Montgomery (J. F.)

WITH THE COMPLIMENTS OF THE AUTHOR.

FRACTURE

OF THE

INFERIOR MAXILLARY BONE,

BY

JOS. F. MONTGOMERY, M. D.,

OF SACRAMENTO, CALIFORNIA.

Extracted from the Transactions of the Medical Society of the State of California, for the year 1875.

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READ BEFORE

The Medical Society of the State of California,

At the Annual Session, Held at Sacramento, April, 1875,

By JOSEPH F. MONTGOMERY, M. D., of Sacramento,

MEMBER OF THE CALIFORNIA STATE BOARD OF HEALTH, THE AMERICAN MEDICAL ASSOCIATION, AND THE MEDICAL SOCIETY OF THE STATE OF CALIFORNIA, MEMBER AND EX-PRESIDENT OF THE SACRAMENTO SOCIETY FOR MEDICAL IMPROVEMENT, EX-PRESIDENT OF THE SACRAMENTO CITY BOARD OF HEALTH, ETC., ETC.

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FRACTURE OF THE INFERIOR MAXILLARY BONE.

By JOS. F. MONTGOMERY, M. D., of Sacramento.

Owing to the looseness of its articulation, its great freedom of motion, and the number and strength of the muscles attached to it, and which constantly tend, by their almost perpetual action, when it is broken, to draw its fragments asunder in different directions, the multiple or communicated fractures, at least, of the inferior maxillary bone, have puzzled surgeons more than the fractures of any other bone in the body—not, perhaps, excepting those of the clavicle—and they have, in consequence, at every period of the development of their art, exerted their ingenuity and skill to the utmost to devise contrivances to meet the indications so difficult to fulfill. These contrivances are numerous and diversified, and have been modified in a variety of ways, according to the fancy of each inventor, in his efforts to improve or perfect what his predecessors may have offered to the profession.

I will not pretend to offer a detailed and descriptive account of these expedients, but they may be reduced to, and arranged in, four classes, viz: ligatures, slings, bandages and splints. In a few rare instances, the ligature may be employed with advantage, either by bringing together overlapping fragments of the bone itself in oblique fractures, or by being passed around the teeth on either side of a transverse fracture, merely as an aid to the bandage or sling—never as the sole reliance. I have in several instances so employed them, or thin plates of

silver or platinum, with much advantage. But this expedient is usually objectionable because it is generally inefficient and unreliable, and often causes mischief by loosening even the firm teeth to which it may be attached, by the operation of the unsteady lateral force or dragging motion to which, through its agency, they are subjected.

The treatment of fractures of this bone, by the single-headed bandage or roller, has had many distinguished advocates, particularly among American surgeons; and in many cases of simple vertical or transverse fracture at a single point, or, perhaps, two points, where there is but little disposition to displacement, it answers very well. In this class, the bandages of Gibson & Barton are prominent.

Other eminent surgeons, both in Europe and America, recommend the sling in some form, and use as materials therefor, leather, gutta percha, adhesive plaster, and gum elastic, and also cloth or muslin in the form of the four-tailed bandage or sling. Under this head must be placed the apparatus of Hamilton, composed of leather and firm linen cloth. I regard these as but little, if any, better than the bandage or roller, for the reason that they are, according to my experience, not sufficiently firm and unyielding to resist successfully the persistent disposition and effort on the part of the patient to open the mouth or move the jaw—sometimes involuntarily—and thus to favor displacement. I believe, indeed, that the roller, applied by turns sufficiently numerous to afford firm support, and to offer strong resistance to the action of the muscles, particularly when a sub-mental splint of leather or gutta percha, accurately moulded to the jaw, is first applied, is really preferable.

