II. *Fracture with irreducible transverse displacement.*—At No. 45, there is another variety of fracture in the lower third of the left leg, which we have had under observation for a fortnight. It is in a rather young and vigorous man who fell while running, and in whom we have no reason to believe in the intervention of a direct cause.

Since the first day we have recognized the projection of the upper fragment and its V shape; but it was in vain that I tried to make it disappear by executing the manoeuvres of extension, counter-extension, and coaptation; I did not succeed; I applied poultices for three days, gave opium, and left the limb untouched, hoping that perhaps reduction was prevented by spasmodic muscular contraction, and that this contraction would disappear with time. The fourth, fifth, and sixth days I failed as on the first. I succeeded in diminishing the projection by means of the compression mentioned in the preceding case, without causing an eschar; but I did not get complete reduction, and I am obliged to recognize that I am in the presence of one of those irreducible displacements which our predecessors did not describe. For in all the books which preceded Malgaigne's, reduction of fractures is spoken of as a very simple thing, which is always easy and never meets with obstacles. Now the case before us, the examples of which, fortunately, are not very frequent, shows you that it is not always so.

Can we at least explain this irreducibility? I might be permitted to attribute it to muscular action which, the transverse displacement once produced, had caused the over riding, and had been too strong to yield to the attempts at reduction. But it is very rarely and with

much difficulty that the upper fragment entirely abandons the lower one. On account of the breadth of the bone and the irregularity of the fracture, the fragments always touch at some points, and muscular action does not produce so much overlapping that our efforts at extension cannot overcome it. Moreover, experience has shown us that in fractures of the leg longitudinal displacement, which is always the result of muscular contraction, can most often be easily corrected.

In these exceptional cases where reduction cannot be obtained, I think it ought to be attributed to some obstacle offered either by a strip of muscle or by a splinter or piece of bone, which has slipped into the place of the upper fragment.

We can never demonstrate materially either in our present patient or in those of the same kind which we meet from time to time, the interposition of a foreign body between the fragments; but as autopsies of recent fractures have demonstrated it sometimes, we have a right to believe in its existence in irreducible cases. I have in my collection a specimen which came from a woman in the Hôpital de la Pitié, who had a compound fracture, the upper fragment of which I was unable to bring into place. This was due to a large muscular bundle of the tibialis posticus which had caught upon the end of the lower fragment and occupied the place of the upper one.

I have often met also with splinters of bone placed crosswise in the inter-fragmentary space, and I have found them especially in V fractures. For the result of the splitting and rotating action of the upper fragment upon the lower is sometimes that one of the sides of the lower or hollow V breaks, and the fragment, drawn by the muscular fibres attached to it, or in consequence of an impulsion communicated to it by the lower fragment, or of some outside pressure, leans towards the inter-fragmentary space and is caught in it so as to oppose reduction. What happens with one of the sides of the hollow V may also happen with some detached point or with several, and thus, instead of one, we have several obstacles to reduction.

I repeat that I do not know what is the obstacle in this case; but I presume, from what I have seen in the cadaver, and from the full V shape of the upper fragment, that reduction is prevented by a cause of this kind, and that it would be impossible to reduce it completely.

We shall then expect to see this patient get well slowly and with a deformed callus, which will, however, in no way affect the functions of the limb. I shall forewarn the patient of this result.

Let us also meet the indication of pushing back this fragment as far as possible towards its proper place, so as to avoid an eschar over the point, and render the deformity as slight as possible.

For that purpose we apply graduated compresses all along the upper fragment. This would be a suitable case for Malgaigne's point¹ if we preferred it. But although this eminent surgeon claimed that his apparatus was almost infallible, you may be sure, that in a case of this kind, it would not have succeeded in removing the deformity entirely.

In any case, remember this fact, that although our classical authors

¹ Malgaigne, *Traité des fractures et luxations*, Paris, 1847-1854.

have represented fractures of the leg as always susceptible of reduction, it must be admitted that some are irreducible, and that the consecutive deformities are due to the circumstances of the fracture and not to the carelessness of the surgeons. I treated this subject fully in 1859.¹

III. *Fracture of the lower third of the leg with transverse displacement and projection forwards of the lower fragment.*—I do not wish, gentlemen, to describe fully all the varieties of fracture of the leg; but let me tell you, in passing, that if displacement of the upper fragment is the one which is the most often observed, you will also see in some rarer cases transverse displacement of the lower fragment forwards.

We have an example in the woman who occupies No. 10. At the time of her admission there was a notable projection of the lower fragment which I was able to reduce and keep reduced.

But you will also meet with patients in whom reduction and retention are difficult. That may be explained in the same way as the irreducibility of the upper fragment, by a peculiar interlocking, or by the interposition of a splinter or piece of muscle. But we must also attribute it in part to the action of the gastrocnemius and soleus, which, drawing the calcaneum and lower fragment upwards, keep the broken end of the latter in front of the upper fragment.

I do not know what causes this kind of displacement; in any case, it does not coincide with a V fracture, and is found in certain toothed and oblique ones. The prognosis and treatment present no peculiarity.

IV. *Fracture with very prominent angular displacement forwards.*—Notice also the patient in No. 26, in whom, on the day of his admission, we found a fracture in the lower third of the two bones of the left leg with a very prominent angular projection in front (angular displacement). Lateral angular projection is not very rare, it is easily corrected, and rarely reproduced. But the same is not true of angular displacement with prominence in front; it is easily corrected, but has a great tendency to reappear, and the surgeon should struggle against this tendency so long as the callus is not sufficiently strong to oppose its reproduction.

