

*A Case of Intra-Uterine Amputation.* By A. V. MACAN, M.B., M.Ch.

**MR. PRESIDENT AND GENTLEMEN,**—The case I have the honour of bringing under your notice this evening is one of spontaneous amputation of the left forearm of a foetus, in utero.

That such cases are very rare may be gathered from the fact that, so far as I can ascertain, there is no case on record as occurring in the Rotundo Hospital during the last thirty years. That such a thing is possible is of itself interesting, but I think the chief interest of such a case lies in the inquiry as to the cause or causes by which such a deformity can be produced.

**CASE.**—Catherine Brady, aged thirty-one, was admitted into the Rotundo Hospital on October 23rd, 1874, and was delivered, after an easy labour, of a fine healthy boy, which weighed 6 lbs. 12 oz.

On the birth of the child it was at once thought that the left forearm was entirely wanting. From the appearance of the end of the stump, it was plain that it was not a case of arrest of development, but of spontaneous amputation; and though the missing portion of the limb was carefully looked for it could not be found.

The woman had had five children, who were all strong and well-formed; she enjoyed good health during this pregnancy, which differed in no way, that she could remember, from any of her previous ones.

On examining the limb more carefully it was found that the seat of the amputation was not through the elbow-joint, as had at first been supposed, but through the forearm, just below the insertion of the biceps. On the surface of the stump there was a semicircular cicatrix, about the size of a threepenny piece, which had evidently been a long time healed. Just beneath this, but not adherent to it, could be felt the end of a small bone. When this short stump was flexed by the action of the biceps, the effect was as though the arm itself was suddenly shortened and its end flattened out. When the arm was flexed the olecranon process could easily be made out posteriorly.

When asleep or at rest the forearm was kept extended, but when aroused the child flexed the arm frequently. It was perfectly formed in all other respects, and thrived well during the time its mother remained in hospital. She herself was evidently greatly distressed by the deformity, and was most anxious to find out something she might blame for it.

The difficulty of getting the limb photographed was great, but I am happy to say that the photographer has succeeded in getting an impression, which conveys a very good idea of the deformity.

It is, I am sure, well known to the members of this Society, that our fellow-countryman, Montgomery, was the first who gave any satisfactory explanation how such a lesion could occur. To his able paper on the subject I am indebted for a large portion of the information I have been able to collect on this interesting subject.

Before his time the deformity had been noticed by many of the older writers, who, however, explained it as being the result of inflammation and consequent gangrene. The first case that drew Montgomery's attention to the subject was one reported by Mr. Watkinson in the *London Medical and Physical Journal* for July, 1825. In this case it was found, on the birth of the child, that the left leg a little above the ankle-joint was wanting. On searching for it the missing foot was found. The surface of the stump was nearly quite healed, and the foot, which from its relative size seemed to have been about two months separated, showed no signs of putrefaction, but appeared to be in a state of perfect preser-

vation. This condition of the foot, of course, excluded any idea of gangrene, and Montgomery was quite at a loss how to account for the lesion.

Four years after reading the above, he was fortunate enough to meet a case in his own practice which enabled him to give a satisfactory explanation how such a deformity might be produced. It was a case of abortion at the fifth month, in which he found, on examining the foetus, which was greatly deformed, that the legs were tied tightly together just above the ankles by ligamentous bands, which had penetrated fully two-thirds of their thickness, without there being any breach of the skin, any appearance of disease, or even any discoloration of the parts.

It would occupy too much time to go through the cases, in number about twenty-eight, which Montgomery brings forward in support of the theory that such lesions are caused by bands encircling the limbs and acting like ligatures. Suffice to say, that among these twenty-eight cases may be found illustrated all the different effects produced by ligatures, from a mere indentation of the skin to total separation of the limb.

But even when we have come to the conclusion that such lesions are the result of ligatures applied to the foetal limbs, several important questions still remain to be answered, viz. :—

1st. How are the ligatures formed or produced?

2nd. How are they applied round the limbs?

3rd. How do they produce their effect?

Montgomery thought they were formed of organised lymph the result of inflammatory action, and were similar to the bands sometimes found connecting the lungs and the walls of the chest, or the intestines, and more especially the uterus and its appendages, with each other.