The bandage or the sling will, in many simple cases as stated, be fully adequate to subserve the ends to be attained; but in another class of cases, the comminuted fractures, especially when oblique, nothing but the splint, in some form, will at all meet the indications. Splints have been, from an early day, employed in various ways. First—simple interdental splints, to be placed along between the crowns of the teeth, and only sufficiently grooved to be retained in place. Second—clasps applied over the crowns and sides of the teeth, and retained either by lateral pressure or by screws. Third—splints moulded and applied to the outer and inferior margin of the jaw and retained by a

bandage passed over the head; and fourth, and lastly, interdental splints, combined with and attached by wings to outside or sub-mental splints, and so arranged that the two parallel or opposing surfaces can be drawn together and retained at will by and through the operation of a thumb-screw. The first variety is now generally discarded, except in some cases where many teeth are absent, and when gutta percha can be adopted as the material for their construction, instead of cork or wood, as formerly. The gutta percha may also be pressed down on the sides of the teeth, so as to operate as clasps When thus applied, and the jaw is, besides, properly supported by an external splint and bandage, the plan would in many instances be ample, doubtless, to fulfill every indication in the case.

But within the last twenty-five years, during which period much advance has been made in dental surgery, and the dental surgeon has been frequently called to the aid of the surgeon in treating this class of cases, great improvement has been made in the construction of the interdental splint, the favorite form being that of the clasp, either fastened to the teeth by screws or not, as may be deemed necessary in each particular case, and extended sometimes to and embracing the upper jaw when circumstances seem to require such extension or inclusion. In this manner a double splint is really constructed out of this material, gutta percha, so plastic when sufficiently warmed, and so firm and durable when cold, or at the natural temperature of the month. Some dental surgeons have, indeed, become noted specialists in treating these fractures, two of whom I will mention, viz: Gunning, of New York, and Beans, of Georgia. They employ gutta percha as the material for the interdental splint, and mould it to the form of the clasp; and after thus moulding it to fit the parts accurately, they vulcanize it so as to give it greater firmness and durability, and to admit of its being screwed to the teeth when found necessary. The former of these gentlemen reported in 1866 eight cases thus treated successfully, several of them being cases that had baffled, among others, several army and navy surgeons; and Dr. Beans treated for the Confederates, during the Civil War, upwards of forty such cases, with very satisfactory results, most of them, probably, being fractures caused by gun-shot.

This plan is designed, or is applicable only, or chiefly at least, for such complicated cases or comminuted fractures as cannot be successfully managed by other means previously in use; but the use of gutta percha might be extended with advantage to some simpler cases, as it could be applied by any skillful surgeon directly to the teeth, properly moulded to fit them, and thus the treatment would be more certain to result satisfactorily.

External splints applied along the base of the jaw were first recommeded by Paré, who constructed them of leather. They have been employed in some form by most surgeons, being composed of different flexible materials, as wetted pasteboard, felt, and linen saturated with whites of eggs, or paste, or dextrine, or starch. Gutta percha has more recently been used for the same purpose, and it is probably better than anything else of like character.

The last form of splint mentioned is the combination of the interdental splint, with outside splints; and in some instances in which this is used it is proposed to dispense with all bandages or slings whatever, the mouth being allowed to open and shut at will during the treatment, in partaking of food and drink. This idea was originated as early as 1780, by Desault, who advised bands of iron or steel to be placed over the teeth upon the alveolar margin, covered with cork or plates of lead, and fastened by thumb-screws to a plate of sheet-iron, or some other material under the jaw. This principle has been carried out since by various surgeons in constructing an apparatus for the injury under consideration, and has been used with varying success in different hands. The most recent contrivance constructed on this principle is an apparatus planned by Dr. Wales, surgeon United States Navy, and which is fully described in his work, entitled "Surgical Appliances and Operations." While this seems to me superior to any similar instrument previously in use, and approaches more nearly than any other the apparatus I propose to introduce, it appears manifestly defective on account of its lack of sufficient solidity and firmness to resist successfully the powerful muscular action to be encountered and overcome.

