

## Spinal control of anorectal function

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Controlling of defaecation and preservation of continence is mainly achieved by the physiological function of rectum and anus. The seemingly two to tally opposite functions is coordinated by a spinal centre in the lumbosacral region of the spine which is under conscious control of the cortex.

Defaecation is a stereotyped sequence of actions, usually initiated by a conscious mechanism and involves a number of pelvic reflexes that are controlled and coordinated by a centre in the brain stem. The basic control mechanism is present in the newborn and the higher cortical activity develops through "training".

Under resting conditions and during gradual (approximately 10 mL/min) distension of the rectum, continence to rectal mucus and faeces is largely maintained by the tonic contraction of the internal anal sphincter (IAS), which some assistance from the tonic activity of the external anal sphincter (EAS)<sup>[1,2]</sup>. The tonic contraction of the sphincter is unable to maintain continence when this is threatened by rectal contraction, rapid rectal distension and increases in intra-abdominal pressure. This is because rapid rectal distension and contraction cause a reflex relaxation of the IAS, mediated by intrinsic nerves, while rises in intra-abdominal pressure are usually

of sufficient magnitude to overwhelm the resting sphincter pressure and may also induce sphincter relaxation<sup>[3]</sup>. Continence can only be maintained under these conditions by a compensatory contraction of the EAS. Although the EAS responses are present in paraplegic patients and are therefore spinal reflexes, the response to rectal distension is heavily modulated by conscious mechanisms and is very closely linked with rectal sensation. The activity of the EAS is almost completely absent when the subject is asleep and does not show any increase in response to rectal distension<sup>[4]</sup>.

Despite these evidences, the mechanisms are still poorly understood. The main reason is that there is no good physiological model for studying in human being. We have studied a group of patients who had complete spinal lesions before and after rhizotomy<sup>[5-7]</sup>. Results derived from those studies were also compared with normal subjects and patients with faecal incontinence or constipation. From those data, we may draw a conclusion that spinal centre plays a coordinative role in controlling anorectal function in man.

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