

Etiology.—Fissures may be occasioned by most of those causes which produce fractures in general, such as direct or indirect shocks; but they are occasioned much more often by direct blows, especially when inflicted upon bones imperfectly covered by soft parts, such as the tibia. Bullets, having violently struck or penetrated the bone, have frequently occasioned fissures.

Their course may be parallel with the axis of the bone, oblique, or transverse; they are often multiple; some merely enter the outer laminae, others open into the cellular tissue, and others still divide both surfaces of the bone through and through; and, according as they penetrate more or less deeply the bone, their lips will be found to be more or less separated. They frequently extend into the joint surfaces.

Diagnosis.—The signs which indicate the existence of a fissure must, in a large majority of cases, be insufficient to determine fully the diagnosis during the life of the patient. It is not probable that such fissures could ever be clearly made out by the touch alone, where the skin is not broken, since the pain, swelling, suppuration, etc., are only characteristic of inflammation of the bone or of its coverings, and might be equally present whether a fracture existed or not. In those rare cases only in which the flesh is torn off, and the surface of the bone is brought directly under the observation of the eye, will the diagnosis become certain.

Treatment.—Fortunately, an error in judgment in this matter will not materially, if at all, prejudice the interests of the patient; since, whatever may be the fact in other respects, if the bone, or its periosteum, or its medullary tissue, is inflamed, and rest, with antiphlogistics, does not accomplish its speedy resolution, incisions and perforations become inevitable, if we would give either safety or relief to the sufferer. Accordingly, in the inflammation and suppuration consequent upon these fractures, we have seen that it has been occasionally found necessary to lay open the soft tissues freely, and even to trephine the bone at one or more points.

Fissures in Cartilage.—I have once met with a fissure in the thyroid cartilage, which constitutes, so far as I know, the only example upon record of a fissure in cartilage.¹

¹ Buffalo Med. Journ., vol. xiii., article entitled Fracture of the Thyroid Cartilage.

CHAPTER IX.

FRACTURES OF THE NOSE.

§ 1. Ossa Nasi.

OF twenty-five cases of fracture of the ossa nasi recorded by me in my first edition, only fourteen were seen by a surgeon in time to afford relief. It seemed to me necessary, therefore, that the student should be instructed how frequently the nature of this accident is overlooked by the friends, and even by the surgeon himself, to the end that he might be thus admonished of the necessity of always instituting, in such cases, careful and thorough examinations. In some of the cases recorded in my notes, where surgeons were called in time, and a deformity remains, it is not improbable that the accident was not recognized. The rapidity with which swelling ensues after severe blows upon the nose, concealing at once the bones, and lifting the skin even above its natural level, explains these mistakes. The nose, also, is remarkably sensitive, and the patient is often exceedingly reluctant to submit to a thorough examination. It ought, however, not to be forgotten that the omission on the part of the surgeon to do his duty will not always be excused, even though the patient himself has protested against his interference, especially where an organ so prominent, and so important to the harmony of the face, is the subject of his neglect or mal-adjustment; since the most trivial deviation from its original form or position, even to the extent of one or two lines, becomes a serious deformity.

When the ossa nasi are struck with considerable force, from before and from above, a transverse fracture occurs usually within from three to six lines of their lower and free margins, and the fragments are simply displaced backwards; or if the blow is received partially upon one side, they are displaced more or less laterally. This is what will happen in a great majority of cases, as I have proved by examinations of the noses of those persons who have been the subjects of this accident, and by repeated experiments upon the recent subject.

These fragments are generally loose, and easily pressed back into place by the use of a proper instrument. A silver female catheter, which we have seen recommended by surgeons, may answer well enough in a few instances, but it will more often fail. The diameter of the meatus at the point where the instrument must touch in order to make effective pressure upon the ossa nasi, is on the average not more than two lines; and when the membrane which lines it is injured, it becomes quickly swollen, and reduces the breadth of the channel to a line or less. Under these circumstances, any instrument of the size of a female catheter could only be made to reach and press against the nasal process of the superior maxilla, which is too firm and unyielding to allow it to

pass without the employment of unwarrantable force. In this way it happens that the operator is occasionally surprised to find how much resistance is opposed to his efforts to lift the bones, and, after repeated unsuccessful attempts, the case is not unfrequently given over. If, however, he had used a smaller instrument, he would have found almost no resistance whatever. A straight steel director, or sound, or sometimes even a much smaller instrument, if possessing sufficient firmness, is more suitable than the catheter. For the same reason, also, one ought never to wrap the end of the instrument with a piece of cotton cloth, as some have, I suspect, without much consideration, recommended.

