

The disease being in its essence a constitutional defect in healthy nutrition, the surgeon must form a just estimation of the sources of the constitutional defect in each particular case; the remedies, to be useful, must be directed to the cause of the disease, and not to its effect. The patient should not only be protected against influences likely to depreciate the physical standard or her constitution, but measures should be adopted to enhance its vigour and fortify the frame against distortion. The patient should live regularly and generously, avoid fatigue, and, in the language of a word-painting American, "abstain from all conflict with the laws of physiological hygiene;" should alternate in proper proportion between rest and locomotion, providing for freedom of exercise without indulging in habits likely to exhaust her physical power by over-exertion; in fine, for a year or more should live for physical well-being alone, until puberty, with its attributes has become fairly established and the constitution confirmed. Other measures, however, are necessary to avert the impending deformity—viz, those relating to the operation of the mechanical cause, the superincumbent weight acting, as I have already explained, by deviating the centre of gravity. It must be evident that, so long as a patient stands erect—equally balanced upon her feet—the centre of gravity will fall in its proper place, but let her stand at ease, or sit upon one haunch, to relieve the weariness inseparable from general debility and languor, and the spine is at once thrown out of its perpendicular. The effect of this is to incline the pelvis, on which, as a *base*, the spine rests, and that, too, a very small one compared with its height—viz, the sacro-lumbar articulation, and the line of gravity inevitably traverses a new series of curves, causing the spine to rotate upon its axis and subsequently inducing curvature out of the mesial plane. The spine is projected to the left side at the lower part, and to preserve the balance the body is twisted to the opposite side above.

Rotation would appear to be the starting point of every deformity. In *varus* the anterior part of the foot rotates upon the transverse tarsal joint of the foot, the primary disturbed motive force being in the *tibialis anticus* and *posticus* muscles. In *genu valgum* the tibia is rotated upon the femur by the action of the *biceps* long before the bending inwards occurs, and one of the chief obstacles to treatment in each of these diseases is difficulty in unbending effectually the twisting. It is a somewhat singular fact that a rotatory movement is observed in buildings which are loosened upon their foundations.

Now, so long as a patient is in motion, the centre of gravity falls within its proper base, and when recumbent, the action of it in an improper line is abolished. Hence, if the principles inculcated are true, it follows that the patient should be either constantly recumbent or in motion; but here we encounter the established habits and motions of society. It will be argued that if the patient be confined to the horizontal position, the health will certainly suffer; and this is perfectly true, unless

counteracted by the other alternative, freedom of exercise; and we must not forget the reasoning of Meyer, that the recumbent posture, unduly maintained, has a tendency to diminish the normal thoracic curve of the spine, more especially when it is still over-flexible. Hence we must be particularly careful that the recumbency be not too rigidly enforced or prolonged; but this can scarcely be the case if a patient be allowed to lie on her side, or choose any position consistent with her comfort, so long as she is recumbent.

My own practice, therefore, in the treatment of these cases is based upon the foregoing principles. Patients must be recumbent or in motion; when in motion they may walk, run, jump, dance, &c., but there must be no standing, lounging, nor even sitting, and the education must be conducted in the recumbent position, and unless there is manifest disposition on the part of the patient, and a moral co-operation of the part of her friends, no good will result, or, at the best, the distortion fixes in a moderate degree. The patient, moreover, should sleep on a firm mattress, with a low pillow and endeavour to change the side upon which she sleeps. The spine should be sponged and well rubbed night and morning.

Now comes the question of exercise. I concur with Mr. Skey in thinking that it should follow, not precede, other treatment. I am equally sure that, whatever exercise be adopted, it should tax the entire muscular system, and not exempt one part or the other; neither should it, under any circumstances, approach exhaustion of the physical strength. And here it may be mentioned that a certain amount of exercise is quite compatible with rest in the horizontal position.

I have occasionally practised where the torsion is fully marked, and I have thought with benefit, such as the following. Let us suppose an ordinary case, in which there is slight curvature above on the right and below on the left side:—

I place the patient standing with her back towards me. I then cause her to stiffen her neck and left shoulder, while offering support with one hand to the patient's right arm, and applying the other to her left hip. I cause a movement of the upper part of the body tending to carry it to the left side and slightly backwards, preventing, at the same time, all attempts to lower the shoulder or bend the trunk on the right hip. This movement, when properly performed, must cause rotation of the dorsal vertebrae to the left, and, consequently, a corresponding motion of equal extent of the lumbar vertebrae. During the movement the thumb of the left hand lying over the first lumbar vertebra informs me of degree of torsion of the spine, and whether the muscular action has been properly accomplished. These movements may be continued for twenty minutes, with an interval of rest, four or five times a week, once daily, sufficient care being taken that fatigue is not induced and, I may say that when they are properly performed in moderation they induce neither pain nor fatigue.