The treatment of fractures of the lower jaw / by Hugh O. Thomas.

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THE TREATMENT

OF

Fractures of the Lower Jaw,

BY

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TREATMENT

OF

FRACTURE OF THE LOWER JAW.

SEVERAL years have elasped since I began to practise the following method of treating compound fracture of the lower jaw. Since the first publication of my pamphlet on this subject, I have operated upon an average of six cases annually, and am more than ever convinced that the method in question is a decided improvement upon prior modes of treatment. The additional cases which have thus come under my notice, have enabled me to devise and practically test some varieties in the mode of its application, and to further improve and also simplify the mechanics of the treatment. My entire experience of this method, has convinced me that it can be more easily and quickly applied, and with less irksomeness to the patient, than any hitherto proposed; and I am so convinced of its superiority that I believe it has only to be known to be adopted, and to supersede the complicated and painful appliances hitherto in use.

It is not necessary for me to enter into the merits of the numerous methods now in practice, the mechanics of this injury having been so well illustrated by Hamilton, Packard, and Heath. I make no claim to originality in the use of the metal ligature in fractures of the jaw, as it has been used

—though only in exceptional cases—by Dr. Buck, of New York, in 1847; Kinlock, of Charleston, 1859; Hamilton, of New York, 1858; and Mr. Wheelhouse, of Leeds, 1864. In 1863 I first operated successfully, using the plan here detailed, in a case, related further on, where a portion of the lower jaw, including two incisor teeth, had been removed by a direct blow from a capstan bar. Since then I have uniformly practised this plan.

The instruments I now use, are the following:—

Fig. 1, Pl. 1; the "Handbit," with cutting edges, right and left.

Fig. 2, Pl. 1, shows the cutting edges; fig. 1 exhibits the cutting edges with the right and left "angles of relief." The bit should have one-sixteenth of an inch diameter, and be three inches in length of stem. The hole drilled by it will thus allow one twenty-fourth of an inch silver annealed wire to pass easily.

Fig. 3, Pl. 1; the Key for coiling the wire ends, with slit. The slit should be wide enough to receive the wire easily, and should widen slightly towards the extremity. This key is cut out of a one-eighth inch steel rod.

Fig. 4, Pl. 1; The tube, with oblique orifice, to receive and guide the wire, when withdrawn through the bone or between teeth.

Fig. 5, Pl. 1; the watchmakers' broach, to broach between teeth. It is well also to have at hand a similar broach, bent to a right angle at half-an-inch distance from the point.

The wire used should be full 1-32 inch silver annealed wire; a stronger cannot be manipulated with ease; and wire less than 1-32 inch would not set or retain its coil, but would soon become loose. To make certain that this wire will retain its coil, the key must not exceed one-eighth of an inch in diameter. If a thicker wire were employed, the coil made upon it should be proportionally larger; but a large coil is very inconvenient in the mouth.

I recommend this operation for compound fractures only, of the lower jaw; meaning by compound fractures, those in which the periosteum and surrounding tissues have been lacerated, and allow some degree of primary displacement. Simple fractures seldom require the aid of the surgeon.

Having applied, in the early part of my practice, the wire ligature with the ordinary tie or cross-twist, I could not avoid noticing that, however firmly the fracture might be fixed at the time of operating, it became relaxed on the second or third day. As the wire, when cross-twisted, will not bear the strain of several subsequent twistings without breaking, I was sometimes necessitated to make a second application with fresh wire. This further manipulation, at a stage of the treatment when the parts are so sensitive to pain, was often objected to by the patient. To obviate this difficulty, I devised the method of securing the wire by coiling its ends, which is detailed in the following cases. These coils the surgeon may tighten, and thus maintain correct replacement of the parts, as

often as he judges the case demands, without pain, and in a few seconds of time.

The various methods of applying the wire will be found detailed in the illustrative cases.

There are a few points of special practical value which should be borne in mind, for without attention to them, no amount of careful and efficient mechanical treatment will give rapid and successful results.

First, it is not well that the operator should strive after great nicety of adaptation during the first three days; absorption, diminished tumefaction, and consolidation of the parts assist replacement at a later period, without much effort on the part of the surgeon. Again, the line of fracture will sometimes be found to have passed through one or more of the dental sockets. In this case, a tooth will require to be extracted from the extremity of one, and, in some cases, both of the fragments, or correct replacement will hardly be possible, and union of the fracture may be not merely delayed, but prevented altogether. The position of the tooth which usually requires removal is illustrated by that marked D in Pl. 5. The root of this tooth will be observed to cross the line of fracture, remaining attached to the "riding" fragment of the broken bone. This point is our guide. The tooth that is embedded in the "riding" fragment of bone ought always to come away.

Further, if union is delayed beyond the fourth week, *even when correct reduction has been secured*, then usually a tooth is

impeding union, and ought to be removed. In the case of vertical fracture, two teeth, one on each side of the fracture, may be hindering cure and require extraction.

