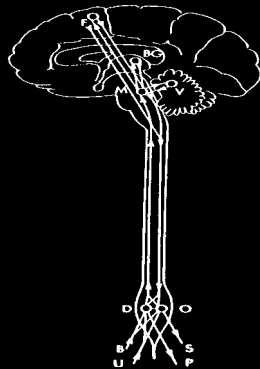


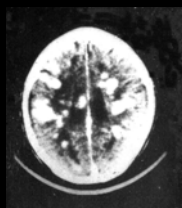
**F:** frontal lobe  
**BG:** basal ganglia  
**M:** micturition center  
**V:** Vermis  
**D:** detrusor nuclei  
**O:** Onuf's nuclei  
**U,B:** afferent fibers  
**P,S:** efferent fibers



Pathways	origin/destination	function
Cerebral loop	frontal lobe basal ganglia brainstem	initiates and inhibits switches between filling and voiding states
Cord loop	brainstem conus medullaris	coordinates both rectal and bladder voiding
Segmental loop	puddendal/pelvic nerve sacral motoneurons	activates voiding reflex and sphincter relaxation
Corticospinal pathway	motor cortex puddendal motoneurons	voluntary control of sphincters and pelvic floor

Group cause	underlying cause
Cerebral	bilateral medial frontal lesion hydrocephalus parasagittal meningioma parenchymal degenerations (Parkinson's and Alzheimer's disease, etc.)
Spinal cord	spinal cord injury or compression multiple sclerosis cord tumors and angliomas cervical spondylosis transverse myelitis
Cauda equina	lumbar disc prolapse trauma spina bifida
Peripheral nerve	idiopathic and acquired neuropathies (diabetes, autonomic, amyloid, vasculitis etc.)

meningioma



encefalopatia multifartuale

Fig. 10. (a)  $\alpha = 0$ , (b)  $\alpha = 10^\circ$ , (c)  $\alpha = 20^\circ$ , (d)  $\alpha = 30^\circ$ . The subject was instructed to move his right leg forward and back, and to move his right arm forward and back, in order to move his center of mass forward and back, and to move his center of mass up and down.

## EXTRAPYRAMIDAL INHIBITION OF THE URINARY BLADDER

RICHARD J. LEWIN, GEORGE V. DILLARD and ROBERT W. PORTER

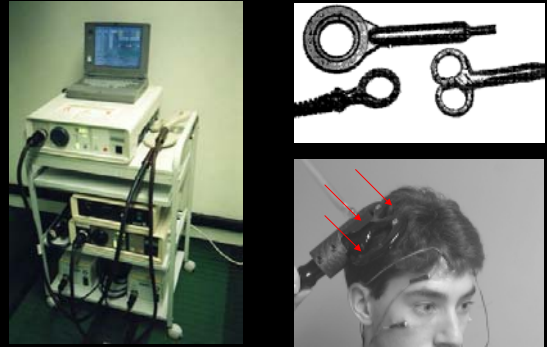
RICHARD J. LEWIN, GEORGE V. DILLARD and ROBERT W. PORTER

*Veterans Administration Hospital, Long Beach, and Departments of Anatomy and Surgery, and Brain Research Institute, U.C.L.A. School of Medicine, Los Angeles, Calif. (U.S.A.)*

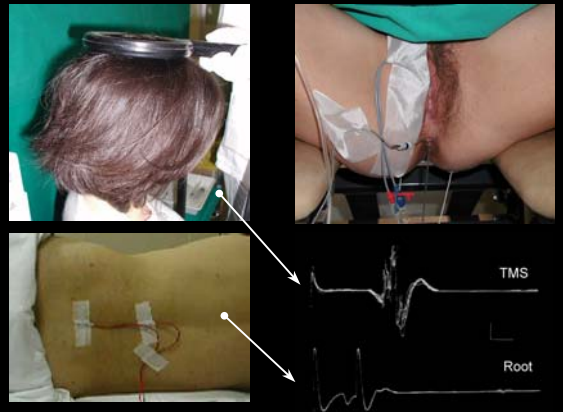
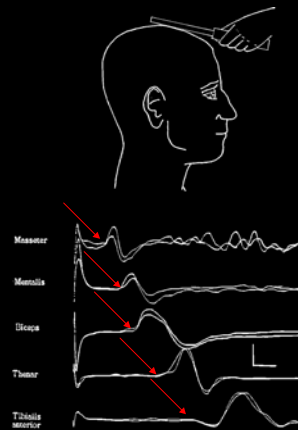
### Lesioni midollari



