THE SURGICAL RELIEF OF SPASTICITY IN PARAPLEGIC PATIENTS

II. PERIPHERAL NERVE SECTION, POSTERIOR RHIZOTOMY, AND OTHER PROCEDURES*

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In order for the paraplegic patient to insure health and an extended life span, ambulation with orthopedic aids must be pursued. Ambulation is necessary from several standpoints, one of the most important of which is the excretion of calcium. In the recumbent position calcium is mobilized from the bones of the limbs and is excreted in great quantities in the urine. This leads to the formation of urinary calculi which recur with great frequency unless the primary cause—recumbency—is removed. Only when the limbs are forced to bear weight is the process stopped. Of lesser importance, but still significant, are other improvements that are noted when ambulation is pursued, such as better vasomotor tone and superior bladder and bowel reflexes. In many patients, persistence and perfection of ambulation techniques are rewarded by a useful mode of locomotion. Furthermore, although a limited amount of aided walking is possible in patients with high cord lesions, it is often too difficult to prove of real value as a useful means of travel. It is useless to advocate ambulation as a means of locomotion for all patients, for some patients do not have enough persistence to reach that goal. On the other hand, one should never be satisfied with a wheel chair existence for these patients. To do so demonstrates a failure to recognize the underlying metabolic disorders associated with spinal cord injuries.

In attempting to launch patients into a schedule of training for ambulation, one of the difficulties frequently encountered is uncontrolled reflex spasms of various muscle groups in the limbs and abdomen. Thus, the feet may bounce out of the shoes, the legs may suddenly fly forward, or the legs may draw sharply against each other. Any one of these unpredictable reflex actions serves to throw the patient off balance, creating a fear in the mind of the patient and acting as a damper to his further efforts.

In a previous publication it was pointed out that the procedure of choice for the relief of severe flexor spasms in patients with complete traumatic

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transverse lesions of the spinal cord was section of appropriate anterior spinal nerve roots. Patients so treated show remarkable improvement, particularly after ambulation is undertaken. However, a somewhat larger group of patients presents problems of spasticity in which irrevocable procedures do not seem necessary or justified. This group is comprised of those patients whose spinal cord injuries are clinically incomplete or have been proven to be anatomically incomplete by operation. Included in this category are those whose injuries are of less than one year's duration and have not been demonstrated to be complete, and those who have exhibited considerable return of function but are disabled by severe spasms of the legs. The procedures which will be described have been undertaken after a trial of vigorous physical therapy and other medical measures; regardless of the therapy instituted, physical therapy was continued. The disappointing results obtained from curare in water, curare in oil, prostigmine, and other such agents forced the use of surgical measures in most cases. Watchful, expectant waiting for spasticity to "burn out" rarely was profitable, for spasticity that interferes with ambulation usually demands immediate correction. Too frequently, physiotherapeutic measures merely serve to augment the spasticity. It is the aim of the authors to list those procedures utilized in an effort to control spasticity and to evaluate the benefits derived from each.

PERIPHERAL NERVE SECTION

1. Obturator Nerve. Bilateral section of the obturator nerves at their entrance into the obturator canals will relieve the severe adductor spasm seen in almost all patients with spastic paraplegia. This approach is far preferable to the regular orthopedic approach and can be performed entirely extraperitoneally. In 12 patients, there were no failures to relieve the adductor spasm by this procedure, whereas 5 of 8 patients observed who had been done by the lower approach had inadequate relief, probably because of failure to sever sufficient branches. The identification of all of the branches of the obturator nerve in the thigh wherein muscles must be transected and extensively dissected is an exceedingly difficult task, even for the highly skilled orthopedic operator. In all of the patients with complete obturator nerve section ambulation could be conducted without a hampering bar on long leg braces, previously necessary because of severe scissoring action of the legs. All but one of these operations were carried out on patients with clinically incomplete lesions. Strangely enough, each of these patients had a marked reduction in general spasticity and much unsuspected voluntary motor function was uncovered by the procedure. In 3 patients, markedly spastic bladders with capacities of less than 2 ounces gained in capacity to as much as 15 ounces with fair automatic control. In the others, definite improvement in bladder capacity and control was noted. This procedure should probably be used in many permanent quadriplegic patients with adductor spasms. A lipless glass urinal would then stay between the legs, allowing removal of the catheter.