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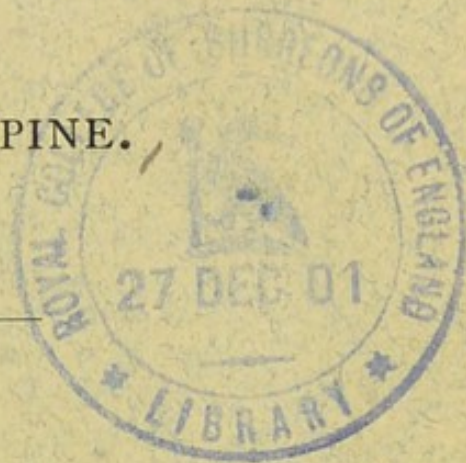
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P. C. 5.

TREATMENT OF LATERAL CURVATURE
OF THE SPINE.



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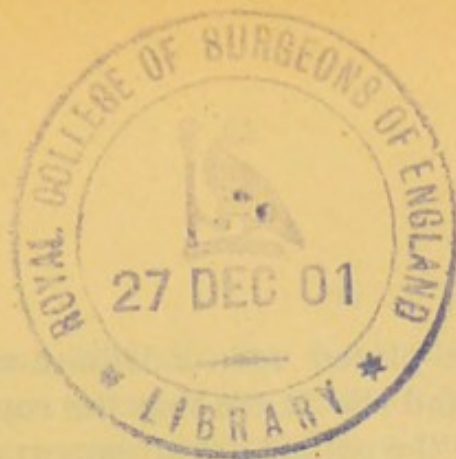
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*TREATMENT OF LATERAL CURVATURE
OF THE SPINE.*

BY DE FOREST WILLARD, M.D.

Cases of lateral curvature of the spine present such great variations that it is almost as difficult to lay down positive lines for treatment as it is to assign reasons for the curvature and for the rotation of the bodies of the vertebræ. The varying degrees of distortion and of rotation, moreover, demand close and special study, both of the requirements of a given case and of the results secured by any set of muscular movements. A careful survey of a hundred cases will show that the deviations in the curves of the spine, and in the other bony distortions, are almost infinite. Two curvatures in the same region and of apparently the same degree give entirely different results as regards the position of shoulders, the rotation of the scapulæ, the deformity of ribs, and the twist of the pelvis. The first element in treatment, therefore, and the one most neglected perhaps, is close observation of the nude back, and the effect of various motions upon the vertebræ and ribs; oftentimes, too, a front view is desirable. In young children the whole body should be stripped.

Differences in length of limb and tilt of pelvis should be mechanically corrected. False habits of sitting, standing, and working should be overcome. The life of the indi-

vidual should be placed upon a definite and healthful basis, and the axiom that the cooperative efforts of the patient are all-important for success must be inculcated. Cure, in fact, lies in the hands of the individual, under the direction of the surgeon and the physical instructor.

As many of these cases are or have been rachitic, and as nearly all have lax ligaments and relaxed muscles, attempts should be made to restore muscular equilibrium. No brace, it is obvious, can accomplish this; it is, therefore, worse than useless as a corrective measure. Apparatus may sometimes be necessary to assist in the prevention of a rapidly increasing curve, or for the comfortable support of an old and hopeless curvature and rotation, but it is not a part of the proper treatment. Apparatus has a place, but a limited one, in the correction of this deformity.