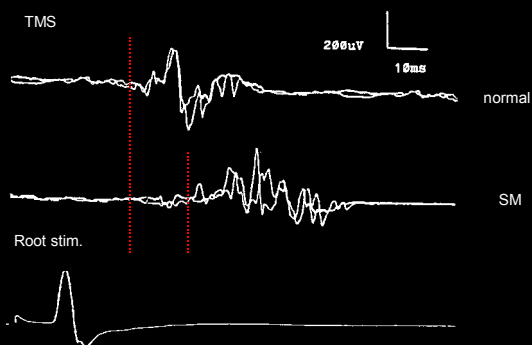
### Transcranial magnetic stimulation of the motor areas (TMS)



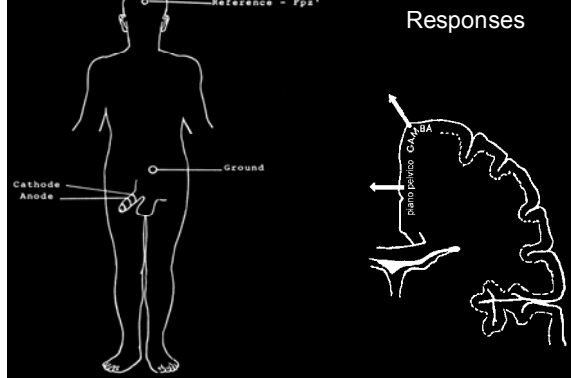
### Transcranial magnetic stimulation of the motor areas

