✓ **Lectures** ON **ORTHOPÆDIC SURGERY.**

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LECTURE VIII. **ON CURVATURES OF THE SPINE.** (Continued.)

Pathological Anatomy.

THE *anterior surface of the thorax* presents changes which are scarcely less striking than those which have already been mentioned. Thus, on the side of the convexity, the ribs are flattened and depressed; and, together with them, the position of the mammary gland is changed, the position varying from a quarter of an inch to an inch or more. This necessarily depends both on the situation of the curve and on its extent. The gland retains, if not entirely, almost its normal relation to the ribs, and is depressed together with them. On the side of the concavity of the thoracic curve, the ribs and cartilages become prominent; so that the projection is not unfrequently spoken of as a tumour. Sometimes pain is felt in this position; and I have more than once known this to be the only seat of pain in scoliosis. This prominence is occasioned through the rotation of the vertebræ, and the consequent thrusting forward of the ribs and their cartilages. These changes are shown in Fig. 18, Lecture VI.

The sternum also deviates somewhat from its normal position, its lower extremity being directed towards that side which is occupied by the convexity of the thoracic curve.

The *viscera* both of the thorax and the abdomen are compressed, and their functions become deranged in every severe form of lateral curvature of the spine. Such is the case, indeed, before distortion reaches its most severe stage. But the thoracic viscera suffer especially, being surrounded by bony walls. On examining the skeleton, one is apt to wonder how, in numerous instances, the functions of respiration and circulation can be carried on; so great is the change from the normal condition. The most prominent effects which are produced through compression are imperfect expansion of the lungs and condensation of their parenchyma, deficient aeration of the blood, and dilatation of the right side of the heart.

The aorta always follows the inflexions of the spine in scoliosis. Sometimes the curves which it describes are sharper, and sometimes they are less so, than those which are formed by the vertebræ. In severe lateral curvature, the aorta assumes curves so sharp as to interfere materially with the circulation of the blood; and this impeded circulation is manifest in severe forms of scoliosis. Specimen 3416 in the museum of the College of Surgeons shows well these abnormal curves of the aorta.

Before concluding this subject, I must again direct attention to rotation of the vertebræ. The changes which are produced are so admirably delineated in the following figures (24 and 25), from specimens for

Fig. 24.

which I am indebted to my friend Mr. Wheeler, that I cannot resist giving them in this place. Here are shown the anterior and the posterior surfaces in a case of advanced distortion; and the wonderful difference between the curves which are formed by the spinous processes, and those which are formed by the bodies of the vertebræ, will be remarked. The wedge-shape of some of the bodies of the vertebræ will also be observed, as well as the position of the pelvis, which is similar to that maintained during life in the erect posture.

Rachitic scoliosis seldom appears until disease is fully established in the long bones, and usually also in the pelvis. The nature of the affection can, therefore, rarely be doubtful. A rachitic tibia or femur, by inducing obliquity of the pelvis, may be the cause of spinal curvature. This is an every-day occurrence. The curve is not, however, therefore rachitic. Rachitic scoliosis and ordinary scoliosis have little in common but the curve and the compression of viscera consequent upon distortion.

Rachitic scoliosis commences in the bony structures. First, the periosteum becomes unusually vascular, tumid, and adherent to the bone. The structure of the bone itself is then somewhat swollen, and its vessels are filled with blood. The cells, too, of the spongy parts of the bones, and of the epiphyses of the long bones, become dilated and filled with sanguinolent

fluid. Eventually the cell-walls are broken down, and the medullary cavities become chambers filled with this fatty, sanguinolent, dark coloured matter. This fluid is found both in the cavities of the bones and between the periosteum and the bone; and at length the bones become soft and cartilaginous, being

Fig. 25.

deprived of their earthy constituents entirely or in part; so that they are easily cut with a knife, or as readily yield to pressure or to muscular force, and become misshapen. Wherever pressure is greatest, there is the most distortion. So in the spine it is found that the vertebrae which are most implicated in the curve are not only much compressed, but they are twisted on their axes, and through pressure become misshapen.

Through the weight of the trunk also, the pelvis is flattened and narrowed in its conjugate diameter; and this tendency to flattening is increased by the existence of lordosis, which, as a rule, exists together with scoliosis in rickets. The ribs on both sides of the thorax are flattened, and they are distorted into every conceivable shape.

To this softened and tumefied condition another even more important yet succeeds. The bony substance becomes more and more firm, the outer surface being hypertrophied and of ivory hardness; so that the distorted limb or spine, however misshapen, must so remain: change is impossible.

Treatment.

The treatment of lateral curvature of the spine may well be divided into *preventive*, *curative*, and *palliative* treatment.

The *preventive treatment* of lateral curvature of the spine comprises all those measures of hygiene which tend to the development of the body, and which conduce to its perfection. It relates, consequently, to food, clothing, bathing, exercise (bodily and mental), sleep, rest, etc.—to every circumstance, in fact, which may affect nutrition.

In youth, every care should be taken to strengthen the bones, to develop the muscles, and to promote activity of body—a system the reverse of that which prevails throughout England.

The freedom of action which is permitted to boys prevents them from suffering from affections of this nature. Scoliosis is very rare among boys; and when lateral curvature does occur, it arises generally from some affection of the lower extremities. But debility is the commonest cause of distortion in young girls—debility which, one might almost say, is purposely induced, so different is their mode of life to that which seems to have been intended.

Exercise is essential to develop the muscular system; not only such regulated exercises as are comprised in a system of gymnastics, but freedom must be permitted in walking, running, playing, etc. This system has been introduced into some of the best schools in the neighbourhood of Paris, and with the happiest results. Nothing can exceed the appearance of health which prevails among the inmates. Widely different is it from that which may be observed in London schools, and, indeed, in schools throughout England. The use of forms and stays, and the want of adequate exercise, bathing, sleep, and rest, induce so much distortion, that it has been said, and with much truth, that it is difficult to find a young person so well developed as she ought to be, and that distortion is the rule rather than the exception in our female schools.

The *curative treatment* of curvatures of the spine comprises not only restoration to symmetry of form, but also such a development of muscular power as is necessary to that suppleness and activity of body which belong to health. The treatment may, therefore, be divided chiefly into two parts; namely, physical and dynamical, or constitutional and mechanical.

NATURE OUTDONE. A report was read lately at a sitting of the Société Médicale d'Emulation, on a paper by Dr. Foley, in which he recommends a high atmospheric pressure as a cure for various diseases. Applying certain facts to therapeutics, Dr. Foley remarks that mountaineers are obliged to breathe more quickly than men inhabiting the plains, because the air is more rarefied on the mountains than in the plains, and therefore affords less oxygen at a breath than the denser air. Conversely, therefore, if a patient be in want of more oxygen than he can get under the ordinary pressure, let him be exposed to an atmosphere rendered artificially denser. This can be done by constructing a small chamber communicative with a forcing-pump, and provided with an air-gauge and a safety-valve. A patient confined in such a chamber may be subjected without inconvenience to the pressure of about two atmospheres and a half. By this treatment catarrh, asthma, and other complaints of the respiratory organs may be removed; in croup the compressed air will flatten down the adventitious membranes; and in disorders arising from weakness, compressed air will arterialise the blood and increase the vital power of the patient.