What I have said of the facility with which these bones may be replaced, when a proper instrument is employed, is true only when the treatment is adopted immediately, or at most within a few days after the accident.

Boyer, Malgaigne, and others have noticed the fact that these fractures are repaired with great rapidity. Hippocrates thought the union was generally complete in six days; and in a case which has come under my own observation, the fragments were quite firmly united on the seventh day.

Nor has Malgaigne, whose observations are always very accurate, overlooked the fact, also, that their repair is effected without the interposition of provisional callus, but as it were, "*par première intention.*" My own observation confirms this statement. Among all the specimens which I have seen in the various college and private collections illustrating fractures of the ossa nasi, and amounting in all to over forty, in no instance has there been detected, after a careful examination, the slightest trace of provisional callus.

I am not certain that it will always be found so easy to retain these loose fragments in place, as it is to replace them. The very swelling which takes place so promptly under the skin tends to depress the fragments, unsupported as they are by any counter-force; a tendency which, possibly, is in some instances increased by attempts on the part of the patient to clear his nostrils by snuffing and hawking. I have, in one instance, noticed very plainly a motion in the fragments when such efforts were made. How we are to remedy this, I am not prepared to say. None of the plans which I have seen suggested possess, in my estimation, very much practical value. Few patients will consent to the introduction of pledgets of lint, or of stuffed bags, or, indeed, of anything else, sufficiently far up into the nostrils to answer any useful purpose. The membrane is too sensitive and too intolerant of irritants to enable us to have recourse generally to such methods. Then, too, it would require, on the part of the surgeon, more than ordinary tact to accomplish so nice and delicate an adjustment of the supports from below as these cases demand, where the slightest excess of pressure, or the least fault in the position of the compress, must defeat the purpose of the operator.

Yet, if one were disposed to make the attempt in certain cases where the comminution was very great, or where, for any other reason, the fragments would not remain in place, I think there could be no better plan than to push up in succession a number of small pledgets of sheet

lint, smeared with simple cerate, to each one of which there has been attached a separate string, so arranged that their relative position may be recognized, and that they may at a suitable time be removed in the order of their introduction.

The employment of canulas, as recommended by Boyer, B. Bell, and others, allows of the nostrils being stuffed without interfering materially with the breathing; a provision, however, which is quite unnecessary with a majority of persons, so long as there exists no impediment to the free admission of air through the fauces.

With nicely adjusted compresses made of soft cotton or lint, and secured upon the outside of the nose with delicate strips of adhesive plaster or rollers, we shall be better able to prevent the fragments from becoming displaced outwards than by moulds of wax, of lead, or of gutta percha, under which it is impossible to see from hour to hour what is transpiring.

The complicated apparatus devised by Dubois and recommended by Malgaigne, to lift the bones and retain them in place, seems to me indeed very ingenious, but destitute of a single practical advantage.

Supporting the fragments with a nickel-plated or gilded needle, which is made to transfix the nose at a point just below the fragments, was first

FIG. 26.



Mason's dressing.

suggested by Dr. Lewis D. Mason, Surgeon to the Long Island College Hospital, in 1880.¹

Dr. Mason has, since this date, reported five cases treated by this method, three of which were treated by himself, and with highly satisfactory results. The pin is removed on the eighth or tenth day, or as soon as the fragments are sufficiently united not to require support. I have

¹ Mason, Annals of the Anatomical and Surgical Society of Brooklyn, March, 1880.

omitted to mention that a narrow strip of pure rubber bandage is to embrace the ridge of the nose, to give additional support.¹

A more considerable force than that which I have first supposed will break, generally, the ossa nasi transversely and a little above their middle; while, at the same time, the nasal processes of the superior maxillary bones may suffer slightly.

With neither of these accidents is the cribriform plate of the ethmoid likely to be broken or disturbed. Indeed, in numerous experiments made upon the recent subject, and in which the force of the blow was directed backwards and upwards, breaking and comminuting the nasal bones above and below their middle, with also the nasal processes of the superior maxillary bones, and the septum nasi, the cribriform plate of the ethmoid was, without an exception, uninjured. The exceeding tenuity and flexibility of the septum nasi at certain points prevents effectually the concussion from being communicated through it to the base of the brain. If, therefore, after these accidents, cerebral symptoms are occasionally present, as I have myself twice seen,² they must be due rather to the concussive effects of the blow upon the very summit of the nasal bones, where they rest immediately upon the nasal spine of the os frontis, or to some direct impression upon the skull itself.