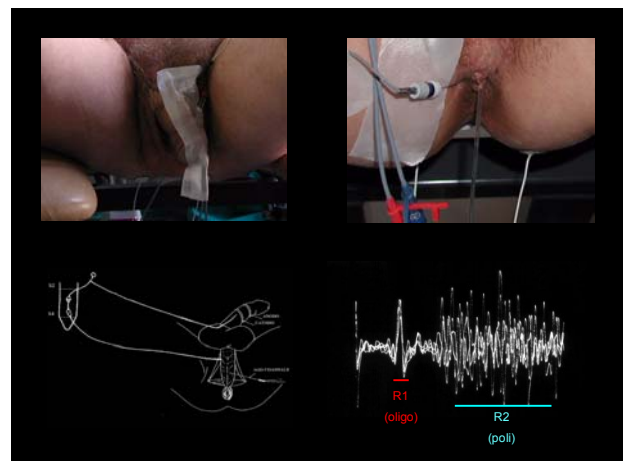
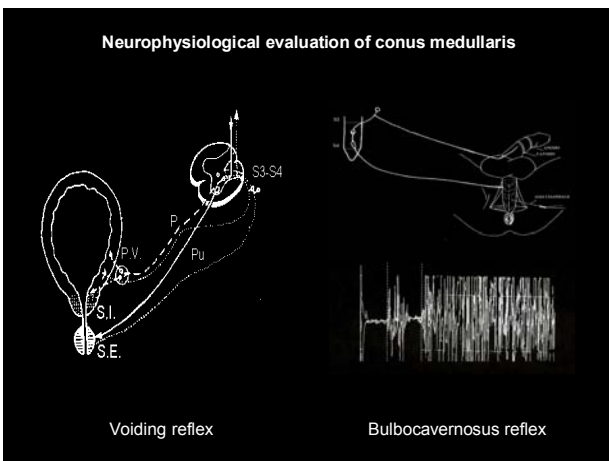
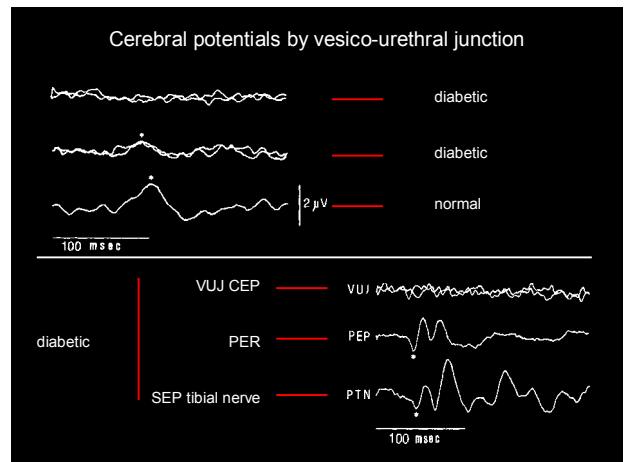
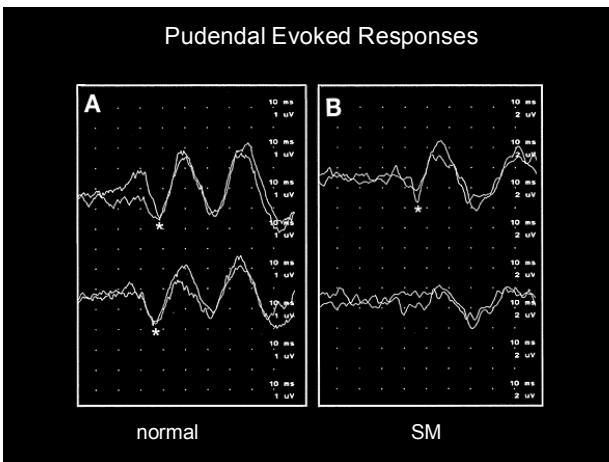
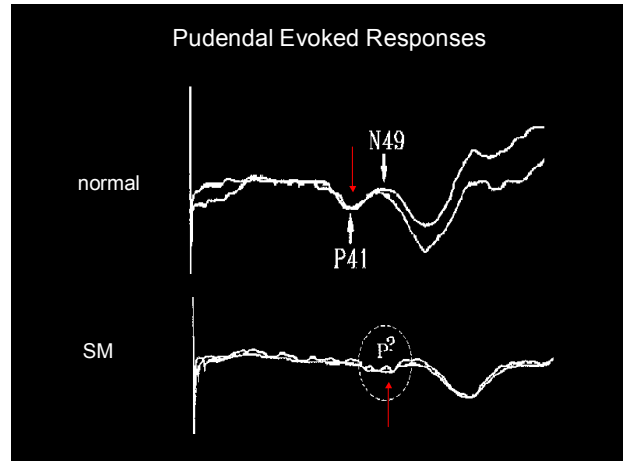
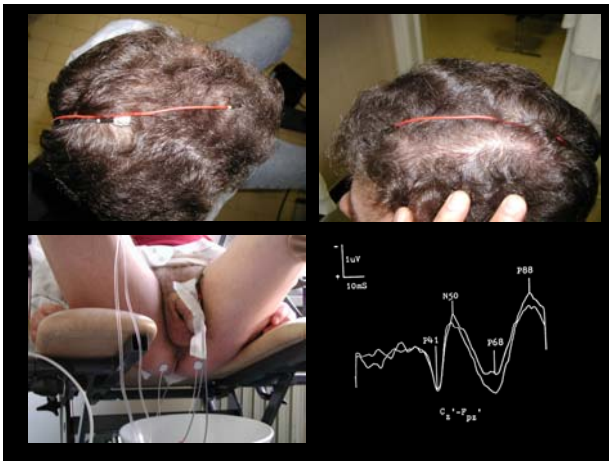