As to the way these bands become applied to the limbs, Montgomery confessed he could give no explanation, but he rejected the theory put forward by Professor Gurlt to account for their origin and application. Professor Gurlt's theory was that these bands were formed by adhesions taking place between the skin of the foetus and the amnion. As the liq. amnii was secreted, it tended to separate the two points thus adherent, and the tissue joining them became stretched out, and twisted by the movement of the foetus into cords, which the same movements would easily twine round the limbs of the foetus. The reasons Montgomery gave for rejecting this theory seem to me quite insufficient.

The third question, as to how these ligatures produce their effect, is not so hard to explain.

In the first place the ligature, if formed of organised lymph, has itself a tendency to contract on the limb which it encircles. But even if this were not the case, the growth of the limb itself would have a like effect. The degree to which the limb will be constricted by the ligature seems to depend in a great degree on the time of intra-uterine life at which it

first becomes applied, and of course on the tightness of its first application, which is probably much the same in every case.

Corresponding to this difference in the time of the application of the ligature, are the different conditions of the stump or limb at the time of birth. If the ligature has been applied early in foetal life you will find the limb most probably wholly amputated, and the stump quite healed. If somewhat later, you may still find the limb amputated, but the stump will present a small portion of its surface still unhealed, which is always found to be the end of the bones. If the ligature has been applied at a still later period, you may find nothing but a furrow or indentation on the limb. This will also, to some extent, explain why the amputated portion of the limb is so often not found. For if the separation has taken place early in pregnancy, the part amputated is very small, and is subjected to the action of absorption within the uterus during a long period. On the other hand, the nearer the end of gestation when the limb was amputated, the larger it will be, the shorter time it will be subjected to absorption, and the more likelihood, in proportion, of its being found. That such absorption does take place is probable from the analogous cases in which whole ova or part of an ovum have been absorbed in utero. The fact also, that even in those cases where, from the very nature of the deformity, it seems certain that it was caused by a ligature, the ligature is often not found at the time of birth, would lead to the conclusion that the ligature, though at one time present, had been since absorbed; and if a ligature is thus absorbed, why not an amputated limb.

Dr. Simpson, in a paper read before the Medico-Chirurgical Society of Edinburgh, in 1841, notices a very curious occurrence in some cases where the limb has been spontaneously amputated—viz., a tendency to the rudimentary reproduction of the amputated member on the face of the stump.

After noticing that the lower you descend in the animal kingdom the more readily is an amputated part reproduced, and having given a case in which a supernumerary thumb was reproduced after being amputated, and another case in which a nail grew on the second phalanx of the finger after amputation of the first, he gives two cases in which, after spontaneous amputation of the forearm in utero, rudiments of fingers with nails attached were reproduced on the face of the stump. He says this rudimentary reproduction of the amputated limb is most frequently met with when the forearm is the seat of the amputation. He also notices the curious fact that in most cases, as in the case I have just had the honour of bringing before you, it is the left forearm that is amputated.

It has been held by some that spontaneous amputation may be caused by compression exerted by the cord. This seems at first sight almost

impossible; for one cannot but think that any compression exerted by the cord on a limb, sufficient to produce amputation of that limb, would immediately stop all circulation in the cord and so lead to the death of the foetus. In other words, one essential condition for spontaneous amputation to take place is, that the foetus should continue to live for a considerable time after the application of the ligature.

In support of this view I may mention that, though Montgomery gives several cases in which the limbs were indented or furrowed by the cord, in none was the limb wholly amputated, and in most of them the foetus did not live beyond the third or fourth month. In nearly all of these cases the limb affected was on the left side of the body.

However, a number of authors have declared their belief in the possibility of amputation through such compression, and we must suppose that in such cases the compression is exerted more especially on one artery of the cord, and that the Whartonian jelly is very firm and plentiful. In support of this view these authors bring forward the fact that a living child has been born in cases where the cord was tied in a firm knot.

That the left side is the side affected in the great majority of cases seems to depend on the fact that the movements of the foetus in utero, as deduced from the direction in which the cord is twisted, takes place in most cases from left to right.