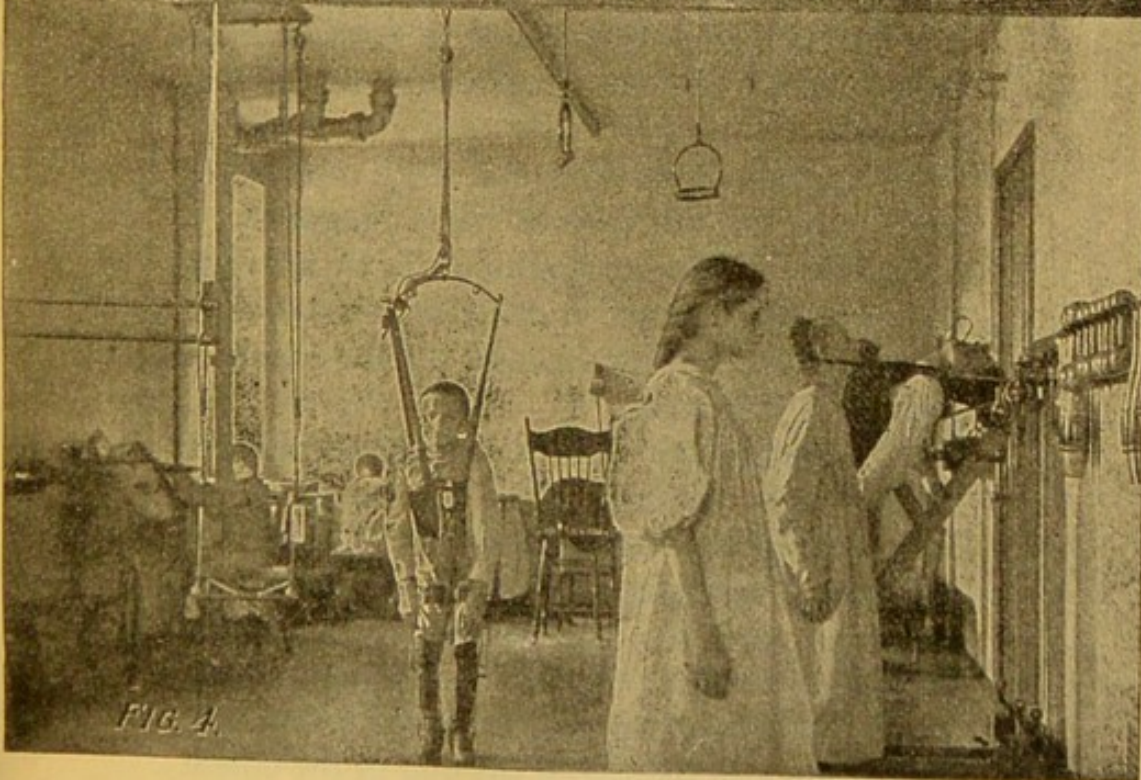
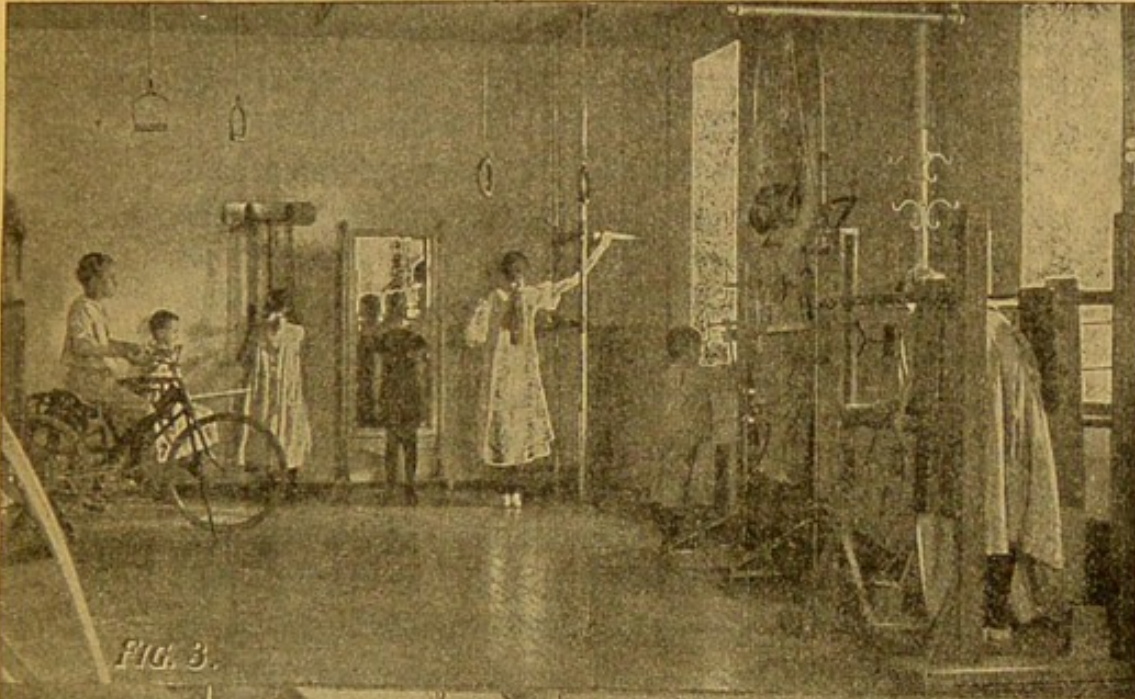
After long experience in the management of these cases, at the office and at their homes, both personally and through a physical instructor, I found that to maintain the interest of these patients in their work, and to prevent the exercises from becoming a drudge and an unpleasant duty, it was necessary that there should be a large variety of exercises to allow variation from day to day. As this cannot be secured in private homes I fitted out at the Hospital of the University of Pennsylvania a special gymnasium, with forty or fifty different appliances helpful for special muscular development. The results of a test of several years have been more satisfactory even than I expected. A prescription for each case is carefully made after several examina-