I make the reduction in this case very easily every morning, and compress with a cushion and anterior splint as well as possible. The next morning I find a little of the projection which I had effaced so well the day before, and I am obliged to make a new reduction.

This is another of those cases in which it is necessary to examine the limb every day, and to correct the deformity as often as possible. Be careful in such circumstances not to apply the immovable apparatus too soon, for if the callus has not already acquired a certain solidity when you inclose the limb, the angular projection will be reproduced little by little under the apparatus without your perceiving it, and when you remove the bandage you will find the leg solid but very irregular, with an angular callus which will shorten it very much, and compel the patient to walk upon his toes and to wear a shoe with a very high heel.

¹ Gosselin. *Sur l'Irréductibilité et les Déformations consécutives dans les Fractures des Os longs.* (Gazette hebdomadaire, t. vi. p. 130.)

I shall undoubtedly not apply the silicated apparatus before the thirtieth day, and even if I then find marked mobility I shall not apply it at all, and shall continue to use the ordinary apparatus, examining it often, until the end of the treatment.

I have not thus far spoken of section of the tendo Achillis as part of the treatment of fractures of the leg with displacement difficult to correct, because this operation, proposed long ago by Laugier, seems to me useless in the transverse displacements to which I have called your attention. For of two things, one: either these displacements can be reduced and maintained by the aid of the measures which I have mentioned, in which case tenotomy would only add to the consecutive muscular weakness of the limb; or the displacement cannot be corrected, which is due, as I have told you, rather to certain peculiarities of the fracture than to contraction of the gastrocnemius; tenotomy, therefore, would be useless.

But in angular displacements forward which are so easily reproduced, it is allowable to think that the contraction of this muscle has a great influence, and that consequently division of the tendo Achillis by temporarily suppressing the cause would also suppress the effect. But I can support by no personal experience the advantages of this operation, for I have had no occasion to perform it, and the examples published by Laugier, who, according to Malgaigne, introduced this modification of the treatment, and by M. Meynier d'Ornans, are not numerous enough to bring conviction.

In a word, the procedure is not generalized in practice; is it because it has not been considered good, or because the particular class of cases to which it is appropriate, the one which now occupies us, has not been clearly indicated? I do not know; but it is for this reason, and also because I expect to succeed without it, that I have not had recourse to it. On one occasion, however, I keenly regretted not having employed it, for, notwithstanding all my care, my patient got well with an infirmity and a shortening which tenotomy would undoubtedly have avoided.

V. *Fracture with engagement of the point of the fragment in the thickness of the skin.*—Finally, gentlemen, I wish you to notice, in passing, the patient in No. 7, who presents a singular fracture of the tibia.

The point of the upper fragment is implanted in front in the under portion of the skin, that is to say, has *spitted* it without traversing its entire thickness. This case establishes the transition between fractures without wound and fractures with wound. You saw that I tried at once to withdraw the bony point from the skin, and in this case I succeeded quite easily with my hands alone and by the ordinary manoeuvres of reduction.

It is not always so, and once I had to draw the skin downwards with a double hook implanted on the sides of the point.

In another case all my efforts to disengage the point were unsuccessful. I then treated the fracture without occupying myself any further with this incident, and had the satisfaction of seeing that little by little the depression of the skin diminished; at the end of the treatment it was no longer adherent, the point had been reduced spon-

taneously. Remember this peculiarity if ever you have to treat a case of this kind. Try to disengage the point, and if you do not succeed, treat your patient as for an ordinary fracture.

LECTURE XIII.

COMPOUND FRACTURES OF THE LOWER THIRD OF THE LEG.

- I. Small wound. Diagnosis completed by the flow of blood and drops of oil. Possible termination without suppuration. After mild suppurating osteitis, and necrosis. After putrid and infecting osteo-myelitis. Importance of occlusion. Methods of practising it. Imbricated strips of diachylon plaster. Bands dipped in collodion. II. Large wound. Suppuration more difficult to avoid.

GENTLEMEN: We visited this morning, at No. 41, a man about 40 years old, who broke his left leg by a fall upon the ice. When he was picked up his stocking was found to be wet with blood; and after we had undressed him, and cut off this stocking, we found at the anterior portion of the leg, near the junction of the lower and middle thirds, a wound nearly half an inch long, through which a bony point projected slightly. Blood, mixed with drops of oil, flowed from the wound. There is also an abnormal mobility which leaves no doubt as to the existence of a fracture of both bones. But this fracture is complicated by a small wound with issue of the upper fragment.

This patient reminds you of two others whom we have seen during the year, and in whom you did not have the opportunity of seeing the projection of the upper fragment. In one of them the reduction had been made by the interne on duty the evening before our first visit. In the other the dressing was also made in the evening. The interne had not found the bone projecting, but as he saw a considerable quantity of blood escaping, and as by passing a probe carefully into the wound, he felt the denuded extremity of the fragment, he was convinced, and I shared the conviction, that the wound communicated with the fracture. But had this wound been made, like the two preceding ones, from within outwards by the fragment itself, or, on the contrary, from without inwards by some external vulnerant body? There we had to deal only with probabilities, and it is so in most cases of this kind; certainty almost never exists. The probability that the bone was the vulnerant body is based upon the narrowness of the wound, and the absence of a severe contusion, such as would have been produced by a blow. Still, this question is not of capital importance. The wound was not quite half an inch long, its edges were not bruised, and its condition was favourable for immediate union, which is the essential point. Let us here recall the case of another patient.