The amount of force requisite to break in the nasal bones, at their upper third, is very great; no less, indeed, than is requisite to fracture the os frontis. If they do finally yield at this point, then no doubt the base of the skull must yield also. Nor do I think patients could often be expected to recover from an accident so severe. To this class of fractures belongs the specimen contained in my museum, in which not only both of the nasal bones are depressed—the nasal spine being broken at its base—but also the os frontis is depressed; the nasal processes of the upper maxillary bones are broken and greatly displaced, and the anterior half of the cribriform plate of the ethmoid is forced up into the base of the brain. If it is meant that in *these* cases the patient is in danger from injury done to the base of the skull through the fracture and depression of the ossa nasi, we can appreciate the value of the opinion; but we do not understand how this danger can exist when the nasal spine of the os frontis is not broken, and the upper ends of the nasal bones are not displaced backwards. But, admitting that it were possible in this way to force up the base of the skull, it does not seem to me that we ought to attach any value to the advice occasionally given, to attempt to restore the broken ethmoid by seizing upon the septum and pulling downwards. A force sufficient to break the base of the skull never fails to comminute and detach almost completely the septum nasi. We are to proceed in such a case as we would in a case of broken skull. We must lay open the skin freely, and with appropriate instruments seek to elevate and remove, if necessary, the fragments. Indeed, after such accidents, we shall generally see plainly enough that death is inevitable, and that our services will be of no value.

Occasionally, I have observed, the bones are neither broken at their

¹ Amer. Med. Digest, Jan. 1882.

² Report on Deformities after Fractures, Cases 16 and 18.

lower ends nor through their central diameters, but only at their lateral, serrated, or imbricated margins. This is rather a displacement, or dislocation, than a fracture. It is more likely to happen, I think, in childhood than in middle or old age, as in the following example:

Thomas Kelley, aged four years, was kicked by a horse. Two hours afterwards, when he was first seen by a surgeon, the nose and face were much swollen, and the fracture was overlooked.

One year after the accident, I found both nasal bones depressed through nearly their whole length, and especially in the lower halves. The right nasal process was also much depressed, and the right nostril obstructed. The lachrymal canals upon this side were closed.

Sometimes the lower ends of the nasal bones are bent backwards, or laterally, constituting a partial fracture.

A lad, aged ten years, was hit by one of his mates accidentally with his elbow, upon the left side of his nose. I was immediately called, and found the lower end of the left os nasi displaced laterally and backwards, so that it rested under the lower end of the right os nasi. There did not appear to be any fracture beyond that which was inevitable by the mere separation of its serrated margins from the bone adjoining. The angle formed by the bone at the point where the bending had occurred was smooth and rounded, and not abrupt as in a complete fracture.

With a steel instrument, introduced into the left nostril, I attempted to lift the bone to its place. The membrane was very sensitive, and the patient very restless under my repeated efforts. I pressed upwards with considerable force, and succeeded at length in bringing the bone nearly into position.

If there is more complete displacement, the upper ends are not usually forced backwards, but rather a very little forwards, from their articulations with the os frontis, and the bones then swing, as it were, upon the lower ends of the nasal spine, as upon a pivot. In this condition they are very firmly locked, and it requires considerable force, applied under their lower extremities, to restore them to place.

Such seemed to be the position of the bones in the case of the lad Kelley, already mentioned, and also in a German, whose nose was flattened by a severe blow when he was eleven years old, whom I saw, thirteen years after the accident, in the Buffalo Hospital. In this last example the bones were very much displaced backwards.

In children, also, the nasal bones may be spread and flattened, the lateral margins not being depressed or displaced, but only the mesial line or arch forced back, so as to press aside the processes of the superior maxilla; which deformity may become permanent.

A block of wood fell upon a child three weeks old, as she was lying in the cradle. The nature of the injury was not understood by the parents, and no surgeon was called. The ossa nasi are now, twelve years after the accident, much wider than is natural, and depressed; the nasal processes of the superior maxilla appearing to have been spread asunder.

Jacob Kibbs, a German, aged seven years, fell from a height of forty feet, striking on his face. His parents did not suspect the injury, and no surgeon was called. Twenty-four years after this, I found the nose

almost flat. The nasal bones appeared unusually wide, and were sunken between the processes of the upper maxillary bones, which latter might be recognized by two parallel ridges on each side, slightly rising above the level of the *ossa nasi*.

Benjamin Bell and others have spoken of tedious ulcers, polypi, necrosis, fistula lachrymalis, abscesses, impeded respiration, and impairment of the sense of smell and of speech, as circumstances apt to result from these injuries, and it is certain that such consequences have occasionally followed; but they must generally be regarded as accidents due to the state of the general system, and as having no connection with the fracture, except as this injury served to awaken certain vicious tendencies.

