

their shape can, and should, be corrected by appropriate apparatus. But after sclerosis has taken place, or even is well advanced, orthopedic appliances will not correct. I am not a believer in the spontaneous cure of bending of the long bones. We often hear the advice given to mothers by members of the profession not to submit these cases to treatment; that the child will "outgrow" the malposition; and I wish to enter a protest against such advice, as it will only lead to disappointment.

## CHAPTER II.

## OSTEOTOMY.

"OSTEOTOMY," says Macewen, "in its broadest acceptation, may be defined as a section of bone. It has, however, been regarded in a much more restricted sense, the term being applied to such divisions of bone as have been proposed and undertaken for the relief of deformity, for the rectification of badly united fractures, and for the straightening of limbs affected with osseous ankylosis, which are fixed in a bad position." ("Osteotomy," p. 37.)

Section of the long bones for deformity had been proposed by many early writers on surgery, yet it does not appear to have been put in practice until 1815, when Le Mercier made a section of the tibia with a saw for a badly united fracture of that bone; and in the following year Wasserführ practiced the same operation upon the femur. Barton, in 1826, performed an osteotomy just below the trochanter major for ankylosis with flexion of the thigh, through an open wound, the division being made with the saw. In 1834 Clémot removed a wedge-shaped piece of bone for the correction of an angular deformity of the femur. Portal, Ashley Cooper, Warren, of Boston, and others, performed similar operations. All sections of bones prior to 1852 were performed through

an open wound. In that year Langenbeck made a division of the femur for ankylosis of the hip-joint by perforating the bone with a drill through a small wound in the soft parts, and then, introducing a narrow saw, divided the bone. He gave to this operation the name of subcutaneous osteotomy.

In 1868 L. Stromeyer Little made use of a carpenter's chisel to divide the bone in a case of osseous ankylosis of the knee-joint, working through a small wound half an inch in length. In the following year Mr. William Adams performed the operation of subcutaneous section of the neck of the thigh-bone, known as Adams's operation. In 1875 Volkmann<sup>1</sup> operated antiseptically on two cases of ankylosis of the knee-joint, and in April of the same year Macewen performed a similar operation. Ogston, May 17, 1876, divided the internal condyle of the femur with a saw in a case of genu valgum, and Reeves<sup>2</sup> March 17, 1878, made a section of the internal condyle in Ogston's line with an osteotome. And on February 2, 1878, Macewen first performed the operation above the condyle.

Prior to 1875 all osteotomies were performed through an open wound, and were followed by suppuration more or less profuse. In the earlier operations no attempt was made to obtain primary union of the soft parts. Barton states that it was not desired.

Langenbeck's operation does not seem to have been a great improvement upon those performed through an open wound, as deep-seated suppuration

<sup>1</sup> "Edinb. Med. Jour.," March, 1875, p. 794.

<sup>2</sup> "Brit. Med. Jour.," September, 21, 1878, p. 431.

is admitted to have frequently followed, and, as the only object in his method was to prevent such an occurrence, it failed in its object. Moreover, deep suppuration, with a small outlet for the discharge, is more productive of injury than suppuration in an open wound. It was, however, an advance toward a better method of operation—namely, the subcutaneous way in which osteotomy is now performed, and, as such, merits a place in the history of osteotomy. There was also at this time another revolution taking place in surgical practice, which has contributed more to its advance within the last ten years than any one circumstance, and that was the method of treatment of wounds advocated by Mr. Lister.

It was only on account of the safety which this method of wound management seemed to afford that surgeons felt justified in operating upon tissues, with which their predecessors considered it too hazardous to interfere. Although much of the technique of strict Listerism has been abandoned, yet its fundamental principles have stood the test of time—namely, that on perfect cleanliness, thorough drainage, and absolute rest, depend the best results in every operation. That osteotomy has obtained its place as a safe and justifiable procedure is due to the influence of Listerism.

The instruments requisite for an osteotomy are few. It may be performed with a saw, chisel, or osteotome. Mr. Adams's saw, which may be taken as a type of such instruments, he describes as follows: It is three eighths of an inch wide, with a cutting edge an inch and a half in length, at the end of a slender shank three inches long. He at first had a

straight handle, but later substituted a curved one, as being easier to grasp. The saw has a round, blunt end, in order not to injure the tissues behind the bone. (Fig. 1.)