When this Treatise was first published, I did not fully appreciate the great practical value of careful attention to the behaviour of the teeth in the neighbourhood of the lesion. It is now my opinion, that the mishap of non-union of the fracture in case No. 3, might have been averted. Early in the treatment of case No. 5, extraction of a tooth was practised. Even in some cases of simple fracture, where no wire operation or other surgical interference is called for, it may be necessary to remove a tooth.

I may mention a few cases which have illustrated to me very conclusively the importance of this point. I was requested to visit Runcorn, and examine a case with my friend Dr. Robinson of that town. The patient, a sea-captain, was suffering from fractured jaw, caused by some spars falling from their attachment to the mast. I went prepared to operate, but, on examination of the patient, I found he had only a simple fracture of the left body of the lower jaw, with other severe injuries to the scalp and face. The fracture not being compound, operative interference was not required. This patient was sent for my inspection six weeks after my visit; yet, though the parts were not displaced, there was no consolidation. I at once removed one tooth, and consolidation followed in ten days.

Some workmen were taking down an old building, adjoining

which was a workshop, where a numerous staff of females were employed. The exposed party wall of this building gave way, and many of them were seriously injured. One sustained a simple fracture of the body of the lower jaw, and was, with the other sufferers, taken to a public hospital, where the fracture was adjusted. She remained an indoor patient for many weeks, and, on being discharged, consulted me, when I found excellent adaptation in line, but no complete consolidation ; motion being perceptible at the point of fracture. I removed a tooth which I judged to be the cause of delayed union, with the result of securing complete consolidation in ten days.

During the latter part of 1879, I operated upon the compound fracture of the lower jaw, of a lady hailing from the neighbourhood of Limekiln Lane. During the operation, I did not consider that any of the teeth required to be disturbed ; however, there being no union at the end of four weeks, I suspected that some of them were to blame for our failure. On careful examination, I found a tooth on either side of the fracture, loose and easily moveable, and when these were removed, the alteration towards consolidation was very marked in its rapidity. These offending teeth usually come away very readily, requiring but little force.

During these latter years I have repeatedly treated, by this method, cases presenting the mechanical difficulties noticed in the case No. 9. related below, namely, where a portion of the jawbone has been entirely removed ; either, as in that case, through direct injury, or during operations for

malignant disease of the bone. I may state that I have found it to answer well, after section of the jaw, when practised for removal of the tongue.

CASES.

The first case illustrates the method of applying the wire shewn in Fig. 1. Pl. 2.

Case 1.—T. S—, while engaged in a street brawl, April 5th, 1866, received a blow on the jaw. On making an examination the following morning, I found a compound fracture of the lower jaw at the symphysis, with great mobility at the seat of injury. I prepared to fix the fracture. Having directed an assistant to steady the head, and another to evert the lower lip, I passed the drill through the bone on either side of the fracture at the reflection of the mucous membrane, care being taken not to injure the fangs of the teeth. The silver wire was then passed through the opening at A (see Fig. 1, Pl. 2). Next, the tubular needle was passed through at B, and into its open end the return end of the wire was introduced. The tubular needle was then withdrawn, and with it the wire. The object of this needle is to act as a director to the posterior opening of the aperture as at B, and to obviate difficulty and delay in searching for the entrance, from behind forwards, of the aperture. Afterwards the end of the wire at A, was inserted into the slit of the key (Fig. 2, Pl. 2) and twisted into three or four coils, the same being done with the end of wire at B, until the fracture was fixed. On the fifth day I found that the wire had slackened, and required the use of the key in one of the coils. Although either end of the wire may be tightened under these circumstances, it is generally better to choose the shorter coil, and, before proceeding to twist, we must, of course, make sure that the cross piece of the wire A is well into the slit of the key B (Fig. 2, Pl. 2). In this case

the wire required tightening every three or four days. In twenty days the fracture was firm and united. The patient, from the commencement, expressed his ability to masticate, which I did not permit. Afterwards he informed me that he had occasionally disregarded my veto in this respect.

In this situation, at or near the symphysis, the application of the wire ligature need not occupy more than three minutes. When the wire requires removal, we can introduce the key into one of the coils and unwind it, afterwards passing the key into the remaining coil, and winding up until all the wire has been coiled upon the stem of the key. Or it may suffice to introduce the key into one coil only, and wind up steadily. The coil at the other extremity will then uncurl until the wire is withdrawn and wound around the key.

