Considering it to be secondary in importance, I have dealt first and chiefly with what I have taken to be the primary condition—that is, the lateral curvature—and in treating this I have always found the amesial condition disappear rapidly. If the patient be very weak, the spine may tend to give way all the time that the patient is not recumbent, but in a great many instances the spine will be held straight during activity, and will only relapse into its lateral curves when the patient is trying to rest, by sitting down without supporting the back thoroughly.

It seems to me obvious that these facts—if they be facts—point to two objects of attainment: one the strengthening of the muscular system, so as to increase the power of the patient to keep the spine from subsiding into lateral curves, and the other the support of the spine in a straight position during the necessary periods of rest.

Periodical rest of the muscles is a physiological necessity, as we all know; and however much the muscular system may be developed, the spine cannot be constantly held upright. Directly the muscles cease to act, lateral curves are produced, unless the normal position is maintained by recumbency or by artificial support in sitting. For the latter purpose, a chair fitting the natural form of the spine must be used constantly whenever the patient is not using his dorsal muscles actively, if we are to obtain a beneficial result from the strengthening of the muscles.

This line of treatment applies only to slight cases—those in which the curves have so little developed that they do not show themselves when the patient stands firmly erect, or sits upright with muscular effort. When the curves are more pronounced—so that they are apparent under all conditions of posture, even when the patient makes the greatest effort to hold himself erect—something more must be done.

Some surgeons consider that these cases are hopeless, but I have found, upon the contrary, that the majority of them can be cured if dealt with before very severe rotation of the vertebræ has taken place.

Then comes the question which has been so often raised, and is now again under discussion, as to the relative advantages of treatment by exercises alone or by exercises in combination with mechanical support. We must bear in mind that when distinct curves have been developed the cartilages and even perhaps the vertebræ have already changed their form. They have become more or less wedge-shaped. The convexities of the curves are formed by the thicker sides of the cartilages and bones, and the concavities by the thinner edges of these wedge-shaped parts. Such a spine, in the earlier stages of the deformity, may, by certain movements and exercises, be temporarily placed in a straight position, and by long-continued and persistent application of this treatment permanently beneficial results may be obtained. The natural forces are, however, very much against perfect success by this means, for directly, and every time, these special exercises cease the spine will subside again to its curved position.

The object of mechanical treatment is to maintain any improvement effected by exercises, or by the support alone, keeping up the improved position until the cartilages and vertebræ have again altered their shapes into the normal.

That these parts can alter their shapes is proved by the gradual increase of deformity which occurs when no treatment is employed, and therefore, if we can hold the spine straight continuously for a sufficient length of time, we may depend to a certainty upon obtaining a perfect and permanent cure, provided we take care to strengthen the body in the meantime. If we agree as to the correctness of this view, it remains to be decided if it be possible to effect this correction by any mechanical means at our disposal. In such a case as I have last described we can generally, upon examination of the patient, hold the spine by means of our hands alone, in a much straighter position than the patient can possibly effect by his own unaided muscular efforts, and in many cases we are able to entirely remove the curve while so holding him. That being so, we ought to be able, by scientifically constructed apparatus, also to hold up the spine, and in my experience we are certainly able to do this. The use of apparatus undoubtedly requires careful study and aptitude, and should be avoided by those who cannot carry out the

details of adjustment themselves without the help of the instrument maker.

Some of the advantages of Chance's splint and the modifications of it which I have introduced, are correctly described by Dr. Lewis in the *BRITISH MEDICAL JOURNAL* for August 14th, but the description in the *JOURNAL* for July 17th is no hard-and-fast rules as to the disposition of the plates, as absolutely incorrect. In using such an apparatus there are might be supposed from the statements there made. Each case is treated in accordance with its own peculiarities, and it is quite possible by careful adjustment to hold up the spine without interfering with the development of the patient's body, without interfering in the least with the use of the muscles, and without producing any harmful effect upon any function or organ of the body.

I have entered so fully elsewhere¹ into all the details of these matters, that I should be encroaching unfairly upon the columns of the *JOURNAL* if I were to discuss them now; but I shall be glad to touch upon one important point. It is well known that in lateral curvature the rotation is increased when the individual stoops, and in the examination of the spine it is customary to make the patient bend down as low as possible to show the degree of this rotation.

If in treatment we can only hold the patient upright and prevent his stooping we shall thereby lessen the rotation and also straighten the curves. The maintenance of this upright position will alone in some cases entirely remove the curves, and therefore is a curative procedure. When side plates are applied they do not exert injurious pressure, but hold the spine straight or towards that position, just as the hands of the surgeon have previously done. The instrument as a whole acts as a guide to the patient, directing him how to hold himself straight by his own exertions, and it only interferes with those movements which would be detrimental in their action.

If the patient can hold himself for any short period absolutely erect and straight the apparatus does not interfere, but directly he allows the spine to subside towards its former vicious position the instrument comes into action and checks that subsidence.