tions, and all the work is done under the supervision of the surgeon and an instructor. For young children the element of play must be considered, and for them spring and hand-propelled swings are valuable. These are also available in any private house or on a porch, the latter needing only a pair of turned hand-pieces sliding up and down upon the ropes, these hand-pieces being attached to a fixed point or arm a foot in advance of the suspension points of the swing. For home use also for young children, musical dumb-bells, return hand- and foot-balls, balance boards and spring boards, are of service, in addition to punch-balls, light dumb-bells, clubs, wands, wooden guns, and similar apparatus. Only rarely do I use heavy dumb-bells.

The best voluntary corrective position obtainable by the key-note position of the patient's arms and trunk having been ascertained, flexions of the body both forward and backward are greatly desirable. With the arms thus placed, rotations of the vertebræ upon their long axes, either to right or to left as may be found helpful in each case, should also be practiced. Rotations in the long axis of the vertebræ with the body flexed at right angles to the legs should also be employed in this key-note position. In the same position, also, there should be rotations of the body from side to side. It is very important that the backward flexibility of the dorsal portion of the spine should receive attention. In the position of hyperextension with hands clasped behind the neck, lateral backward movements are very helpful, as are also rotations and leg movements. Care

should be taken that the patient does not simply lordose the lumbar region. This backward flexion can be more forcibly accomplished by supporting the projecting ribs on the side of the convexity with a fulcrum or padded roll, or with a webbing strap, which saves the strength of the instructor. In all dorsal lateral curves the muscles on the side of the concavity of the curve should receive at least one-third more work than those on the side of the convexity; for this purpose a trapeze with two bars, one above the other, should be employed; also swinging rings of uneven heights.

A large proportion of the movements should be voluntary, but the supervision of the surgeon or of the instructor is imperative, not only to guide the movements, but also to control the position of the pelvis, and to make hand-pressure as a fulcrum upon the projecting area. With the chest weight, or with a Whiteley elastic-rope exerciser, many valuable movements can be secured by having one attachment for hand, another for foot, and another as a bridle for head, neck, and trunk work. In the use of the chest weight it is important that the movements shall be such as will not simply bring arm muscles into play; the final pull must demand the action of all the scapular muscles, particularly the serrate, so as to secure the full rotating effect on the chest upon the side of the concavity. Single hand-work, therefore, should be largely employed. During this single hand-work the body should be placed with the side of the convexity nearest the machine.



Special Orthopedic Gymnasium, University Hospital.

An endless rope running from a pulley supplied with a friction brake is also helpful.