Case 2.—T. B—, a ship carpenter, was struck on the face by a piece of heavy timber, and fell seventeen feet from a working stage. On examining him, an hour after the accident, I detected a compound fracture of the lower jaw on the left side, at the situation of the first and second molar teeth, which had been removed by the force of the blow. With one exception I never before witnessed so much mobility in a fracture of this part. The remaining teeth were firm *in sitû*. Agreeably to my instructions, my assistant exposed the seat of injury by drawing aside the cheek, and the third molar tooth was steadied with a piece of wood directed across the mouth from the side opposite to the fracture. Then, using the drill, a hole was bored from without backwards and inwards through the third molar tooth below the enamel, this tooth being firm in the posterior portion of the fracture. The wire was then passed through the hole in the molar tooth B (Pl. 3) from without inwards, and brought forward between the bicuspid and canine teeth A (Pl. 3). As these latter teeth were closely set in the anterior fragment of the fractured bone, the broach was used between them to enable the wire (1-32 inch) to pass. Finally, the ends of the wire were coiled with the key, an operation which was repeated from time to time as required. In three weeks there was union. After the fourth week the bone was firm, and I removed the wire. During the treatment the patient was with difficulty restrained from using the jaw in mastication.

In this case, it will be noticed, the bone was not drilled; but, had the bicuspid and canine teeth not been firm, I should have drilled at a point between A and C, Pl. 3. The hole which had been drilled in the third molar tooth was filled with a metallic amalgam, which was easily introduced.

Case 3.—W. T—, during a street riot, February 18th, 1867, was severely injured about the face. On making an examination the next morning, I found a compound fracture of the lower jaw, half an inch to the right side of the symphysis, and a simple fracture at the left angle of the jaw, accompanied by great swelling of the surrounding tissues. I operated on the fracture at the symphysis, repeating the method employed in Case I. The fracture at the angle was supported with bandage and adhesive plasters. On the fifth day the parts over the injured angle of the jaw became the seat of inflammation followed by abscess, and, pneumonia setting in on the eighth day, it became impossible to do much for this injury. The fracture at the symphysis was tightened at intervals, and at the expiration of six weeks it was firmly united, at which time there was no union at the angle. The patient now returned to his native town.

Case 4.—W. H—, while at work, fell into a dry dock, March 8th, 1867, and received a severe compound fracture of the lower jaw at the symphysis. The base of the skull was also fractured, and there was a compound fracture of the arm. From the very serious nature of his other injuries, I did not think it prudent to interfere with the injured jaw in this case during the first week. On the 15th of March, the condition of the patient being much improved, on examination I found the fractured portions of the jaw separated by an interval of a quarter of an inch. They were now adapted and secured by the method followed in Case I. The subsequent treatment consisted in the usual tightening of the coils, and there was perfect recovery in four weeks after the operation. This patient made use of the jaw in mastication during the treatment, abstaining only from animal food.

Case 5 is illustrated by Fig. 4. Captain T— applied to me on November 11th, 1867, to fix a fracture of the lower jaw. The fracture was compound, and situated between the right bicuspid and canine teeth; there was also a simple fracture of the left ramus, from which I removed, at a later period, a portion of necrosed bone. To fix the fracture, the anterior

fragment was drilled through at B, Pl. 4, and a broach was passed between the bicuspid and first molar teeth. The wire was passed inwards through the drilled hole at B, and then backwards and outwards between the molar and bicuspid teeth. Its ends were then coiled and tightened with the key, but I could not reduce the displacement until I had removed the canine tooth, which projected between the fragments, and prevented proper adaptation of the fracture. This being accomplished, I had no difficulty in bringing the fractured ends fairly together, and fixing them. The broken ramus was aided with bandage and plaster. At the expiration of seven weeks the parts were firm and united. On the patient's recovery the gap between the bicuspid and incisor teeth no longer existed, nor was there any trace of the site of the the removed canine.

Case 6.—April 16th, 1868, J. P— was struck a severe blow on the jaw by a pugilistic acquaintance, with such effect that there resulted a compound fracture to the left side, between the first and second molars, and a simple fracture to the right of the symphysis. The molar teeth at the site of the fracture were large and firm, which induced me to operate as illustrated in Pl. 5, by the method C E. Had the simple fracture required treatment, I should have followed the method represented by A and B Pl. 5. The wire was tightened occasionally. The simple fracture was firm in three weeks. The compound fracture was united at the end of the seventh week.

Pl. 6 illustrates the case of John O'N—, who, while standing at a street corner, September 13th, 1874, was assaulted by a ruffian, and sustained a compound fracture of the left ramus, near the third molar tooth. The first and second molars were dislocated, and had been removed prior to my examining him. On the second day after the accident, when he consulted me, I found the face much swollen and tender, the remaining teeth all firm, and the third molar prominent. I decided to operate by twisting one end of the wire securely into a loop, placing this around the neck of the third molar tooth, then bringing forward the other end of the wire from within, through a hole drilled in the anterior fragment, and coiling up the wire as usual. As the fracture was deep in the mouth, and the parts tumified and tender, I could not drill the anterior fragment from within the mouth, so I passed the drill through the cheek, opposite the point marked A, Pl. 6, and proceeded to perforate the bone. I found no difficulty in so doing, and on withdrawing the drill, I introduced the tubular needle, and having passed the free end of the wire into its orifice, brought it through the jaw from within. As soon as I felt that the

wire, which I had sharpened at the point, had come through the jaw, I incised the mucous membrane and drew the wire into the mouth. I then applied the key and coiled the wire as at A in Fig. 6. On the tenth day erysipelas set in, caused by exposure while crossing the river on a very cold evening. Recovery was complete in six weeks.