Judging from the large number of cases treated in this way by my colleagues and myself at the City Orthopedic Hospital I can say that the use of apparatus is of very great value in the treatment of lateral curvature of the spine; so much so that cases undertaken in the earlier stages can be cured with almost absolute certainty.

There are a variety of means which can be brought to bear to help our efforts, amongst which I have found massage of great value, but if we wish to produce the greatest amount of good with the least amount of trouble to the patient and the least amount of expense to the parents we shall have to use mechanical apparatus.

REFERENCE.

- ¹ *Curvatures of the Spine*. Fourth edition. London: Smith, Elder and Co. 1896.

A CASE OF SPONTANEOUS ANEURYSM OF THE ULNAR ARTERY IN THE PALM: EXCISION OF THE ANEURYSM: RECOVERY.

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THE rarity of spontaneous aneurysms of the ulnar artery, or, indeed, of any small limb artery, is so great, that each example that comes under notice deserves to be put on record. The case I herein describe came under my care at Addenbrooke's Hospital, and, in addition to a descriptive account of it, I intend giving the results of an inquiry into the changes induced in the artery wall, and making some remarks upon the plan of treatment adopted.

The cases hitherto published are (1) one reported by Walton¹ an aneurysm, the size of a horse-bean, that formed without any assignable cause in the ulnar artery one inch above the wrist in a medical student, 21 years of age, a pupil at the Middlesex Hospital Medical School. Direct com-

pression of the aneurysm and of the artery immediately led to cure; (2) one reported by Guattani² occurred in a groom, 45 years of age, in the portion of the right ulnar artery in the hypothenar eminence; this was more or less solid, and its nature was not suspected until it was deemed advisable, from the skin showing signs of giving way, to incise it; when this was done the flow of blood was very great, and the wound was rapidly increased and packed with dry lint; (3) one reported by De Morgan³ occurred in the lower part of the ulnar in a man, 47 years of age, who suffered from albuminuria and heart disease; (4) one reported by Sir Astley Cooper⁴ in the upper part of the ulnar; (5) one by Erichsen,⁵ which was under the care of Todd, and in which the brachial artery was successfully tied; (6) one referred to by Holmes⁶ in a lad, 17 years of age, who died from vegetative endocarditis. The aneurysm in this last case was considered by Holmes to be the result of the impaction of an embolus detached from the valves of the heart, since other cases have been reported in which emboli (septic) proved to be the cause of aneurysmal dilatations.⁷

The following are the notes of the case which has been under my care at Addenbrooke's Hospital:

C. M., aged 23, single woman, residing at Fordham, admitted August 23rd, 1896; fair and healthy-looking, appetite good; pulse 82, regular, and artery walls soft and supple; no cough and no difficulty in breathing; urine normal. There is a smooth fusiform swelling $1\frac{1}{2}$ in. in length by $\frac{1}{2}$ in. in breadth in the inner part of the hypothenar eminence of the right hand and in the position of the ulnar artery; this pulsates synchronously with the heart, and the swelling expands equally in all directions. On compression of the brachial the swelling almost disappears, to fill again on release of the artery. It is not tender and not adherent to the skin of the palm. Occasionally there is pain in the inner side of the forearm, and usually numbness of the little, ring, and of the ulnar side of the middle finger. Early in May, 1896, she first noticed a throbbing in the hand, and in June following observed a small swelling on the inner side of the palm, which has since continued to throb and increase slightly. She can assign no cause. She is the second of seven children, and her father, mother, brothers, and sisters are quite well and healthy.

On August 25th, 1895, a longitudinal incision $1\frac{1}{2}$ in. long was made over the swelling. After cutting through skin, lower half of palmaris brevis, and palmar fascia, the aneurysm was exposed and carefully dissected, the ulnar nerve lying behind and to the inner side and easily separated and pulled to one side. The ulnar artery proximal and distal to the swelling was next ligated. The sac was then removed by scissors, and from it proceeded the deep branch of the ulnar, which had also to be ligated. The wound was stitched, and ten days after all had firmly healed and there was no sign of aneurysm.