Having presented the foregoing sketch of the history or literature of the subject under review, with comments on the

plans of treatment suggested and pursued at different periods, and my personal experience with some of them, the object of such preliminary remarks being to render apparent the defects and inadequacy, in certain cases, of all the contrivances hitherto devised, and to induce a more comprehensive and earnest consideration of the matter than mere reports alone would be likely to lead to, I will now report two cases of comminuted fracture of the bone whose injuries constitute our theme—the first treated with an interdental splint resting only upon the crowns of the teeth of the lower jaw and connected by wings to a sub-mental splint, the two, thus connected, being approximated by the action of thumb-screws extending on either side through projections from each; and the other with interdental splints, one being severally adjusted and screwed to the teeth of each jaw, and the two being then firmly tied together with coarse silver wire. These cases will be presented in the order of their occurrence, and the apparatus employed in each, though differing widely, will both be shown to embrace features or modifications never heretofore brought to the attention of the profession.

Case 1.—Was called February 18, 1867, to see S. L., æt. 32, a pilot. Four days previously, while on duty, a windy day, on board a heavily laden wood-barge, then descending the Sacramento River, one hundred and fifty miles above the city, the boat, being unmanageable because of the strong current and high wind prevailing at the time, was swept under an overhanging tree, the numerous strong boughs of which broke down the stanchions upon which the pilot-house rested, and precipitated him a distance of twenty-four feet, he alighting on the left side of his head and face, on the keelson in the bottom of the vessel, and sustaining a multiple or comminuted fracture of the inferior maxillary bone, two of the fractures being transverse, one directly through the symphisis, and the other between the lateral incisor and the canine, and a third, an oblique fracture, through the angle and ascending ramus, extending forward and slightly upwards through the socket of the third molar, separating it completely from its articulation, and rendering its removal necessary. The two last mentioned fractures were on the left side, the other being, as stated, exactly through the symphisis—an accident, according to authorities,

extremely rare in the case of a mature adult. Besides these fractures and severe contusions, the patient was so stunned by the fall as to be unconscious for five or six hours. It was four days before he reached the city, having had no treatment during the time, and having suffered much from pain and loss of sleep.

When first seen, the soft parts were excessively inflamed and swollen, and there was a high grade of symptomatic fever, besides considerable pain. As there was too much inflammation and swelling to admit of any manipulation, I ordered an anodyne, to be repeated as needed, and warm poultices, to be kept constantly applied to the affected part. Also, gave a gentle cathartic, to be followed by fifteen or eighteen grains of quinine, in three or four grain portions, to be taken several succeeding forenoons.

February 21—Attempted to apply suitable apparatus, but found it impracticable, on account of the swollen and sensitive condition of the parts. Continued the poultice.

February 26—Opened an abscess that had pointed an inch behind the angle.

February 27—Opened another abscess near the same point.

February 28—Adjusted the fractures as well as practicable, and applied Hamilton's apparatus, besides several turns of the roller.

March 4—Removed the apparatus, which failed to maintain the fragments in apposition, and applied, in stead, a gutta percha sub-mental splint, moulding the material, when warm, as well as could be, with the assistance of Dr. Nichols, to adapt it to the case in hand, aiming, at the same time, to adjust the fragments properly and then secure the splint by frequent turns of the roller under the jaw and over the head. But all these efforts failed to accomplish the purpose aimed at.

Becoming convinced that nothing else would answer the case but interdental splints, properly made, after taking an accurate impression of the mouth, I applied to Dr. W. H. Thomas, an experienced and skillful surgeon dentist, to construct the apparatus contemplated. Upon calling on him I ascertained that some time previously he had constructed and used successfully, an apparatus for a simple fracture of the same bone, near the symphisis, in a case that some physician