Dr. George F. Shrady, of this city, has modified

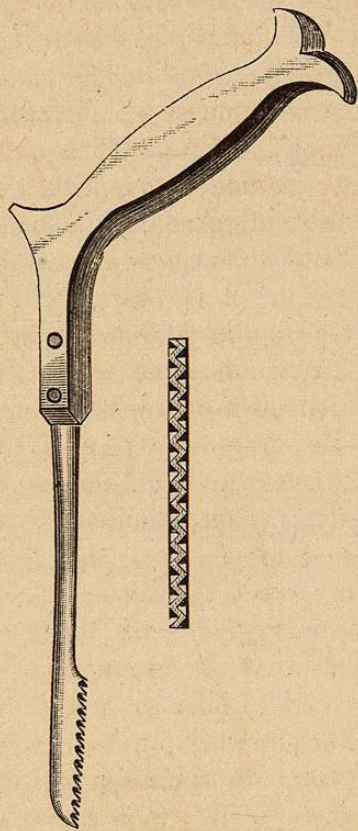


FIG. 1.—Adams's Saw reduced one half, and the cutting edge.

Adams's saw by making it more probe-pointed, and has an arrangement by means of a trochar and canula, so that in introducing the saw all danger of any injury to the vessels and soft parts is obviated.

The instrument consists of first a trochar and canula—the former is of the same size and shape as the saw. The canula has a fenestra corresponding in position to the teeth upon the saw. The method of using it is as follows: The trochar and canula are thrust down by the side of the bone to be divided—the instrument being held in such a position that the fenestrated portion of the canula shall rest upon the bone at the point of desired section; the trochar is then withdrawn and is replaced by the saw; the former is then removed, leaving the saw in position. After the bone has been sufficiently divided the canula is passed down over the saw and both are removed.

It is claimed that with this instrument the danger of injuring the soft parts is reduced to a minimum. I have never used it, but those who have speak well of it. The objections to the use of the saw in osteotomies are: It is harder to work, it takes a much longer time to make the section, there is more disturbance of the surrounding tissues, and, theoretically, the dust from the saw is liable to lead to suppuration, an objection that has not been sustained by practice. Wounds after the use of a saw heal kindly, and the bone-dust does not give any subsequent trouble. The method of using the saw for making section is as follows: An incision is made just large enough to easily admit the instrument down to and by the side of the bone to be divided. The saw is then passed down upon the knife as a guide, and the bone divided through the greater part of its thickness. The saw is then removed, a sponge dampened with carbolized water placed over the wound

to prevent the entrance of air, and the remainder of the bone fractured. The wound is to be treated in the same manner as one after an osteotomy performed with the chisel.

In what experience I have had with the saw in tibial curves it has not seemed to me to be as good an instrument as the osteotome. It is more difficult to work, and it takes a much longer time to complete a section. Thus the time necessary to divide the neck of the femur varies from five to twenty-five minutes, and there is no doubt but that the soft parts are more or less lacerated by the teeth of the instrument. Shradly's saw may do away with this latter objection.

A chain-saw has been used to make the section. Barwell has advocated its use within the past year.

*Osteotomy with an Osteotome.*—There are two forms of cutting instruments of the chisel order—one having both planes gradually sloping down to a sharp cutting edge, the other made like a carpenter's chisel. To the former Macewen has given the name of osteotome, to distinguish it from the latter, which is properly a chisel. The osteotome is an instrument having its two flat surfaces gradually sloping down to a sharp cutting edge, like a long, slender wedge, resembling a knife-blade, being as thin as it approaches the cutting surface as is safe.

The accompanying cuts (Figs. 2 and 3) represent two views of an osteotome. They are reduced one half actual size. Fig. 2 shows the gradual slope of the flat surfaces, while Fig. 3 represents the latter. Fig. 4 is a smaller osteotome useful for division of the fibula and similar bones.

It should have a temper between that of a cold chisel and a carpenter's cutting tool, so that the edge will not be turned by the hardness of the bone, or so

FIG. 2.



FIG. 3.



FIG. 4.



brittle as to chip. It is well always to test the instrument on a piece of hard bone, driving it in with a pretty strong blow with a mallet. If the edge is neither turned nor nicked, it is of a proper temper. The cutting edge should be very sharp. It should