

## REINNERVATION OF THE URETHRAL AND ANAL SPHINCTERS WITH ANTERIOR FEMORAL TO PUDENDAL NERVE TRANSFER

### Hypothesis / aims of study

Regaining bladder and bowel function is of great importance to both paraplegics and quadriplegics. A significant percentage of patients with spinal cord injury have a flaccid urinary bladder paralysis resulting from a lower motor neuron lesion. These patients cannot use functional electrical stimulation (FES) to induce bladder emptying because the neural connection between the spinal cord and the bladder is disrupted. If both the detrusor as well as the urethral sphincter become reinnervated, then both bladder emptying and urinary continence may be achieved. We have had considerable success in bladder reinnervation in canines. The goal of the present study was to determine if the urethral and anal sphincters can be reinnervated with an anterior femoral nerve transfer.

### Study design, materials and methods

Following catheterization of the bladder, rectum, urethral and anal sphincters for pressure monitoring, the pudental nerves were identified via intraoperative electrical stimulation and transected. The anterior femoral nerve (AF) was connected to the pudental nerves bilaterally and enclosed in a unipolar nerve cuff electrode with leads to a Bion RF micro-stimulator. Postoperatively, the nerves were stimulated to determine whether the urethral or anal sphincters contracted.

### Results

As can be seen in figure 1, activation of the Bion microstimulator with the external coil in this animal 208 days post operatively resulted in increased anal and urethral sphincter pressure. Of the 3 animals that underwent the AF to pudental nerve transfer (6 transferred nerves total), increased urethral and anal sphincter pressure during bion activation was obtained in 5 of the 6 transferred nerves.

### Interpretation of results and Concluding message

AF to pudental nerve transfer results in reinnervation of the urethral and anal sphincters as determined by increased pressure during stimulation of implanted electrodes. The results of this study, in combination with our previous studies on bladder reinnervation provide direct evidence that both the bladder and urethral sphincter can be reinnervated following a lower motor neuron lesion. Thus these surgical procedures may allow patients to regain bladder function.

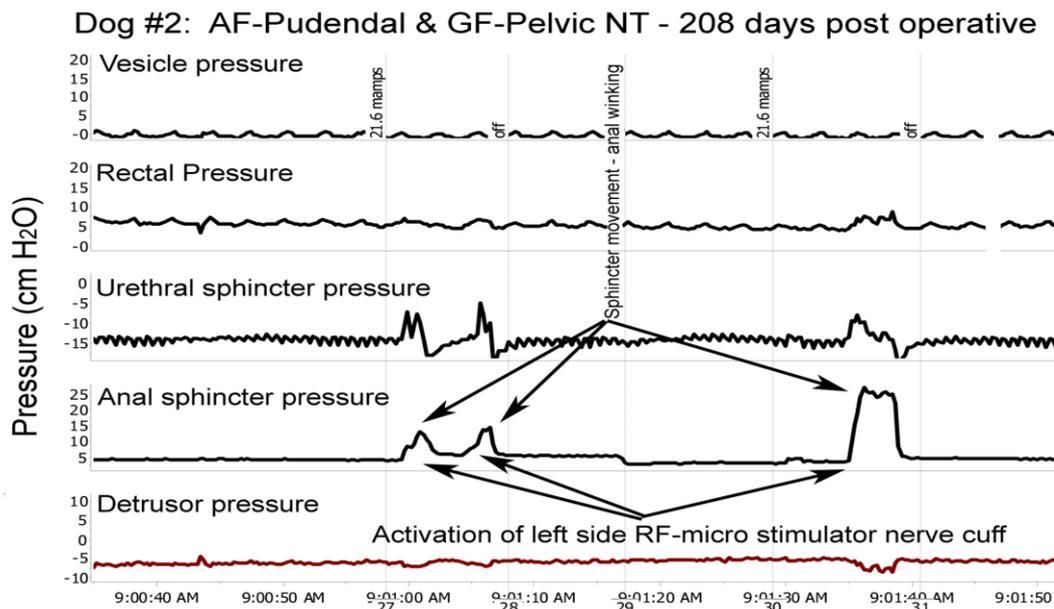


Figure 1

Specify source of funding or grant

Is this a clinical trial?

What were the subjects in the study?

Shriners Hospitals

No

ANIMAL

---

*Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?* Yes

---

*Name of ethics committee*

Temple University Institutional Animal Care and Use Committee

---