in the country had failed to treat with success. It consisted of an interdental splint, composed of silver obtained by melting coin, shaped so as to rest upon the crowns of the teeth on either side of the jaw, and to extend back sufficiently far to afford ample support to the fragments of the broken bone, serving thus as one side of a clamp, while the mental splint, which was formed to accurately fit the under part of the jaw, operated as the other. On either side of the interdental splint, a smooth, flattened wing, made of iron, was blended or welded, which extended out horizontally between the lips—one near each commissure—and was connected by a hinge on each side respectively, an inch and a quarter in front of the mouth, with a perpendicular plate attached underneath to the mental splint. This plate projected horizontally an inch from its attachment, to the mental splint, and was then bent at right angles, or with a short curve, and extended up to unite, one on either side, by the hinge mentioned, to the wings projecting from the interdental splint. The plates connected with the mental splint were about five lines in width and two lines in thickness. In the horizontal portion below, there was a slit or opening, three fourths of an inch in length and the fourth of an inch in width, through each of which a small iron rod passed, and in which it had free play. This rod, which was more than two inches in length, besides the head, was at the upper end converted into a male screw, which worked in a female screw in the horizontal portion of the wing projecting from the mouth. The lower end of the rod had a flat head, by which to take hold in working what was really a thumb screw. The two splints, thus connected, being placed in position, the turning of the screws gradually brought them together until the requisite tightness was attained to hold the fragments securely, and yet not enough to interfere with the circulation or the nervous supply in the soft parts. The mental splint, besides being accurately adapted to the form of the chin and under surface of the jaw, was well padded and covered with buckskin, so as not to cause abrasion.

This apparatus was, in the main, after the plan laid down long ago, but then rudely carried out, combining the interdental and the external sub-mental splint connected together, and so managed as to act as the opposing blades of a clamp—o applied to either surface of the jaw.

Being satisfied that the principle of the contrivance was correct, I determined to improve on the short splint, which had answered for a single fracture near the symphisis, and, to suit my case, have a mental splint constructed to extend on either side, the full length of the jaw bone, passing along its sides and under surface to the angles, embracing them, and extending up behind the rami more than an inch. My instructions were given to that effect, but the manufacturer made the mental splint so short that it did not reach even to the angles of the jaw on either side. The apparatus was, however, applied, to test its efficiency, and it at once became manifest, as I had been satisfied in advance would be the case, that it would exert no control over the rear and worst fracture through the angle and ramus.

I then insisted that my original instructions should be carried out, and the splint was therefore spliced on either side, in the rear, so as to completely embrace, when applied, the angles and rami, as designed in the outset.

The apparatus is here represented:

March 9th.—Being finally in readiness, it was this day applied, and when screwed up, it became at once evident that all the fragments, four in number, would be held securely in

place, and they were thus held, without the slighest motion or disturbance, during the remainder of the treatment. It was somewhat irksome to the patient to wear the apparatus, and the contact of the swollen lips with the wings passing from the mouth, as well as with the upright screws, caused some ulceration upon their inner surfaces, although they were protected as well as could be, by lint, or strips of soft buckskin. But he was a man of real nerve, and bore his annoyance calmly, sleeping well the while, enjoying liquid aliments, and maintaining usually comparative cheerfulness. The apparatus was allowed to remain undisturbed until the 25th, sixteen days from its final application, and thirty-nine days from the time of the occurrence of the accident.

While the instrument was being worn, the sub-mental splint was kept well supported by several turns of the roller under the jaw and over the head, in addition to such support as was afforded by the straps provided and attached by the manufacturer. The patient was sustained, as already intimated, by soups, milk and gruels, and his mouth was cleansed by injecting water freely into it, from time to time, as well as a properly diluted solution of chlorinated soda or tincture of myrrh.

When the apparatus was finally removed, it was ascertained that firm union had taken place at all the points of fracture. I still maintained supervision over the case for a fortnight longer, when it was finally dismissed. The recovery was, in every respect, thorough and satisfactory, and no subsequent trouble arose. Not the slightest deformity remained, and the use of the jaw has been just as perfect as before the accident. The patient has pursued his special business ever since; and now, after the lapse of eight years, no one, not familiar with the history of the case, could detect the slightest trace of former injuries.