### MEPs from pelvic floor muscles

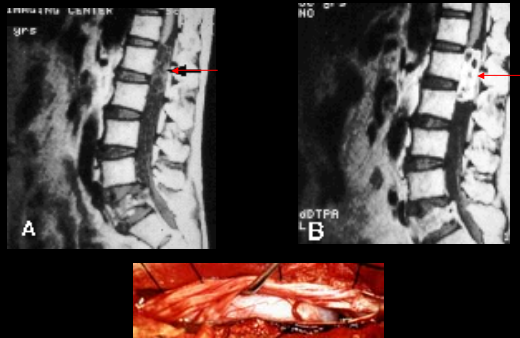


### Pudendal Evoked Responses

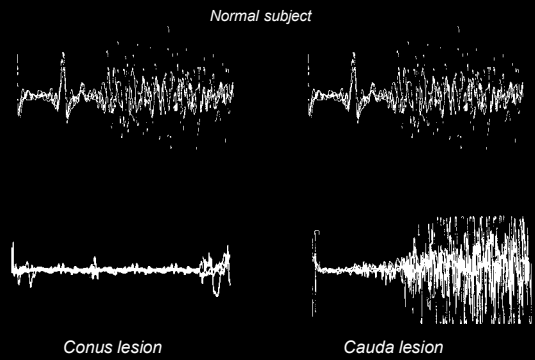




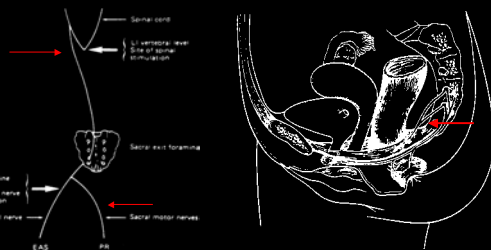
### Conus lesions



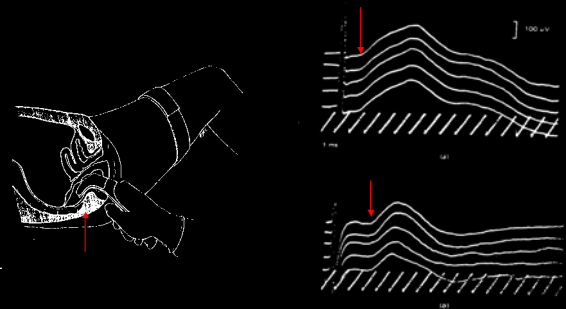
### Conus and cauda lesions



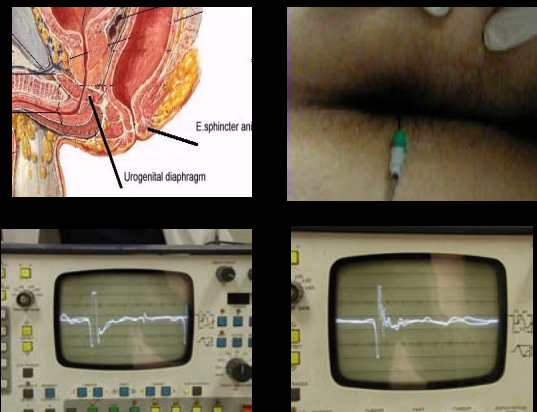
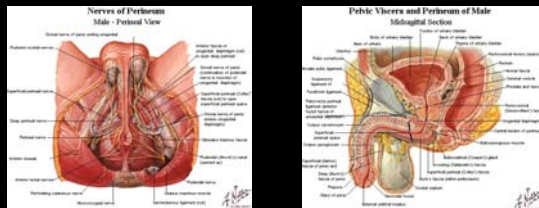
### Pudendal nerve stimulation

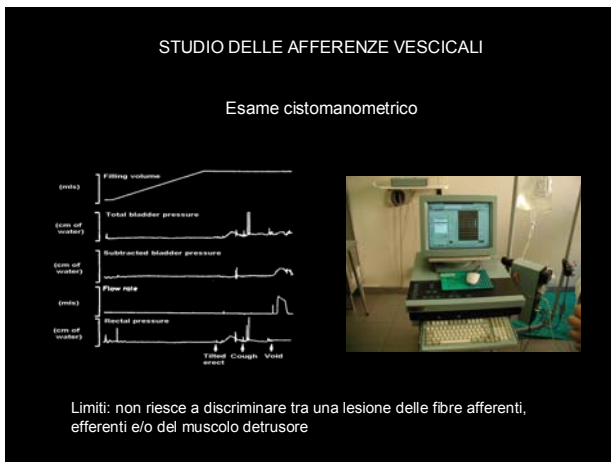


### Pudendal nerve stimulation



### Electromyographic examination of the pelvic floor muscles





Clinicamente e' facile notare come in pazienti con lesione midollare stabilizzata la distensione vescicale possa produrre un aumento della spasticita'.

**Alterations in the H-reflex in the paraplegic induced by bladder distention**

**Porter RW, Krell M.**

Paraplegia 1976 Aug;14(2):105-14