The wall of the aneurysm was found unevenly thickened, and on its inner surface, which was everywhere smooth and glistening, and with no trace of clot on it, there were many small elevations not unlike, but much smaller than, those usually seen in atheroma. Under the microscope the wall of the aneurysm was seen to be composed in the main of fibrous connective tissue, in the middle of which there were remains of unstriped muscular fibres of the middle coat. The inner part of the wall, which corresponds to the intima, was much thickened from the proliferation of the connective tissue cells normally present in it, and, it may be, from the proliferation of the endothelial lining. Near the free surface the cells are elongated and flattened, and close together layer upon layer, deeper the cells are larger and with more matrix between them, and deeper still the cells are few in number, and the matrix, which is here distinctly fibrous, is proportionately greater. Many of the cells in this—the deeper part—are already converted into globules of fat. Beyond, or outside this inner layer, is a thick layer of dense fibrous connective tissue, which represents both the middle and external coats; and in the inner part of this there are dwindled and degenerating unstriped muscular fibres. These changes are almost identical with those seen in a subacute atheroma (endarteritis deformans), the extension into the two outer coats seen in so complete a manner being in all probability accelerated by undue stretching of the walls during the

formation of the aneurysm. In the above case there was no evidence (1) of cardiac valvular disease, (2) of a widely distributed disease in the arteries, (3) of any increased blood pressure, (4) of sudden strain, (5) nor of any kind of injury. The wall of the aneurysm, however, showed definite structural changes. In the intima, or what corresponds to it, the changes were similar to those observed in subacute endarteritis deformans; in the middle coat the muscular tissue was in most places almost completely replaced by fibrous connective tissue; in the outer coat the loose areolar tissue was also replaced by fibrous tissue, which was directly continuous with that replacing the muscular fibres in the middle coat.

So far as can be judged, this case is an instance of subacute localised endarteritis deformans, with extension into and almost complete disappearance of the muscle fibres and of the elastic membrane.⁸ Although this must be of rare occurrence in the smaller limb arteries, yet, as we know, it is known—though not by any means of frequent occurrence—in the smaller cerebral arteries.

The treatment adopted in this case, namely, excision of the sac after ligation of the artery proximal and distal to the aneurysm previously dissected from surrounding structures, commends itself in all such cases. The aneurysm was small, defined, superficial, and not in relation to any important structures, and its excision proved an easy matter, the ulnar nerve being early exposed and carefully drawn to one side. In ten days the wound was healed, and the hand quite well, the patient having got rid of the aneurysm completely; and she was in consequence without the inconvenience of a contracting blood clot that might, seeing the close relation that the ulnar nerve bore to the wall of the sac, prove tender to pressure for some months, and thus prevent her having the full use of the hand. The speediness of recovery and the completeness of the removal of the diseased portion of the artery constitute, I venture to think, the ideal plan in the treatment of aneurysms; and wherever excision of the sac can be performed under careful aseptic conditions, it must be preferable to any of the other methods now in use. Doubtless the risk of septic infection and the liability to secondary hæmorrhage deterred surgeons from adopting this plan in the treatment of aneurysms of the extremities, and the almost uncontrollable hæmorrhage in the incision method required a boldness that many did not possess. With our Esmarch tubing and our almost perfect cleanliness neither the one nor the other need we have any fear of. The above were not, however, the only reasons that prevented the adoption of the method of excision by the older surgeons; for ever since the time of John Hunter it has been believed that in cases of aneurysm the wall of the artery is usually diseased for some distance away from the actual dilatation.⁹ We may find examples illustrating this view now and again, but the majority of instances of aneurysms that I have seen have shown hardly any signs of disease, either in patches or over any extent of surface; and in many the arteries were perfectly healthy immediately above and below the seat of the aneurysm. It seems to me that this view should be accepted only when there is positive evidence of general disease of the arteries, a state which is by no means always present in persons suffering from a single aneurysm. In the instances of false aneurysm or aneurysm following clearly upon a strain, probably the result of a tear in the walls of the artery, this method of treatment has been in vogue, and of recent years Thorburn¹⁰ of Manchester and Littlewood¹¹ of Leeds have published some cases in which it has succeeded well.

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- ² Guattani, *Erichsen, Obs. on Aneurysm*, p. 316.
- ³ De Morgan, *Med. Times and Gaz.*, November 22nd, 1862.
- ⁴ Sir Astley Cooper, *Lect. on Surg.*, p. 47.
- ⁵ Erichsen, *Science and Art of Surgery*.
- ⁶ Holmes, *System of Surg.*, 11 Ed. vol. iii, p. 29.
- ⁷ Langton and Bowly, *Trans. Med. Chir. Soc.*, vol. lxx, p. 117.
- ⁸ John Hunter; *Erichsen, Obs. on Aneurysm*, p. 373.
- ⁹ For an account of the degree of involvement of the middle or muscular coat in the early stages of the formation of aneurysms see Coats and Auld, *BRITISH MEDICAL JOURNAL*, August 26th, 1896.
- ¹⁰ This view is given by Home, in his account of the first case of ligation of the femoral artery for popliteal aneurysm as the reason why John Hunter gave up the old operation. Hunter endeavoured first by experiment on animals and then by the confident application of the result to man to procure a safer mode of treatment of popliteal aneurysm; see *Erichsen, Obs. on Aneurysm*, p. 373.
- ¹¹ Thorburn, *BRITISH MEDICAL JOURNAL*, 1891, p. 1147.
- ¹² Littlewood, *BRITISH MEDICAL JOURNAL*, 1894, p. 1114.