I would, however, advise that, in the construction of this apparatus, the wings and rods be so shaped as not to interfere with, irritate or ulcerate the lips, or press into the angles of the mouth, and that they should be heavily plated with nickel, to prevent corrosion. With the care and precautions mentioned, I regard this not only as a very valuable instrument, but as decidedly superior, in certain cases, to all others. I say this unhesitatingly, in face of the fact that this style of apparatus has been very extensively objected to, on account, as asserted,

of the inflammation, swelling and suppuration, the pressure of the external splint is liable to cause. But by having it properly padded, accurately fitted and adapted to the jaw, and by screwing it up only sufficiently to maintain the fragments of bone securely in apposition, the mischief apprehended may be, I am confident, very generally avoided.

The originality in the instrument consists in the material of which it is composed—silver for the interdental, and sheet-iron or copper for the external splint—the manner of connecting and drawing together the inner and outer splint, and the extension of the latter around the angles, and up behind the rami, thus serving to hold all the fragments securely and steadily in place until firmly united. In these respects it differs materially from all other instruments designed for treating similar injuries. The truth of all this, and the estimate to be placed upon the contrivance, are matters to be settled by a discriminating profession.

Case 2.—Was called June 5, 1872, about 6 o'clock P. M., to see J. S., æt. 54, a farmer, a short, muscular man, who, at a point six miles from the city, while proceeding homeward in a wagon, had met with an accident, and received severe injuries. Upon arriving at the place indicated, I learned that he had been placed in his wagon on a mattrass, and conveyed to his residence, still five miles distant. I proceeded thence, and ascertained that while leisurely journeying on his way, in a two-horse farm wagon, laden with about a ton in weight of plank, he accidentally dropped the rein, and in leaning forward, in an effort to recover it, the small box upon which he was sitting and which rested loosely upon the plank, was toppled over, and he was precipitated head foremost to the ground, behind the heels of the horses. They being gentle, fortunately neither kicked nor became frightened, but proceeded on, and he was run over by both wheels on one side of the wagon, as he distinctly realized and noted, for they were five or six feet apart, the coupling having been extended to accommodate the long plank. The injuries consisted of the fracture of the sixth and seventh ribs, just in front of their angles; the oblique fracture of the clavicle near its sternal extremity, accompanied with the complete dislocation of that end of it; the fracture of the lower jaw at

three points; the comminuted fracture of the nose, including the septum; an extensive irregular laceration of the scalp, extending from the base of the tragus, in a zigzag direction, to a point about the junction of the sagittal with the lamdoidal suture, being altogether, following its irregularities, at least ten inches in length, the forward flap being torn from its connections and dragged forward over the forehead—all these injuries being on the right side; and, finally, the severe contusion and extensive laceration of the left ear, including the cartilages, and nearly severing the entire appendage from the head.

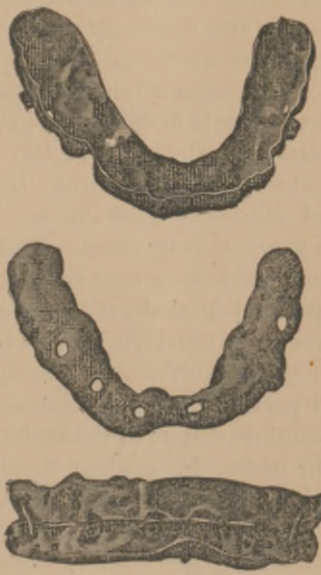
The patient being in great pain and scarcely recovered from the shock, although four hours had elapsed from the time of the accident, a full dose of morphine was administered, and all the injuries were attended to in detail and properly disposed of, except the multiple or comminuted fracture of the jaw. This consisted of a transverse or vertical fracture between the lateral incisor and the canine; an oblique fracture through the ascending ramus, not far above the angle, and a transverse fracture through the neck of the condyle—all, as stated, on the right side. Finding it impracticable with the means at hand to manage this fracture properly, I advised the patient to go to the city, where he could, at less cost, receive all necessary attention, and a surgeon-dentist could be employed to construct suitable apparatus. I then left him at a very late hour at night. Visited him on the 7th and dressed his wounds, finding him comparatively comfortable. On the morning of the 9th he was removed to the city, where I visited him at his lodgings, dressed his wounds, and made arrangements with a skillful dentist, Dr. B. B. Brewer, to prepare suitable apparatus for the case, embracing interdental splints.