Scanzoni, in a short chapter on intra-uterine amputation in his work on Midwifery, while allowing that in the great majority of cases such amputations are the result of compression exerted by adventitious bands, thinks that in the case given by Martin, when there was the history of external injury to the mother's abdomen, the cause of the amputation of the arm was most likely fracture, followed by extravasation of blood, and causing pressure on the nerves sufficient to lead to deficient nutrition of the part, and consequent gangrene. He thinks that in cases where the child is in every other respect well formed, the cause of the deformity is probably fracture; for in cases where ligatures have been proved to be the cause, the deformity was seldom confined to the mere amputation. *A priori*, it would seem highly improbable that anything like a symmetrical deformity could be caused by adventitious bands formed by chance. In cases, therefore, where the lesion is symmetrical and the child well formed in other respects, Scanzoni thinks the origin of the deformity is rather an arrest of development than spontaneous amputation.

Simpson, also, in the *Dublin Medical Journal*, 1836, threw out the suggestion that perhaps in cases where there are any rudiments of fingers, &c., formed on the stump, the case is one of arrest of development, but that in cases of spontaneous amputation the stump resembles in every respect that left after an ordinary amputation.

In conclusion, I would remark that Schröder, in the last edition of his

Midwifery, states that such mutilations are caused by amniotic threads formed by adhesion between the fœtus and amnion during the early periods of intra-uterine life. That a delay in the secretion of the liq. amnii, or a small quantity of that fluid, predisposes to the formation of these adhesions. That as the quantity of liq. amnii increases, the amnion is lifted up from the surface of the fœtus with which it was at first in contact, and that thus cords or bands are formed.

Fürst, in an article in the 2nd vol. of the *Archiv für Gynækologie*, while giving three theories for the production of these bands, concludes that they are formed chiefly by some interference with the due formation of the sac of the amnion, and subsequent "plastic adhesion."

That these bands, if, instead of encircling a limb, they are only inserted into it, and thus produce a constant traction in the same direction, are capable of producing various other deformities, as crooked limbs or dislocations, is obvious.

That all these solutions are but putting the true question one step further backwards is self-evident. For even if we have proved that spontaneous amputation is caused by adventitious bands passing from the amnion to the fœtus, the question still remains to be answered—viz., what causes the formation of these adventitious bands?

The PRESIDENT said the interesting communication just read differed from that which had preceded it, inasmuch as the cases referred to in the former were common, whereas amputation in utero was rare. It was the first case he was aware of as having occurred in Dublin for many years, and he believed Dr. Macan had given them all the information that was known on the subject.

DR. KIDD—We have been fortunate, or perhaps I should say unfortunate, in the Coombe Hospital. My own experience does not extend to altogether thirty years, but I have seen four cases of this condition occur. In one of those cases in the Coombe Hospital the child died soon after birth. Dr. Montgomery assisted me in the examination of the child, and he said that he thought it the most interesting and remarkable case of the kind he had ever met with. In that case I was fortunate enough to find the limb. One leg was amputated midway between the ankle and the knee. I was not present at the birth, but when I paid my visit in the morning I succeeded in getting the membranes; and, searching carefully in them, I found the amputated extremity. The other leg was partially amputated, and there was no evidence how the amputation had taken place. In one hand a fine band passed from the top of the index finger, partly enclosed the middle finger, and attached it to the ring finger. It had very nearly cut off the top of the middle finger, and some of the fingers of the other hand had the same kind of bands attached

to them. We have the preparations still in the hospital. Unfortunately the foot was allowed to dry before it was put in spirits, and it has not expanded. It is a very interesting specimen, and proves the existence of these bands, though it does not throw any light on the source from which they are derived.

DR. DARBY said he had never seen a case of a child born with a limb amputated in utero, but he knew persons in after-life who were said to have been so born. One gentleman told him his mother informed him that he was born without the right hand, and that the doctor who attended her said it had been amputated in utero. He had examined the arm of that gentleman more than once, and had not the slightest doubt that it was a case of defective development. It was like the fin of a porpoise, and in the stump were distinctly to be felt all the bones of the wrist and hand completely enveloped in skin. Within the last three or four years a woman came into his hospital from Kingstown, and she had the same kind of stump precisely. He felt all the bones of the hand and could count them. He thought it probable, therefore, that some of these cases set down as amputations in utero might in reality be cases of arrested development.