The next case (Pl. 7) illustrates another variety in the application of the method.

CASE 7.—During the latter part of 1874, a gentleman of some local celebrity had a compound fracture of the left side of the jaw at the situation of the second molar tooth. I found the first and second molars absent; the third was firm in the posterior portion of the jaw, but so depressed and nearly level with the surrounding parts that no use could be made of it in attaching the wire. I therefore drilled the posterior fragment through the cheek in the following manner. Placing the index-finger of the left hand inside the mouth, slightly beyond and opposite the third molar, I was in readiness to steady the posterior fragment, and to detect when the drill should have passed through the bone; this position of the finger also assisted to indicate the point outside the cheek that I was to select. Thus prepared, I pushed the drill through the cheek, drilled the posterior fragment, and, on withdrawing the drill, entered the wire at the puncture in the cheek, and passed it on through the bone until it could be felt at the base of the tongue. I then drew the wire into the mouth, leaving about one-fourth of an inch outside the cheek, which end I bent to a right angle to avoid overdrawing it. I then stretched the cheek, and the bent end disappeared. I now introduced the finger between the jaw and the cheek, incised the mucous membrane over the bent end of wire, grasped it with pliers, and drew it forward. The anterior fragment having been drilled in the usual way, and the other end of the wire passed through it from within, both ends were coiled with the key. The coil at B will be observed to be reversed—twisted from *right* to *left*. This raises the coil to a higher level, bringing its *inferior* edge in line with the drilled foramen; whereas, the coil at A being twisted from left to right has its *superior* edge in line with the foramen. By attention to this point we will be enabled to reach deep-seated coils much more easily when they require removal.

This method, as illustrated in Cases 6 and 7, obviates the necessity for an external incision of the soft parts, and enables the surgeon to operate on any portion of the body or ramus of the jaw without the risk of disfiguring the face.

Case 8.—T. S—, a young man returning home on the evening of December 26th, 1874, was assaulted by corner roughs, who usually supply me with cases in this department of surgery, and who, on this occasion, as on most others, operated with such success on his head as to inflict, among other injuries, a compound fracture of the lower jaw between the bicuspid and first molar tooth of the left side. The second and third molars were absent, the remaining molar was firm and very prominent. I operated by the method shown in Pl. 8; passing the wire from without through the drilled anterior fragment and drawing it well into the mouth; then passing the same end again inwards, so as to form a loop, with which I encircled the crown of the first molar, and coiled one end of the wire without, and the other within, the jaw. I found this operation very easy, as the same end of the wire could be passed twice inwards, requiring no tubular guide needle. Had this variation of the method occurred to me at an earlier date, I should have practised it in Case 2 and some others. In this case consolidation was complete in four weeks.

Case 9.—The last example I shall report was, with the exception of case 7, the most severe injury to the lower jaw that I was ever called upon to treat. The sufferer, McLeod a rigger, was engaged with several others in "docking" a large ship, known by the name of "Bates' Family," when the strain upon the capstan overpowered the men, and two were severely hurt; McLeod being struck with a capstan-bar on the front of the jaw, with such force, that the centre portion of the jaw bone, including two incisor teeth, was removed. He was taken to an hospital, were he remained almost three days, and nothing being done, he came home, when I was called to see him. On examination, I found that the tumefaction of the surrounding parts, combined with the displacement of the fragments, rendered the jaw and teeth almost invisible. I was puzzled for a while what to do in the way of aid. It was in this case that my method of using the wire ligature was first tried, and the man made an excellent recovery with little perceptible deformity. The plan followed was that shown in Pl. 2.

Among the advantages of this method I may point out the following.

It involves no outward applications, of bandage, plaster, etc., which are so unsightly, and wearisome to the patient.

No interdental splints, of metal, vulcanite or so forth, are required; thus the Surgeon is independent of the dental or other mechanician. Such splints incommode through their bulk, and materially increase the foetor so repulsive in these cases.

The patient can articulate sufficiently for ordinary purposes, and is enabled to follow his business.

The wire when thus used is, in most cases, quite out of sight.

The patient can take food easily, and can wash out the mouth with lotion or warm water frequently and efficiently.

PLATE 1.