Although I had employed the apparatus described in Case No. 1, with such satisfactory results, yet, to avoid the annoyance caused by the wings of the interdental splint as they pass out between the lips, as well as the firm pressure of the submental splint, I suggested to him to construct an interdental splint or splints to be secured to the teeth by screws, as had been particularly recommended and practiced by Gunning & Beans. His partner being absent at the time in the East, and he being very busy, Dr. J. A. Woodward, a very ingenious and skillful young dentist, then at work in the office, undertook the job, after consulting with his principal, Dr. Brewer. He proceeded

according to the plan laid down in the books, taking first a wax impression of the teeth of either jaw separately, and then forming casts of plaster of Paris, answering accurately to both the upper and lower jaw within, and of the face or lower jaw without. To those made after the model of the teeth he fashioned, out of silver plates made from melted silver coin, an interdental splint for each jaw, fitting it respectively over the crowns of the teeth above or below, and extending it up or down in either case, on both the outer and inner aspect, to the edges of the gums, thus encasing the rows of teeth completely in the accurately fitting splint. To each of these on either side he soldered eyelets or loops, through which to pass strong coarse silver wire to tie the splints together after they had been confined, each to its proper jaw, by screws let into the teeth. To prevent the lower jaw from slipping backward, which was its tendency, ingenious devices were resorted to that I have not seen mentioned elsewhere. The first bicuspid in the upper jaw on the right side being gone, a stout flat projection or protuberance of the same metal was soldered to the lower splint at the proper point for it to pass up into the open space when the jaws were brought together, the posterior surface of it being adapted to fit accurately and firmly against the forward surface of the second bicuspid, thereby preventing the possible backward slipping of the lower jaw when pressing against the upper. And to prevent as certainly the slipping back of the same jaw on the other side, a projecting point was soldered on the outer side of the upper splint opposite the space between the two bicuspids, the point being directed downward perpendicularly, and a hole, suitable for its reception, was drilled through the outer edge of the upper aspect of the lower splint at a position to correspond to or to be exactly opposite to the descending point, and into which it could be readily made to pass. Everything being in readiness, the next step was to drill, with a patent drill, worked by a lathe moved with the foot, a sufficient number of holes through the splints and into the teeth to receive the screws designed to fasten the former firmly to the latter. For this purpose a screw was put into the canine, the second bicuspid and the first and third molars in the upper jaw on the right side, and into the canine, the first bicuspid and the first and second molars on the left side of the same jaw, the third molar being absent. On the

lower jaw a screw was inserted into the second bicuspid and the first and second molars on the right side, and into the canine, the first bicuspid and the first and second molars on the left side. Thus, altogether, fifteen screws were inserted and screwed up until all were firm and solid. Wherever a point was chosen in advance on the splint for a screw to be passed through, an additional quantity of metal was soldered on, the purpose being, by making the splint thicker thus at those chosen points, to hold the screws the more firmly. The splints having been fastened as described to the teeth of each jaw respectively, the lower jaw was properly and firmly brought forward, the projecting points were passed into their respective openings, the coarse silver wire, drawn specially for the purpose by a jeweller at hand, was passed through the eyelets or loops, and the jaws were tied firmly together. All this being done, it was manifest that every fragment of the fractured bone was accurately adjusted, and the apparatus was firm and seemed fully to accomplish its purpose.

