

REMARKS UPON SOME PHASES OF THE SPASTIC-PARETIC SYNDROME OF CEREBRAL DIPLEGIA

By Dr. L. Pierce Clark

The president-elect made this the subject of his opening address, especially that part of the subject concerned in the nature and development of the spastic-paretic syndrome. He advocated the abolition of the term Little's disease, and the substitution of Little's syndrome, as the disorder existed as a clinical entity only as yet. The relationship of injuries of the spinal cord and brain was analyzed, and the unicistic view was upheld in spite of Little's strong leaning to the spinal cord origin of the condition. Neither the nature of the lesion nor any one of the causes could explain the spasticity. The pyramidal tracts might be perfectly intact, despite the presence of spasticity. Many cases of such on record had been analyzed. It was not possible to indicate the clinical symptoms from the autopsy findings. The relationship of pseudo-tetany cases to the mild grades of the spastic-paretic syndrome was also discussed. The clinical and possible pathological identity of the two syndromes was emphasized, and the combination of flaccidity and spasticity even in the same case of this syndrome was dwelt upon at length. Autopsy in such had revealed frontal lesions instead of cerebellar lesions. The importance of thorough study of the atypical astatic-atonic types was duly urged. An analytical and critical review of the recent theories concerning tension and inhibitory function of the injured pyramidal tracts in diplegia was given, as well as the views concerning the preponderating role which the periphoro-spinal reflex exerted in inducing the spasticity. The effects of dorsal root section in the spastic cerebral diplegias had shown that attention must be paid to this part of the mechanism of the spastic state. The likelihood that the extra-pyramidal and homolateral pyramidal tracts played a role in the spasticities was also discussed. The speaker concluded with a plea for a clinical and experimental review of the whole subject of diplegia, to the end that a rational therapeutics for the prevention of spasticity in cerebral diplegias might obtain.

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THE CONDITION OF THE SPINAL VASOMOTOR PATHS
IN SPINAL SHOCK

By F. H. Pike

In the attempt to determine whether or not certain of the primitive reflex arcs of the spinal cord retain any part of their function in spinal shock,¹ Dr. Pike has attacked the problem from the side of the vasomotor paths and blood-pressure changes in the spinal animal. It is of importance

¹ Pike, American Journal of Physiology, 1909, XXIV, p. 148.

to determine (1) whether the blood-pressure maintained in an animal with the spinal cord intact, but with the brain and medulla oblongata completely paralyzed by shutting off the blood supply to the brain² is any greater than the blood-pressure which is maintained when the spinal cord is completely removed from the body about 33 mm. of mercury.³ If this residual pressure shall prove to be greater than the pressure maintained when the spinal cord is completely removed from the body we have to inquire whether (2) it is due to afferent impulses coming into the cord, i. e., a reflex phenomenon or (3) whether it is maintained by automatic mechanisms which react to changes or conditions within the spinal cord itself; also, whether these mechanisms involve (4) the skeletal muscle or (5) are concerned with true vasomotor mechanisms or other structures involving smooth muscles.

1. It may be shown that, in an animal (cat) in which the blood-pressure has become uniform following total failure of function of the medulla oblongata and higher centers, a significant fall of blood-pressure occurs when the spinal cord is exposed in its full length by clipping off the arches of the vertebræ, and completely removed from the spinal canal after division of all nerve roots, anterior as well as posterior. With care, the hemorrhage attending such a procedure may be kept from becoming excessive. It is best to eliminate the brain and medulla functionally, as the anesthetic which is otherwise necessary is a disturbing factor, and confusing changes of blood-pressure may occur even after complete transection of the spinal cord at the upper dorsal level. The blood-pressure maintained by the spinal cord after complete elimination of the brain and medulla oblongata is, therefore, greater than that maintained by the heart and blood vessels alone after complete removal of the spinal cord.

2. If, after exposing the spinal cord in its whole length, the posterior or afferent nerve roots are divided, leaving the anterior roots intact, a significant fall of blood-pressure occurs. This fall amounted to 12 mm. of Hg in one experiment. There is a certain reflex element involved in the maintenance of blood-pressure by the isolated spinal cord.

3. A further fall of blood pressure occurs when the anterior spinal roots are divided and the cord completely removed. This indicates that a certain automatic element is involved.

4. On injecting into such a spinal animal the minimum dose of curare that will paralyse the skeletal muscles, there is a prompt and permanent fall of blood-pressure, amounting to 19 mm. of Hg in one case. The pressure after the fall was 38 mm. of Hg, but slightly above that after removal of the cord. The chief agency in the maintenance of blood-pressure by the isolated spinal cord lies in the skeletal muscles.

5. Other lines of experiment show that certain mechanisms involving smooth muscles retain a part of their function after isolation of the spinal cord from the medulla oblongata. Dr. Pike, however, has been unable as yet to get an accurate quantitative estimate of the part they play in maintaining blood-pressure in the spinal animal. It is, at best, very small in the cat.

² Stewart, et al., *Journal of Experimental Medicine*, 1906, VIII, pp. 294-99.

³ Porter, *Harvey Lectures*, 1906-07; Philadelphia, 1908, p. 114.