



Short Communication

The frequency and efficacy of differential sacral roots innervation to bladder detrusor in Asian people

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The parasympathetic autonomic efferents from sacral spinal cord to bladder detrusor are generally considered lying in S2–4 ventral roots. In surgery, it is important to determine the innervative frequency and efficacy of every individual nerve root when operation is performed on the sacral roots, for example, implanting Brindley's sacral anterior root stimulator (SARS) for controlled micturition,¹ or establishing artificial 'somato-CNS-bladder' reflex arc for triggered micturition.²

From September 1998, we performed those operations in ten cases of Chinese with complete supraconal spinal cord injuries. There were seven men and three women, with an average age of 32 years. Intraoperative electrical stimulation was carried out extradurally in one patient with SARS implantation, and intradurally in nine patients with 'somato-CNS-bladder' reflex arc establishment by S1 to S3 anterior root anastomosis. The stimulation parameters applied in this group were as in Brindley's recommendation: 20 V, 30 Hz. Bladder pressure response was monitored by an indwelling balloon catheter connected by a three-way tap to a reservoir of saline and to a water manometer. Every root of each side was stimulated separately and the highest water column it reached was recorded.

Our results show that pressure contributions are provided by S3 roots in all ten patients, bilaterally; and by S4 roots on the right side of ten patients and left side of eight patients. However, only three have minimal pressure uprising by S2 stimulation, one on the right side and two on both sides. The mean innervative efficacy by differential sacral roots to bladder detrusor is shown in Figure 1. S3 root is the most frequent and the most efficacious contributor, S4 is the second frequent and a lesser but still significant

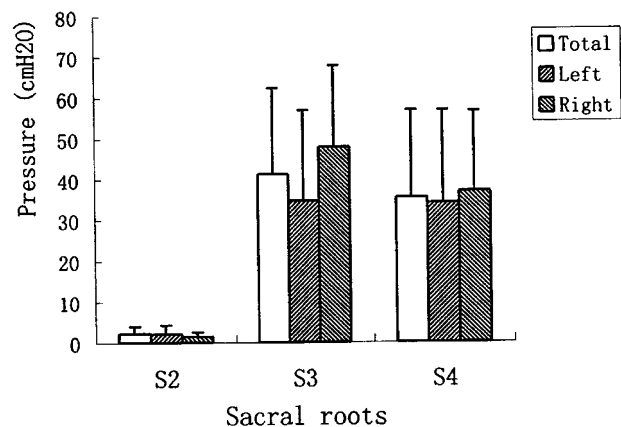


Figure 1 Differential sacral roots innervation to bladder detrusor in Asian People

efficacious one, and S2 is the last frequent and the minimal contributor. The right roots seem to be stronger than the left ones. The efficacy distribution of sacral root innervation to bladder detrusor obtained by us is similar to that by Brindley, but the innervative frequency is different. Rising in bladder pressure is obtainable always by stimulating S3, usually by S4, and often by S2 in Europeans;¹ however, it is always by S3, usually by S4, and seldom by S2 in Asians.

References

- 1 Brindley GS. The Finetech-Brindley bladder controller: notes for surgeons and physicians. Welwyn Garden City, Herts, 1994.
- 2 Xiao CG *et al.* 'skin-CNS-bladder' reflex pathway for micturition after spinal cord injury and its underlying mechanisms. *J Urol* 1999; **162**: 936–942.

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