The splints for the upper and lower jaw, respectively, are here first represented separately, and then as united, after having been brought together and tied securely, the front view being presented.



For greater security, the dentist also moulded a gutta percha sub-mental splint (not here represented, because deemed unnecessary), to fit accurately the lower jaw, with wings to extend a short distance up behind each ramus. Across the chin portion of this splint a small stick was let in, the projecting ends of which were designed the better to secure the roller or bandage that would be passed over the head to maintain it in place as a support. This was applied, as designed, after being well padded with cotton wadding, and was secured by numer-

ous turns of the roller, under the splint and over the head. This was on the twenty-first day of June, sixteen days after the accident, the inflammation and swelling in the soft parts having forbidden an earlier application.

The patient was very comfortable after the adjustment of the fractures and the application of the apparatus, and we hoped that no further difficulty would arise, and that an easy and satisfactory cure would result.

Nothing very special occurred for several weeks, the roller in the meantime having been re-applied occasionally to maintain ample support to the sub-mental splint, and prevent motion of the injured parts. Beside, the screws were inclined to loosen, rendering it necessary to tighten them from time to time. It was also discovered that the canine tooth became and continued loose, and that at the point of fracture, through its socket, there was some motion, and of course want of union. So, on the seventeenth of July, twenty-six days after applying the apparatus, and forty-two from the time of accident, it was determined to remove the dressings and examine into the cause of the unsatisfactory progress. Accordingly, that day, the apparatus was removed, and the mouth thoroughly cleansed. It was then ascertained that firm union had taken place at two of the points of fracture, that is, those through the ascending ramus, and the neck of the condyle. At the other point of fracture, that is between the lateral incisor and the canine, and which extended through the socket of the latter, there was no disposition to union. The canine tooth, being quite loose, was removed, as also several loose spiculæ of bone that had separated from about its socket. The apparatus was then re-applied, in every respect as before, and thoroughly secured in every particular. Thus re-applied, it seemed, as before, to fulfill perfectly every indication, and the case needed no further attention, except in the matter of tightening the screws every four or five days, when they seemed inclined to become loose, and in keeping the sub-mental splint properly secured.

The case was kept under necessary observation, and was examined from time to time to ascertain whether union had become perfect. All through the month of August and the greater portion of September, it was clear, whenever this investigation was made, by having the patient very cautiously move

the lower jaw, that there was some motion at the point of fracture. This unsatisfactory state of things continued until towards the last of September, when there seemed to be union, and by the 7th of October, thinking it safe so to do, we removed the splints and dressings generally. It was then found that firm, bony union had taken place at the gap made by the loss of the canine tooth, as well as of a considerable portion of the bone adjoining its socket, and which had evidently been shattered at the time of the accident.

Thus four months elapsed from the time of receiving the injury until the final and complete cure was effected; but then, at last, we were gratified to learn that it was surely complete and perfectly satisfactory in every respect. Not the slightest trouble has appeared since, and the patient is in all respects as sound as before the accident, except that he lost one tooth, and his left ear is a little contracted from loss of substance, though not sufficiently so to attract notice.

And now, with these cases before us, so similar in character, and both resulting so satisfactorily, the question arises as to the relative merits of the two widely differing styles of apparatus employed in their treatment. With the limited experience I have had, I am decidedly inclined to favor more the instrument used in the first of the two cases reported, while I admit that authorities are just as decidedly in favor of the other.

The first mentioned certainly fulfills as completely every indication, and it is preferable because of its comparative cheapness, its simplicity, its unyielding firmness, and its less liability in consequence to become deranged. The chief objections to it I have endeavored to answer, and I think they may be obviated or easily guarded against.

The most noticeable objections to the other are the necessity of drilling into the teeth, which must injure them; the greater expense attending its construction and application, as well as of plugging the cavities made by the drill; and the great liability to the loosening of the screws, and the consequent necessity, trouble and expense of watching it when applied, and correcting its derangements.