Self-suspension from a head yoke, the hand on the side of the concavity being uppermost, has a decidedly corrective effect. In extreme cases, such a yoke attached to a chair can be used while sitting; and in very bad cases, head extension and traction at night may be employed. For these severe cases I use powerful pressure upon the projecting ribs and also upon the opposite compensatory lumbar curve by means of strong screw-pads and heavy weights, the last in the bowed position. The benefit to be secured in the badly distorted cases is necessarily slight; the time for the improvement of a lateral curvature is in its very first stage; a stage, unfortunately, which is seldom diagnosed either by the physician, mother, or patient.

In a gymnasium where a large number of cases are to be treated simultaneously, a mechanical massage machine run by an electric or a water motor is of great assistance in relieving the instructor, and on the whole it does excellent work.

A perfectly flat rattan couch three feet high is very useful. This can be used not only during the massage of the muscles of the back, but also for leg movements and rotations, and for the voluntary elevations of shoulders and thorax, the patient lying prone. With a strap also to support the legs, the patient can overhang the end of the couch and practice voluntary movements.

Loose gymnastic suits of special pattern should be worn; the whole rear being easily

detachable, so that the effect of muscular movements upon the bare back can be frequently watched and corrected if wrongly employed.

The gymnasium is provided with a hot and cold shower-bath for the completion of the treatment, which is to be followed by rest upon a flat couch in the dressing-room. The dressing-room is supplied with lockers for each patient's individual clothing.

When patients are dismissed they are given a list of exercises to be continued daily at home, preferably under the care of an instructor; but, after thorough training for several months, a conscientious worker can accomplish much through her own systematized efforts.

The majority of these home exercises are voluntary, and do not require special apparatus. When the patients can afford it, however, they are advised to have erected at home, self-suspension yoke, horizontal bar, double trapeze or rings, a chest weight or Whiteley exerciser. They should also purchase a pair of light wooden dumb-bells and Indian clubs. An endless rope and a wrestling machine may be added with advantage. A hard bed or table will take the place of the couch for prone exercises. With any or all of these a large variety of movements can be secured.

The patient should sleep upon a flat mattress; should avoid slouchy positions of sitting, standing, and walking; and in bad cases may use a sloping seat for sitting or for bicycle riding.

The following is a copy of the usual prescription blank:

Check Each Treatment Desired, and Give Full Instructions
as to Massage and Muscular Movements.

ORTHOPÆDIC GYMNASIUM PRESCRIPTION.

HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA.

Name and address

Diagnosis

Age

Surgeon.....

Date.....

Treatments weekly.....

- | | |
|---------------------------------------|-------------------------------------|
| 1. Superheated air appliance. | 24. Fulcrum. |
| 2. Mechanical massage. | 25. Whiteley exerciser. |
| 3. Manual massage. | 26. Endless rope. |
| 4. Muscular movements. | 27. Wands. |
| 5. Mechanical movements. | 28. Guns. |
| 6. Chest expander. | 29. Abdominal stool. |
| 7. Indian clubs. | 30. Leg rotating machine. |
| 8. Light dumb-bells. | 31. Leg circling machine. |
| 9. Heavy dumb-bells. | 32. Flexor foot and ankle machine. |
| 10. Bridle. | 33. Foot circumduction machine. |
| 11. Quarter circle. | 34. Return foot-ball. |
| 12. Wrestling machine. | 35. Balance board. |
| 13. Beely's scoliosis appliance. | 36. Double staircase. |
| 14. Weigel's scoliosis appliance. | 37. Spring board. |
| 15. Sargent's scoliosis appliance. | 38. Trolley support. |
| 16. Swedish side bars. | 39. Spring swing. |
| 17. Sargent's chest weight. | 40. Mechanical swing. |
| 18. Lat. curv. bicycle. | 41. Finger machine. |
| 19. Mechanical bicycle. | 42. Pronator and supinator machine. |
| 20. Rings. | 43. Arm machine. |
| 21. Double trapeze. | 44. Wrist roller. |
| 22. Self-suspension. | 45. Punch-ball. |
| 23. Lat. curv. manual pressure board. | 46. Exercising rings. |
| | 47. Massage exerciser. |
| | 48. Bar dumb-bells. |