A gentleman twenty-five years old was struck accidentally upon the right side of his nose by a board, and the *ossa nasi* were displaced to the left. A surgeon made an attempt to reduce them, but did not succeed, and they have remained displaced ever since. The nose for a time was much swollen. A few months after the accident, a purulent discharge commenced from the right nostril, and at length an abscess formed in the right cheek. Two years later, when he came first under my notice, the nose still continued to discharge pus, and occasionally it bled freely. There was also a perforation of the septum, of the size of a three-cent piece, which had not ceased to enlarge.

No hereditary maladies exist in the family, except that, on his father's side, it has been generally observed that wounds do not heal kindly. The same is the fact with him. When a child, he was also very subject to epistaxis; at sixteen, a pulmonary difficulty began, and he had more or less cough, with hæmoptysis, for two years. Since then his health has been good. He is a lawyer by profession, but of late he has lived in the country, upon a farm, and has accustomed himself to much outdoor exercise.

As to the prognosis in these fractures, I can only say that either owing to the ignorance and carelessness of the patients themselves, who neglect to call a surgeon in time, or to the difficulty of diagnosis, or to the greater difficulty in maintaining an adjustment of the fragments, it has hitherto happened that, after a fracture of the *ossa nasi*, more or less deformity has usually remained. I have seen but a few which could be said to be perfectly restored.

§ 2. Fractures and Displacements of the Septum Narium.

Fractures or displacements of the septum narium must occur to some extent in all fractures of the *ossa nasi* accompanied with depression; but they are also occasionally met with as the results of a blow upon the nose which has been insufficient to break the bones, and in which only the cartilaginous portion of the nose has been bent inwards upon the septum.

Of these simple, uncomplicated accidents, I have seen eight; in four of which no surgeon was employed, or surgical treatment of any kind adopted, and it is quite probable that only in a small proportion of all the cases was the nature of the accident recognized. Such, at least, has

been generally the statement of the patients themselves. The same causes will explain this which have been invoked to explain similar oversights in cases of broken *ossa nasi*. To which we may add, as an additional reason why it may be overlooked, the frequency of lateral distortions or deviations in the natural development of this septum.

The cartilaginous portion of the septum is that which is most frequently displaced by violence, and then it is usually at the point of its articulation with the bony septum. Next, in point of frequency, the perpendicular nasal plate is broken, and especially where it approaches the vomer. We omit in this enumeration, of course, those cases where the nasal bones themselves are broken down, in most or all of which, as we have already said, the perpendicular plate is more or less fractured and displaced. We cannot say how often the vomer is broken, since it is beyond our observation, except in autopsies. It is probable, however, that the force of the concussion rarely reaches it, the cartilage or the perpendicular plate giving way first and easily.

Where the deviation is only lateral, the results are less serious, yet sufficiently so, in a few instances, to demand our attention. Lateral obliquity of the lower portion of the nose follows generally, but not uniformly, a lateral displacement of the cartilage; and when it does exist, it is not always proportioned to the amount of displacement existing in the septum, so that the septum is then made to project obliquely across the nasal passage, causing often a serious obstruction and permanent inconvenience. In one instance, also, I have known it to occasion a chronic catarrh.

A lad, æt. 15, was struck violently on the nose, which became immediately much swollen, but no surgeon was called. Eight years after I found the septum displaced laterally, and to the left side, producing also a slight lateral inclination of the end of the nose. He was unable to breathe freely through the left nostril, and from the same side a catarrhal discharge had continued from the time of the accident.

The following example, in which the accident has been followed by a morbid condition of the cutaneous glands, is of more difficult explanation:

A young man, æt. 23, called upon me, supposing that he had a polypus nasi. I found that in consequence of a fall upon the ice, seven years before, the septum narium had been displaced to the right so as almost completely to close this nostril. In very cold weather, when the vessels of the membrane are contracted, the passage is more free. The left nostril is proportionably wide.

During the last four or five years, the right side of his face has been subject to profuse perspiration. It is almost constant in summer, and only occasional in winter. The line of division between the perspiring and non-perspiring portions of the face passes perpendicularly from the top of the centre of the forehead, along the ridge of the nose, and down to the centre of the chin. The phenomenon is due, perhaps, to an increased vascularity in the right side of the face; possibly to some peculiarity in the condition of the nervous trunks, occasioned by the nasal obstruction.

A depression of the cartilage forming a portion of the ridge of the nose is necessarily accompanied with a corresponding degree of lateral

displacement, with or without fracture, of its perpendicular portion, and produces, therefore, not only great deformity, sometimes a complete flattening of the end of the nose, but, also, in some instances, complete obstruction of the nostrils.

