

THE TREATMENT OF FRACTURES OF THE JAWS*

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FRACTURES of the jaws, including the superior maxillary and mandible, are becoming more frequent, largely due to the automobile and aeroplane, but, needless to say, similar fractures were very common during the war, and considerable experience and information was gained from the treatment of these cases in large numbers. On the Canadian Service, in the hospital at Sidcup, England, a great many cases were treated over a period of three years, and as this was only a small part of the cases under treatment there, one could conservatively estimate them at between six and seven thousand. These figures are mentioned merely to suggest that many types of treatment would be planned and carried out, and that very likely a good general plan would be adopted which could be applied to most cases. The history of a fracture is of importance and the careful taking of it is quite frequently overlooked, because, generally speaking, a fracture is obvious. But fractures in the region of the surgical neck and ascending ramus, involving the temporo-maxillary joint, are frequently overlooked, and, if a careful history is taken, the cause of the force applied, such as being kicked by a horse, or being thrown violently to the ground by lightning stroke, or some other force applied directly to the mental process, would suggest at once a fracture, frequently bilateral, of the ascending ramus. The fracture in the body of the mandible as a rule is easy to detect, provided there is some displacement, but there may be multiple fractures where displacement is considerable on one side, but scarcely visible on the other, due to the fracture through the centre of the masseter muscle, or internal pterygoid. We make it our practice to examine each case carefully before x-ray examination is requested, and make every effort to detect one or more fractures and determine their exact position, so that the area through which fracture has

occurred may be indicated to the x-ray laboratory. As a routine we suggest that postero-anterior and lateral stereoscopic views of the entire skull be taken as a spot plate, and other positions are requested, according to the fractures. We do not require x-rays to tell us there has been a fracture, or what position it is in, but rather to tell us what is in the line of fracture, teeth, or fragments of bone, or foreign bodies of any description. Needless to say, the foreign bodies should be removed before reduction of the fracture is attempted, but occasionally teeth may be retained in the line of fracture if they are necessary for splinting, but with this reservation, that they will delay healing as a rule and will very likely have to be removed in two weeks' time.

The displacements are due to the upward pull of the masseter and pterygoid muscles and the downward pull of specific gravity, and of the mylohyoid, genio-hyoid, genio-hyo-glossus, and other inframandibular muscles, but if the fracture is in the middle line the fragments are frequently brought to a closer position, due to the pull of the mylo-hyoid and specific gravity.

Fractures, then, of the lower jaw are similar to other fractures and are treated along the usual lines, namely, the reduction of the fracture and the immobilization of the parts, but in the treatment of these fractures there is a difference because of the teeth. If the patient has a more or less full complement of teeth, the occlusion of the teeth serves as a guide in the reduction of the fracture. By that we mean, that, if the lower jaw is fractured and the upper jaw is intact, and the lower jaw is brought up to its proper relationship with the upper jaw, the best possible position is thereby attained. This holds for fractures more especially in the anterior part of the mouth, but if the fracture occurs on the ascending ramus it is sometimes necessary to depress the ascending ramus and hold it in position with some mouldable material, such as dental compound, or gutta percha, before bring-

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ing the anterior part of the lower jaw into the proper occlusion with the upper teeth. When the fracture is through the surgical neck of the ascending ramus one is confronted with these problems; whether the condyle is forced completely out of the glenoid fossa and if so may it be reduced; whether it should be removed by open operation at this time; or whether it should be allowed to heal in its abnormal position, probably to be removed at some subsequent time, so that the jaws may separate and overcome the bony ankylosis. We have had many of these cases where the fracture has occurred through both the condyles with considerable displacement, and in some cases we have not been able to reduce the dislocation of the head of the condyles in a satisfactory way. These cases have been followed for some time without noting any marked limitation of movement, except in a few cases in children, where they have fallen down stairs and the fracture has at the time been overlooked.

These cases require very little hospitalization, and morphine is given from the standpoint of shock and some kind of bandage used for the first few hours to support the fractured mandible, but let me say at once that I have never found that bandaging is of any service except as a temporary support as the patient can open his mouth to the extent of 1 inch at any time when the firmest bandage has been applied, with the possible exception of the elastic or rubber bandage. We prefer to treat these cases on the second or third day, for by this time the method of splinting the lower teeth to the upper has been fully considered and frequently the wiring of individual teeth, which will be described later, will suffice, while in other cases an impression of the teeth in each fragment will have to be taken separately, and splints cast of victoria metal with lugs attached. This latter method we believe to be the best, but it adds to the expense as well as to the delay in the treatment of the fracture. If a rigid splint is placed in position as early as the second or third day it will seldom be necessary to drain the neck as is so common when the splints have not immobilized the parts.

A general anæsthetic is seldom necessary, if the case is seen early. In fact we feel that a general anæsthetic in the presence of a septic mouth should seldom be given and, if so, it

usually complicates the treatment of these cases. Further, the patient should be encouraged at the very earliest opportunity to be out of bed and preferably at his home.

As in all cases of fractures, some form of splinting is necessary, and the more rigid or fixed the splints can be made, the better the results to be expected.