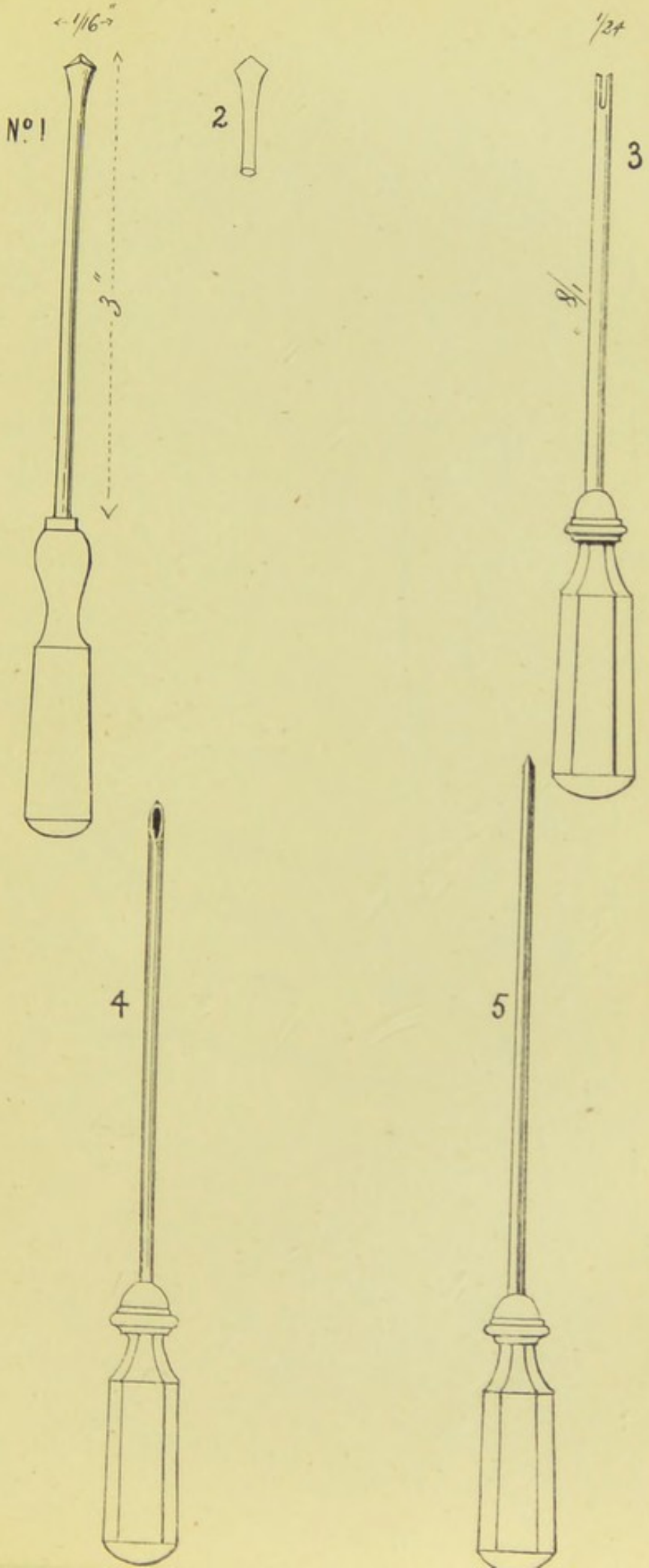


FIG. 1.