We conclude, from all that we have seen, that fractures and displacements of the septum narium are generally followed by permanent deformity, and occasionally with still more serious results. We suggest, therefore, a more careful examination in recent injuries, with a view to the ascertainment of its lesions, and it would be well, certainly, if we could devise some reliable mode of treatment.

It is doubtful whether a partition so thin and unsupported can ever be well adjusted and supported by artificial means. We possess, however, some advantages in the treatment of this accident which we do not in the treatment of broken *ossa nasi*, viz., facility of observation and of approach; and if we can do little with plugs and supports in the one case, we may possibly do more in the other. Nothing seems more rational, then, than to plug carefully and equally each nostril with pledgets of lint, while we cover the outside of the nose completely with a nicely moulded gutta-percha splint or case, which ought to be made to press snugly upon the sides, and permitting these to remain for several weeks, or until the cure is completed. The *papier maché* of Dzondi, employed by him in cases of broken *ossa nasi*, would be equally applicable here; but the gutta-percha, as being more plastic, and hardening more quickly, ought to be preferred.

Attempts to remedy the deformities of the nose, at a later period, belong to the department of anaplastic surgery, and the modes of procedure must be varied according to the circumstances of the case.

The following example will serve as an illustration of what may sometimes be accomplished in these cases:

A young man fell from a two-story window, striking upon his face. A surgeon was called, but he did not discover the nature of the injury to the nose.

One year after the accident he called upon me for relief. The cartilaginous portion of the septum was broken just at the ends of the nasal bones, and forced backwards about three lines, producing a striking depression at this point of the ridge of the nose, whilst at the same time the end of the nose was thrown up. The deformity was very unseemly, and annoying both to himself and to his friends, who at first could scarcely recognize him.

I introduced a narrow, sharp-pointed bistoury through the skin of the nose on the right side, and resting its edge upon the ridge at the junction of the cartilage with the *ossa nasi*, I cut the cartilaginous septum directly backwards about three lines, and then making a gradual curve with my knife, I cut downwards about eight lines toward the end of the nose. The intercepted portion of cartilage could now be easily lifted with a probe, and the line of the ridge of the nose completely restored. It was at once apparent, also, that lifting the cartilage would depress the tip of the nose and restore its symmetry.

To retain the cartilage in place, I constructed a gutta-percha splint of the length and shape of the nose, but so formed along its middle as that

it would not press upon the cartilage which I had lifted, resting well upon the *ossa nasi*, but not touching the ridge from the lower ends of these bones to the tip of the nose, at which latter point it again received support. I now passed a needle, armed with a stout ligature, through the upper end of the uplifted cartilage, transfixing, of course, the skin on both sides of the nose, and this I tied firmly over the splint. This accomplished the important object of pressing backwards and downwards the tip of the nose, and thus tilting up the upper part of the ridge and septum, and of more effectually securing the cartilage in place by lifting it directly with the ligature. On the second day the ligature was removed, but the splint was continued two weeks, during most of which time a band was kept drawn across the lower end of the splint, and tied behind the neck.

To prevent the cartilage from falling back when final cicatrization occurred, I pressed the sides of the splint firmly toward each other, just below the incision, so as to force as much as possible the walls of the nares into the fissure of the septum, made by lifting it up. The result is a complete and perfect restoration of the nose to its original form.

Dr. James Bolton, of Richmond, Va., has devised a very ingenious mode of rectifying an old displacement of the septum nasi. He makes a stellate incision of the septum in such a manner as to form of it about eight triangles with their apices converging to a common centre. He then seizes each triangle separately with a pair of forceps, and breaks it at its base without detaching it. Having thus comminuted the septum, he is able to restore it to position and retain it until consolidation is effected.¹

CHAPTER X.

FRACTURES OF THE MALAR BONE.

I HAVE been unable to find any records of a simple fracture of the malar bone, that is to say, of a fracture unconnected with a fracture of other bones of the face. It is probable, however, that it sometimes occurs, but that, not being accompanied with much displacement, it is overlooked. I have myself seen a fracture of the upper margin, or of that portion which constitutes a part of the orbital border, in two or three instances, while I was unable to detect any other fracture among the bones of the face: but it is by no means certain that other fractures did not exist, perhaps in some of the bones which form the socket, or in the superior maxilla, as mere fissures, or as fractures with only slight displacement. The prominence of the malar bone, and especially the sharpness of its orbital margin, would enable the surgeon to detect easily the smallest displacement, or even a fissure, whilst a much more extensive displacement elsewhere would escape detection.

¹ Bolton, Richmond Med. Journ., April, 1868, p. 241.