



مستشفى الملك فهد التخصصي بالدمام
King Fahad Specialist Hospital Dammam

SNM could offer hope for chronic spinal cord injury patients: A first-reported case

Alhassan Alasiri, Nader Aldossary

King Khalid University Medical City, Abha, Aseer, Saudi Arabia
King Fahad Specialist Hospital - Dammam, Eastern Health Cluster,
Dammam, Saudi Arabia

<https://www.ics.org/2025/abstract/821>

Hypothesis / aims of study

After the introduction of MRI-compatible leads for sacral neuromodulation (SNM), the use of SNM for neurogenic bladder management has increased, despite its off-label status. Some reports indicate successful SNM trials in patients with incomplete & early complete spinal cord injury (SCI), but no documented cases exist for chronic complete SCI. Here, we present the first successful SNM implantation in a patient with chronic (>3 years post-injury) complete SCI.

Study design, materials, and methods:

The patient was a 31-year-old male who sustained a complete SCI at T2-3 (ASIA-A) due to a motor vehicle accident in May 2022, resulting in complete loss of sensation below the nipple level, spastic paraplegia, double incontinence, and erectile/ejaculatory dysfunction. He had a baclofen pump implanted for lower limb spasticity. Renal function tests and upper urinary tract imaging were normal. Video urodynamics revealed a small bladder (180 mL), neurogenic detrusor overactivity, and impaired compliance but no urodynamic stress incontinence or vesicoureteral reflux. He was initially managed with self-catheterization and anticholinergics, followed by 300 IU of botulinum toxin A injections, which provided a good response at the time. The patient was still bothered by his incontinence.

Given the limited treatment options, shared decision-making led to an SNM trial despite the low expected success rate. The stage I procedure was uneventful, and the baclofen dose was reduced from 450 mcg to 200 mcg.

A 6-week trial period was initiated, with daily bladder and bowel diaries.

Post-Stage I Initial Programming:

Settings: Program +3, -1, 0
Amplitude: 0.7v (fine tingling sensation in scrotum and penis)
Pulse Width (PW): 210 µsec
Pulse Rate (PR): 14 Hz

Outcome after 9 days: No improvement in incontinence episodes, drained urine volume, or stool consistency.

Day 10, the program was modified as follows:

Settings: Program +0, -2, 3 (very fine sensation in the scrotum)
Amplitude: 0.6v (Asked the patient to increase by 0.1v every other day)
PW: 300 µsec
PR: 21 Hz

Results:

On Day 20: the patient had 50% reduction in urinary incontinence (UI) episodes; drained urine volume increased to 300 mL.

On Day 30: Softer stools and improved erectile function.

Week 5 (Amplitude was 1.6v, PR: 21 Hz & PW of 300 µsec):

Bladder capacity: increased to 350-450 mL

UI improved by 60%.

Fecal incontinence improved by 40–50%, less use of laxatives

Erection improvement by 30%

No change in ejaculatory function

The neuromodulator was implanted at week 6

Post-Stage II programming

Program: +0, -2, 3 @ 1.8v, PR 21 Hz & PW 300 µsec
Cycling: ON (20 sec ON/ 10 sec OFF)

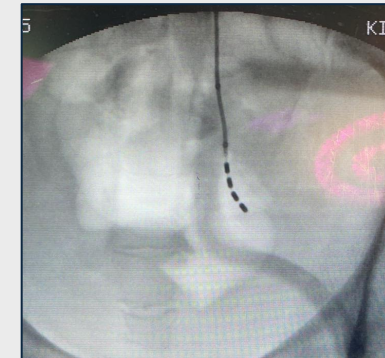
One week post-stage II: The patient's lower limbs were completely flaccid. The baclofen dose was reduced by the neurosurgeon from 200 to 90 mcg gradually.

6 weeks & 3 months post-implantation:

- **UII:** 2-3x/ day - 60% improvement
- **Bladder capacity:** 300 - 350 - 60-70% improvement
- **FI** (improved by 30-40%): Still incontinence but the stool is ranging between type 4 and type 3 on Bristol Stool Chart.
 - Bowel habit: every 1.5 - 2 days
 - Laxatives: every other day, slightly less frequent.
- **Erectile Dysfunction:** Improved by 50% , quick erection initiation, maintaining erection longer, with improved rigidity
- **Lower limbs:** 80% reduction in spasticity at the same Baclofen dose.
- **Total subjective improvement is 60%**
- **QoL:** overall 40-50% improvement

7 months post-implantation:

Maintained the same response with a slight increase in laxatives use.



Interpretation of results:

Sacral neuromodulation (SNM) shows promising outcomes in some incomplete spinal cord injury (SCI) patients, with studies reporting improved bladder/bowel function in 45-75%, especially in patients with ASIA-C & ASIA-D, but no reported success in complete spinal cord injury (ASIA-A), especially those with chronic injury. This case gives hope that sacral neuromodulation may give good results in carefully selected patients with complete SCI in terms of bladder/bowel dysfunction and lower limb spasticity.

Conclusion:

Although chronic, complete SCI patients lose neuroplasticity, the mechanism of SNM efficacy in this patient remains unclear, but this case suggests potential benefits. Adjusting programming parameters (e.g., pulse rate and gradual voltage increments and electrode selection) may help elicit neuronal responses, improve bladder/ bowel dysfunction, & lower limb spasticity. Further studies are needed to explore SNM's role in complete SCI patients.