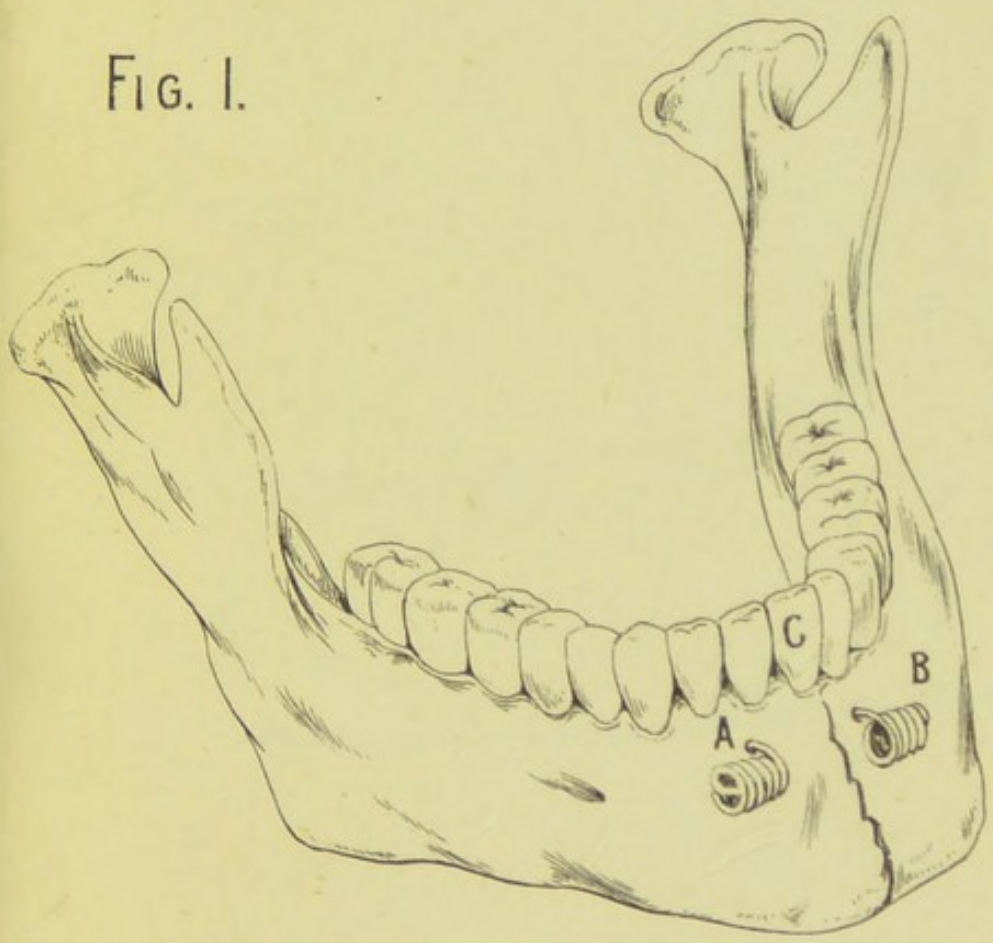
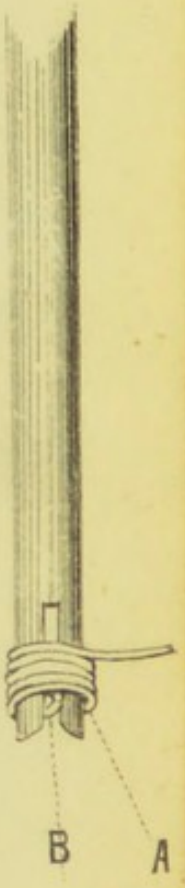
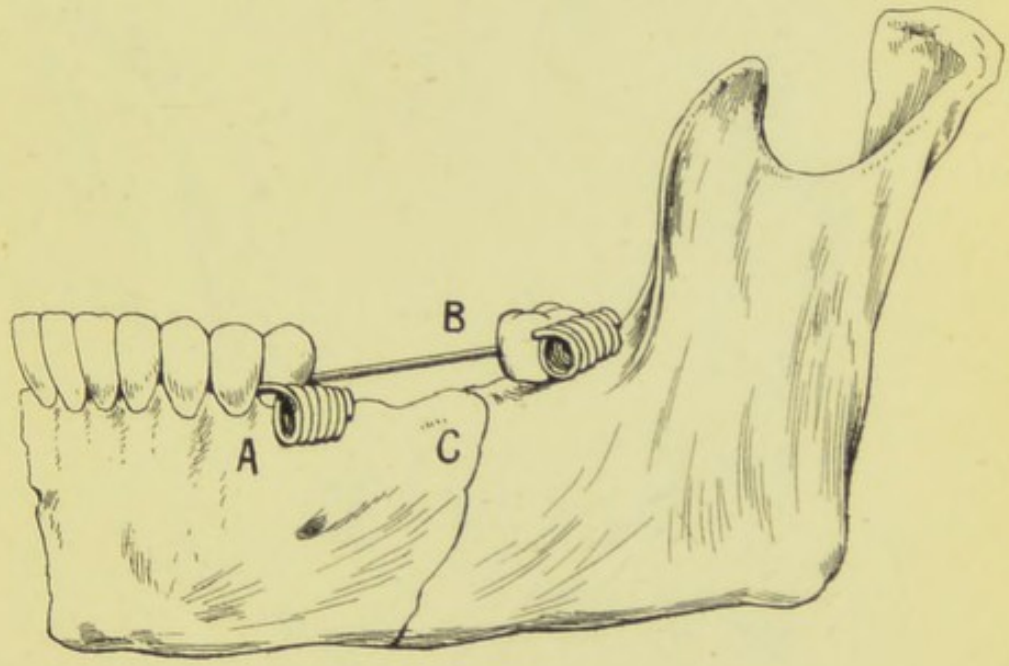


FIG. 2.

