Neurosurgical Classic—XXV

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Otfrid Foerster, like Clovis Vincent, was a neurologist who later gained enough surgical skill to perform the operations he recommended. Because of his basic interest in neurophysiology, his operations were designed to be informative as well as beneficial. An example of this concerns Foerster’s experience with the operation of posterior rhizotomy. This procedure was first performed in 1888 by William H. Bennett for the relief of peripheral pain, and twenty years later Foerster adapted it to the treatment of spastic paralysis and gastric crises. Foerster’s subsequent extensive experience with the patients undergoing this operation resulted in a careful analysis of the sensory dermatomes in man—a major contribution to the understanding of the human nervous system.

References

**THE DERMATOMES IN MAN*†**

BY PROFESSOR O. FORSTER, Breslau.

The nervous system preserves more than any other part of the human body the original division of the embryonic tube into metanemes. The spinal cord is divided in segments, each segment being provided with a pair of anterior and posterior roots. The area of skin which is supplied by the fibres of a certain spinal root is called a dermatome.

The skin is innervated by the posterior roots as well as by the anterior. The former carry the afferent sensory fibres and efferent fibres subserving vasodilatation. The anterior roots carry efferent motor, sudorific, pilomotor and vasoconstrictor fibres, and also afferent sensory fibres. In this lecture I shall deal exclusively with the fibres passing by the posterior roots.

There exist two different methods for the determination of the area of skin subserved by a certain posterior spinal root, the anatomical method and the physiological method.

The anatomical method, used first by Herrington and later chiefly by Bolk, consists in following up the fibres of one single root by anatomical dissection through the plexus and the peripheral nerves into the skin. Fig. 1 shows the second, third and fourth cervical dermatomes as outlined by Bolk by this method, and Fig. 2 the areas of the roots supplying the arm, that is the fifth, sixth, seventh and eighth cervical and the first and second thoracic roots. Each of these dermatomes occupies a different area and these show very little or no overlap.

It is obvious that this method, used by Bolk, has the disadvantage that by anatomical dissection it is impossible to follow the terminal and finest ramifications of the sensory nerves in the skin. The areas outlined by it certainly show the shape and the position of the dermatomes, but not their full extent.

To Sir Charles Sherrington we owe our knowledge of the complete topography of the dermatomes in the monkey. The method used by him, and called the method of “remaining sensibility” or the “isolation method,” consists in dividing a series of contiguous roots above and below a single root which is preserved. The area of the skin, the sensibility of which is preserved after this procedure, represents the sensory dermatome of the intact root.

Fig. 3 demonstrates the second, third and

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† The substance of this article was included in the Schorstein Lecture delivered at the London Hospital, on October 13, 1932.
fourth cervical dermatomes of the monkey; these overlap to such a degree that the area of the third cervical root is supplied to its full extent by the second and the fourth cervical roots.

A similar condition exists in the upper extremity (Fig. 4). The fifth cervical dermatome, for instance, overlaps with the third and fourth on the one hand and with the sixth and the seventh on the other. The amount of the overlap of the different dermatomes is so considerable that division of a single root produces no loss of sensibility.

Another physiological method for the definition of the dermatomes is based upon local strychnine intoxication of the posterior roots. After segmental application of strychnine to the dorsal surface of the cord a sharply circumscribed skin field becomes hyperesthetic, as Dusser de Barenne has demonstrated. The hyperesthetic area is identical in shape, situation and extent with the dermatomes defined by the isolation method, and the same large degree of overlap of adjacent dermatomes is apparent.

Our knowledge of the dermatomes in man is chiefly based upon the work of Sir Henry Head,