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BY

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A HOME-MADE SPINAL APPARATUS.

By C. FAYETTE TAYLOR, M.D.

What may be called *the handy method of getting spinal instruments* came about during my recent visit to Meran, Austria, in this way: Olois Streber, a Tyrolean peasant, thirty-three years old, was run over by his own ox wagon in July of last year. He was taken up completely paralyzed in his lower extremities, and carried home, where he had ever since lain. An English lady, who spends all of her life doing good to the sick and distressed, asked me to see the poor man, which I did, in April last, in consultation with the attending physician, Dr. Mazegger. I found him in a pretty wretched condition, with sluggish ulcers in various parts of his lower extremities, and a large bed-sore over the sacrum. Turning him on his face, I found undoubted evidence of primary injury to the spinal column in the lumbar region, with probable progressive disintegration of several vertebral bodies as a secondary consequence of the injury. The outward displacement of the injured and diseased vertebræ was plainly to be seen. There had been recovery of considerable sensation in the lower extremities, and there was a slight amount of voluntary motion in the right leg, but not sufficient to be available in diminishing his utter helplessness. He had already been lying there nine months, and had a wife and two small children, the youngest only

three months old; altogether it was a case to excite compassion and sympathy. I explained to the doctor that, both on account of the original injury and the subsequent and consequent changes in the bodies of the vertebræ, they ought to be protected, and suggested the plaster-of-Paris jacket as a simple means, in the absence of more efficient permanent apparatus. No apparatus can be procured in Meran. Nothing was done, however; and some days later I was asked to take the case and do what I could for it. My first intention was to make an apparatus of wood, which would be perfectly feasible for the spine or for any other orthopædic purpose when workers in steel can not be under command. But, after thinking about it over night, I adopted another and much better plan. My materials were several sheets of thick blotting-paper, such as can be procured at any stationery store; three yards of coarse linen-cloth; some shellac dissolved in alcohol got at the druggist's, and a plot of glue. My tools were a pair of shears, an awl, my pocket-knife, a brush, and a very definite purpose in my own mind of what I wanted to do. Taking two sheets of the paper held together, I cut them very nearly into the shape of the muslin portion or "back" of a man's waistcoat, long enough to extend from the first dorsal vertebra to below the trochanters, and wide enough to come well around the sides of the body. I then cut a longitudinal slit at the place corresponding to the projecting vertebræ, and slashed the paper on each side under the shoulders and above the ilia to within two inches of the center line, taking care that the cut in the upper one was above or below that in the lower one, so that each cut would be covered in modeling by the uncut portion of the other paper. Everything being ready, I saturated both papers thoroughly with the alcohol and shellac by rapidly applying it with a paint-brush. In a few minutes the paper was soft

and pulpy, and was easily and quickly modeled to the form by gentle pressure with the fingers and hands. The edges at the top and shoulders had been cut at frequent intervals about half an inch deep, the cuts on one paper always coming between those on the other. The edges thus cut were then turned up, so as to form a rim for the purpose of giving increased strength to this portion of the apparatus, the only portion not capable of taking a curved form. Careful manipulation soon caused the paper to take the exact form of the patient's back; and, while I was still at work, the alcohol began to dry out and the paper to stiffen. Within half an hour the mold thus formed was lifted off and placed in the sun for more rapid evaporation of the alcohol, and in half an hour more was stiff enough to carry home without danger of alteration. Next morning it was dry and hard. On each side of this mold I pasted, with thick, hot glue, a layer of coarse linen-cloth, thin enough to stretch and fit without necessity for cutting. Over the cloth thus glued on other layers of blotting-paper were fitted, after having been first saturated with shellac and alcohol, then dried and glued down, and over each of these paper layers was a layer of cloth—thus alternating prepared paper, molded and glued down, and then cloth, to the number of four layers of paper and five of linen-cloth. It was then strong enough except at the point of greatest pressure at the middle of the back, which was strengthened by gluing down alternate layers of paper and cloth till the hollow in the posterior part of the back of the mold was nearly filled up. It would then bear the weight of a man without yielding in the least. Turning it over, the apparatus was completed by pasting with starch-paste a number of layers of paper on each side corresponding to the projection in the spine, enough to secure the pressure desired at that point. Applying the apparatus after this last step of fitting, I found it

lifted away from all parts of the body, top, bottom, and sides, except at the points of contact on each side of the affected vertebræ. The requisite "support" was thus se-

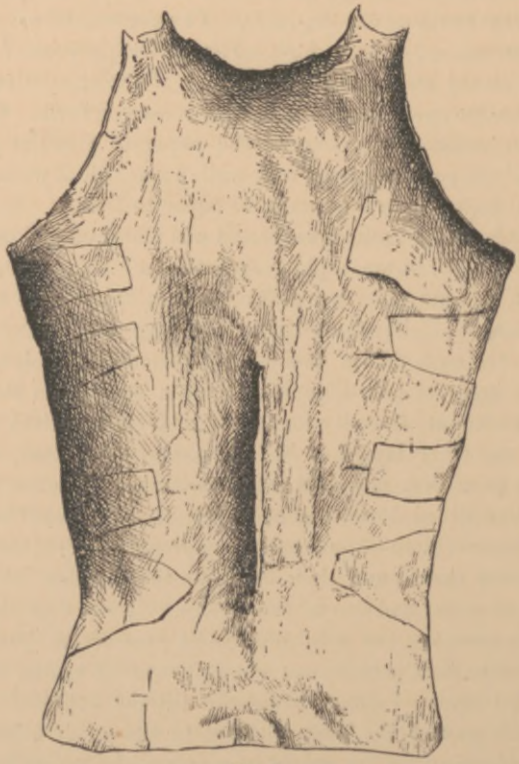

Fig. 1.