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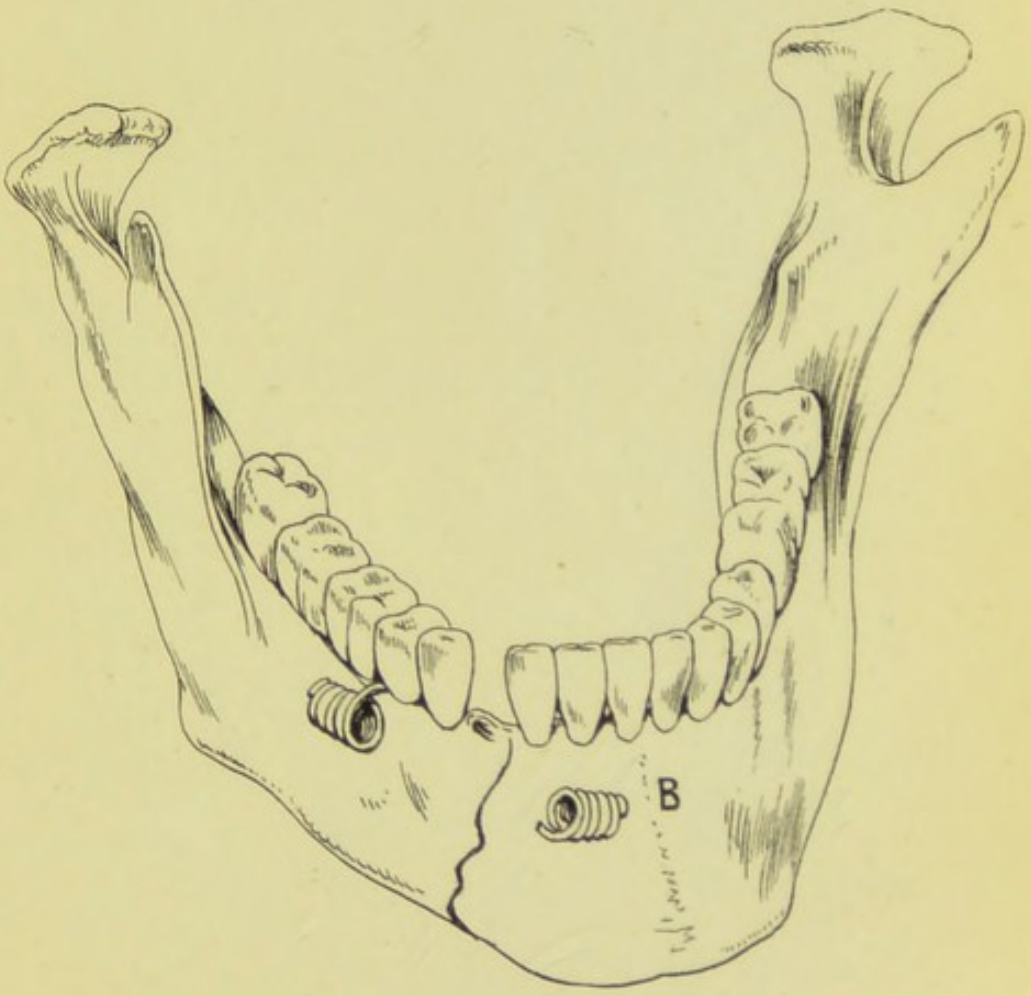
A
C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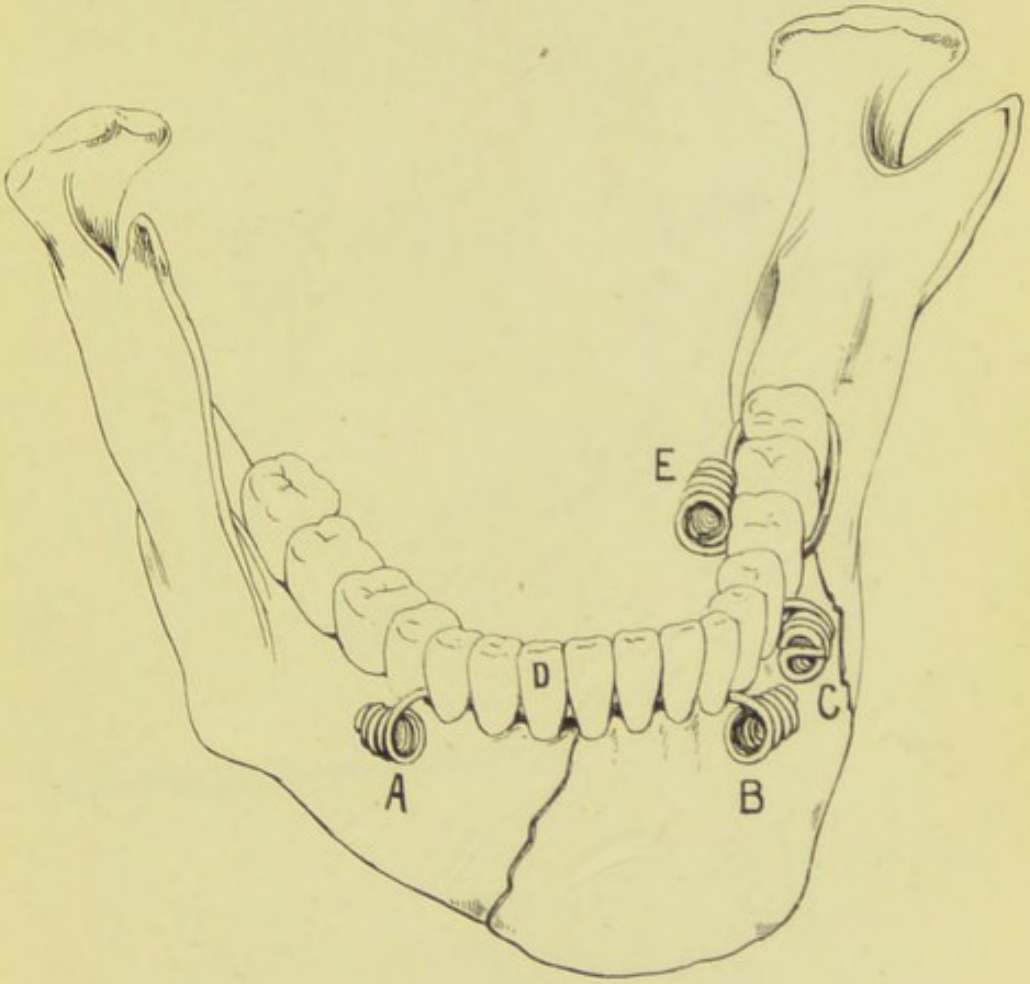