All cases may be conveniently divided into two classes, dentulous and edentulous. In treating a dentulous case, the teeth and their position in relation to the upper jaw are of the greatest importance. This is what is called occlusion of the teeth, and in most cases it is the best guide, as the upper jaw may be used as a splint if the fracture is carefully studied from the standpoint of occlusion. All fractures of the lower jaw are compound, and for that reason wiring or plating is seldom used, so we must depend on some form of splinting the teeth to hold the fragments in position. If the lower jaw is fractured in three places, with or without considerable displacement, an impression of the teeth in each fragment may be taken, and after making a metal cast with lugs on the outer surface, they may be cemented to the teeth separately and with a light pressure they may be drawn up to meet a similar cast appliance cemented to the upper jaw and held in that position until union has occurred. That we believe to be the best method, but there is another method which is less expensive and which can be adapted to most cases where the teeth are present. A piece of bronze wire, about fourteen inches long, is doubled and twisted on one end, thus making a loop on one end and leaving two free ends. These free ends are inserted between two teeth, one wire being carried distally and the other mesially around these teeth and twisted on the outer or buccal surface around the loop that we mentioned. A number of these loops can be applied to the teeth in the upper and lower jaws, and, when ready, may be brought together with ordinary silk. We prefer silk ligatures to wire ligatures, because silk is hygroscopic. Another method is to twist some wire around certain teeth in the lower jaw and another wire around some teeth in the upper and then to attach the long ends together by twisting, but the former method mentioned is to be preferred. Another method which is of use is to attach a piece of German silver wire (gauge 20

or 22) to the upper teeth, extending from molar to molar and attaching a similar wire from the outer or buccal surface of the lower teeth, and then to ligate these two wires together. There is still another method. This is to make a rubber inter-dental splint and cement the upper and lower together, thereby holding the fragments in a firm position. There are many other plans which have been advocated, but those mentioned above should be sufficient for any case where the teeth are present.

In treating the edentulous mouth, where the fracture is not compound, wiring through the bone fragments may be considered, but there is a better method, we believe. This is to use the patient's denture or some material which would fit over the lower ridge, and by circumferential wiring, by which we mean wiring completely around the bone and denture, to hold the fragments in position. If the mouth is edentulous and the patient is wearing a denture, the artificial teeth may be held together by wire and inserted in the mouth and a head-band well covered with cotton, so adjusted that a rubber dam attachment may be placed beneath the chin and tied to the head-band at each side, thereby holding the jaw well up in position.

Fractures of the upper jaw are best treated by the construction of a cast splint to fit the upper teeth. Attach a 13 gauge wire to the outer surface of the casting, and let it project from the angles of the mouth backwards as a loop toward the ear on each side. To this loop is attached a rubber or factory-cotton bandage which passes over the parietal bones or the vault of the skull to a similar loop on the opposite side; in this way the fragments of the upper jaw may be forced well up into their former position. If the fracture of the upper jaw is on one side only, an upper cast splint is all that is

necessary. These splints should be kept on from four to six weeks.

The diet of the patient consists of food every three hours, and, as the teeth are held together, must be of a liquid nature. Something like this may be suggested; egg-nogs, milk, potato and water soups, milk, malted milk, and cocoa with malted milk, and, in the later stages, minced meat and mashed potatoes and vegetables. It is never necessary to extract a tooth for feeding purposes as, if the splints are properly constructed, the fluids have no difficulty in passing through the inter-spaces.

We have not considered the treatment of non-union of fractures of the jaws, as a bony union is to be expected in most cases, but we have had a number of patients that required a bone-graft when no union was evident after a period of six months. These cases were seen late and fibrous tissue had interposed between the fragments. It was considered wise to hurry the treatment by free-graft, but in these cases a period of at least six months had elapsed since the last evidence of infection was noticed, and after dead and infected teeth had been removed. Special splints were constructed for these cases, by that we mean the same type of metal cast splints as mentioned above, but these were re-enforced before they were cemented in position. We have followed some of our earlier cases and x-rayed them six years after operation; and they showed excellent bony union at the end of that time, and the wires were still in position. We would call attention to the fact that in these bone-graft cases wiring was done through sterile areas and all bone-grafts were inserted through an incision in the neck. We believe that in well selected cases all free bone-grafts inserted under favourable conditions should result in bony union within three months.

ELECTROCUTION FROM ULTRA-VIOLET RAY LAMP.—

A case is reported in which a young man was found dead in a bath, with an ultra-violet ray lamp beside him. Death was attributed to shock, and an electrical expert, who examined the lamp at the request of the coroner, gave evidence to the effect that there were five ways in which an electric shock might have been sustained from the apparatus. The deceased had purchased the lamp in order to treat himself for blackheads on the back of the neck, and the makers had supplied a book of in-

structions. About this book the coroner remarked that it appeared to be a "puff," suggesting that the apparatus would cure every disease that mortal flesh is heir to, and that it gave no adequate warning of the dangers which might attend the use of the lamp when connected to a house current of 230 volts. It was stated that the lamp was of faulty construction, and that the insulating material used in it was very inefficient.—*Brit. M. J.* 1: 163, 1929.