cured. This strong frame was then pierced near the edges by the awl in places corresponding to the location of the buckles in the steel "spinal assistant," and the buckles were tied on with narrow tape for strings. A linen "chest-piece"

and an "apron" of thick muslin, exactly like that we ordinarily use, completed the apparatus, at an outlay of about two dollars and a half, and, perhaps, three hours' time, spread over two days. On applying the "brace," it was found that the opening was too narrow to receive the projecting spinous processes. This was speedily remedied by paring off a little with the knife, after which it was perfectly comfortable, and he wore it night and day with entire ease and satisfaction from the first application, and is doing exceedingly well now.

The only thing of special interest in this novel spinal apparatus is the simplicity of the materials from which it is constructed. They can all be procured anywhere. Old newspapers would do just as well for taking the form or mold, and I should have used them, except that blotting-paper is more cleanly to work, and, in this instance, was more easily obtained. Of course, the chief thing is to get a perfect mold of the back. This is then built up and reinforced by successive layers till it is strong enough. Then it is practically indestructible, and will last for years. As the finished instrument does not show the first mold, which is the really important part, I have made a second one—an hour's work—from a photograph of which Fig. 1 was made. It shows the posterior or convex side of the mold. The completed apparatus, as applied to the patient, Streber, is shown in Fig. 2.

I do not see why the same materials and method of procedure may not be successfully employed in some cases for the upper or lower extremities. Indeed, before proceeding to make the spinal apparatus, I made this patient an apparatus to support the most paralyzed leg—anticipating the time for putting him on his feet—for the purpose of testing the manipulative qualities of the materials I proposed to use, especially to see if soft paper, wet in alcohol, could be

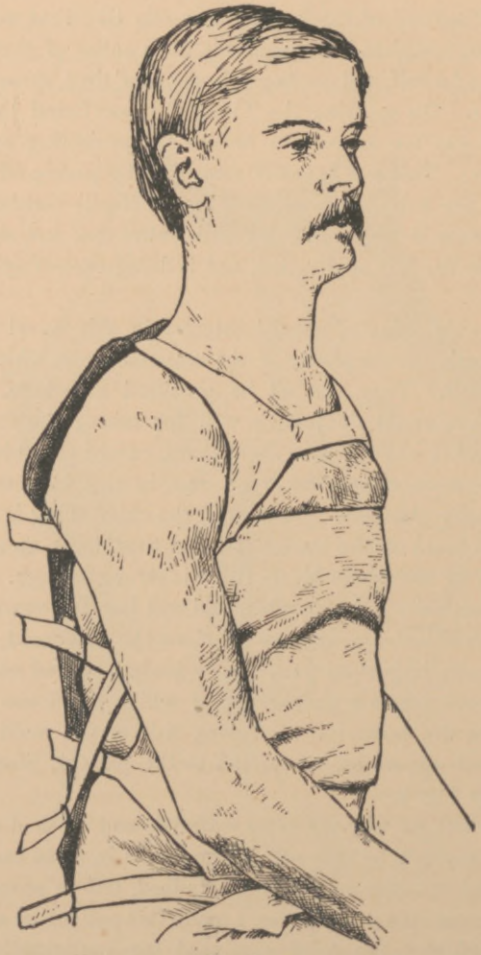

FIG. 2.

molded to the form; and, if that could be done, to see if the shellac would be sufficient to hold it in form after the

alcohol had evaporated. I found both suppositions held true. I had to strengthen the leg brace at the knee, which was readily done with strips of the same materials applied on each side. Thus it is seen that out of simple and readily procured materials, quite independently of distance, not to say incompetent or inattentive instrument-makers, one can have, not a mere bandage of transient existence, but a real practicable machine, capable of definite, prescribed mechanical force and action; capable of modification without injury, and which will be both inexpensive and indestructible.

I do not think the *paper orthopædic appliances* will take the place of steel ones when the latter can be procured, though I am quite sure we shall try them in some special cases. But, in comparison with gypsum for any orthopædic purpose whatever, I am confident that the combination of paper and cloth herein described is immensely superior. It is just as cheap, often more easily procured, does not crumble to pieces, is lighter, is at all times under inspection and control, has capacity for exerting mechanical force in prescribed quantity and direction, and does not have to be renewed.

NOTE.—The foregoing paper was embodied in a letter sent to me by Dr. C. Fayette Taylor from Meran, South Tyrol, and dated May 23, 1886. I was struck with the simplicity and effectiveness of the method, and at once constructed a "home-made" brace according to the directions.

After one failure, due to imperfect preparation, I had no trouble in constructing a perfectly solid and light appliance which seemed to meet the requirements of fit, adaptability, and strength.

The paper should be well saturated with the shellac before it is molded to the back. The shellac must be thin enough to completely wet through the paper; it is at any time easily thinned by adding more strong (95-per-cent.) alcohol. Linen strips doubled and sewed together make an admirable substitute for webbing.

Dr. Taylor suggests that experience may enable us to make the brace lighter and more airy by cutting fenestræ in the parts subjected to least strain, and perhaps by adding light steel strips each side of the spinal column between the layers.

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