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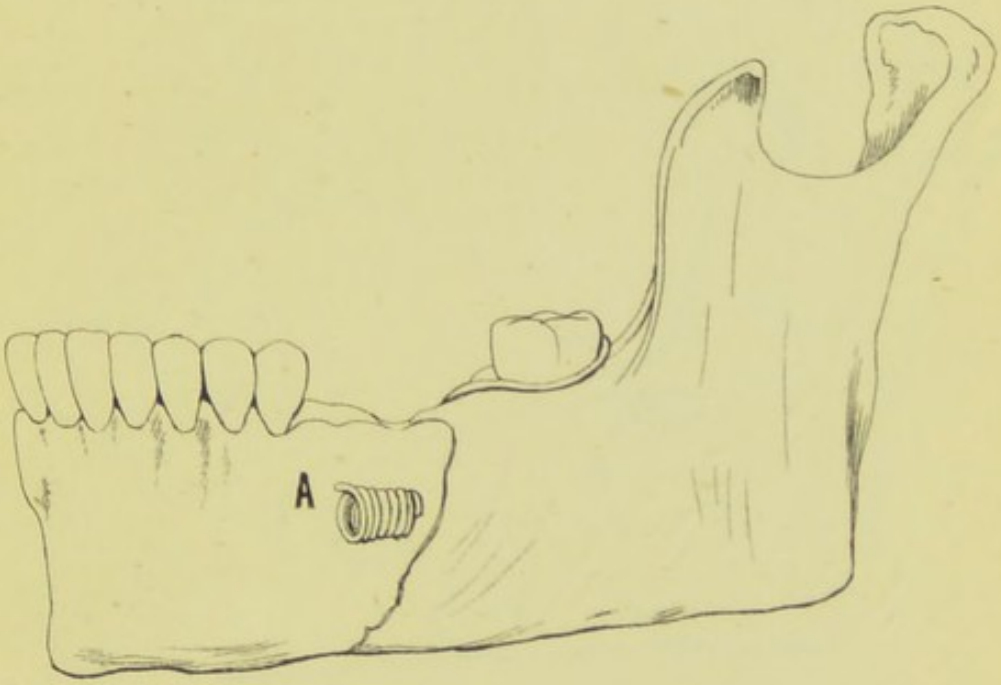
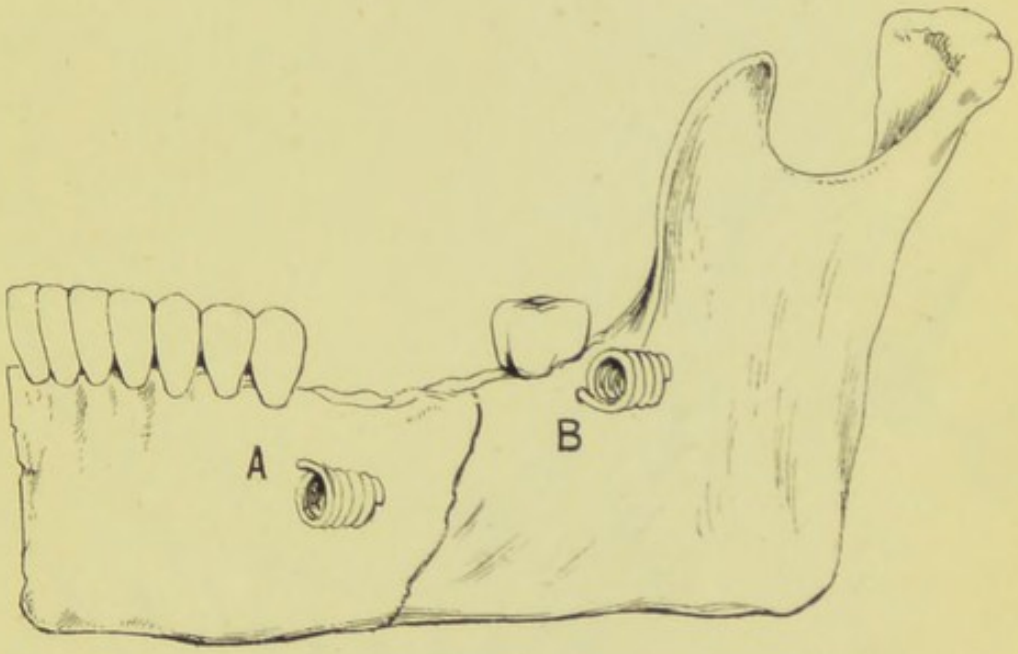
PLATE 6.

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