DR. DENHAM asked Dr. Kidd what was the difference of development between the child born and the foot that had been amputated. It was quite clear, however much there might be in what Dr. Darby had stated, that in Dr. Kidd's case the amputation had taken place, for the foot was found. Whether an arm might be amputated and an attempt made by nature to make up the deficiency, was another question.

DR. KIDD said:—We considered the question very anxiously, and Dr. Montgomery and I arrived at the conclusion that there were two months' difference between the development of the child and the foot. The child was born at the full time of nine months. The last case we had was of a woman who was a considerable time in the hospital as a patient during pregnancy for chronic inflammatory tumour in connexion with the uterus, a localised peritonitis. After she recovered and left the hospital she came back for her confinement. Her child had the two arms amputated and one leg. The child lived, and used frequently to visit me. He was a remarkably intelligent child, and had remarkable power in the use of his toes—he could seize a piece of bread and butter between his first and second toes and convey it to his mouth, and take a pencil between his toes and amuse himself drawing with it. His mother got an artificial leg made for him, which he wore with very great satisfaction, but he would not allow a boot to be put on the other foot, which he used for manipulative purposes.

**DR. DENHAM.**—I asked the question because it throws considerable light on the mode of amputation. If we consider that the pressure of the cord takes place at a very early stage, we may imagine that a very small pressure would be sufficient to stop circulation, when a species of mortification might take place, and the dead body be thus separated from the living.

**DR. KIDD.**—There was no sign of putrefaction whatever.

**DR. DENHAM.**—It may not be putrid. I believe it is a living process that takes place in the arm or leg by which the living part separates itself from the dead.

**DR. HENRY KENNEDY** said he believed that in the new process of amputation by the elastic band, the amount of pressure was extremely small in proportion to the effect produced.

**DR. M'CLINTOCK.**—Dr. Kidd mentions a fact that bears out the view I have put forward in my paper to-night. He states that the amputated limb was not in the slightest degree decomposed, although he believes it had been separated for two months before the birth of the child. It was deprived of all vitality for two months, it was surrounded by fluid, it was at a high temperature most favourable for putrefaction, and yet there was no sign of decomposition. Does not that prove that there is something highly antiseptic in the uterus? I stated in my paper that I had seen cases which bear out the belief that if atmospheric air be not admitted, putrefaction does not take place. We have seen a foetus expelled in a softened state, but perfectly inodorous; and in a few cases, where the membranes were ruptured and atmospheric air obtained admittance, I have seen putrefaction and decomposition progress with great rapidity in the course of twenty-four hours. I remember when I was assistant at the Rotundo Hospital, a woman being brought in, and the ward in which she was placed was pervaded by the most sickening smell. She had been in labour for days under the care of a midwife, and the membranes had been ruptured for some forty-eight hours. Emphysema arising from putrefaction had taken place, and the head of the child was a large, doughy, emphysematous mass. I sent for old Dr. Labatt, and when he came into the ward his horror exceeded anything I ever saw, and when I brought him over to the bed he examined the patient at arm's length, so dreadful was the odour. The child was a large, well-developed child, and was alive two or three days previously, and yet within that time all this dreadful putrefaction had taken place.

**DR. MACSWINEY** wished to remind the Society that the conditions laid down in all elementary works as necessary for the setting up of a putre-



factive process in animal tissues, were air, moisture, and a certain temperature. Now, seeing that in the case of the womb no air can obtain admission, he should like to know whether any animal decomposition had been known to have taken place without the presence of air? He should say the surprise would be if animal decomposition took place without the presence of air, and not that it did not occur.

DR. C. F. MOORE said that if the cord got round the limb of a foetus, as the latter increased rapidly, it was easy to understand how the circulation would be stopped and the growth arrested.

DR. MACAN, in reply, said there could be no doubt that the amputation was caused by bands. Where they came from, and how they worked, were the questions to be decided. He thought the action of the bands was purely mechanical, and that they had no vital action whatever.

The Society then adjourned.