

Dr Ashish Gulve¹, V Goodridge², S. Copley³

1. Consultant in Pain Medicine, 2. Specialist Nurse, 3. Research Assistant,
The James Cook University Hospital, Middlesbrough, UK

Introduction

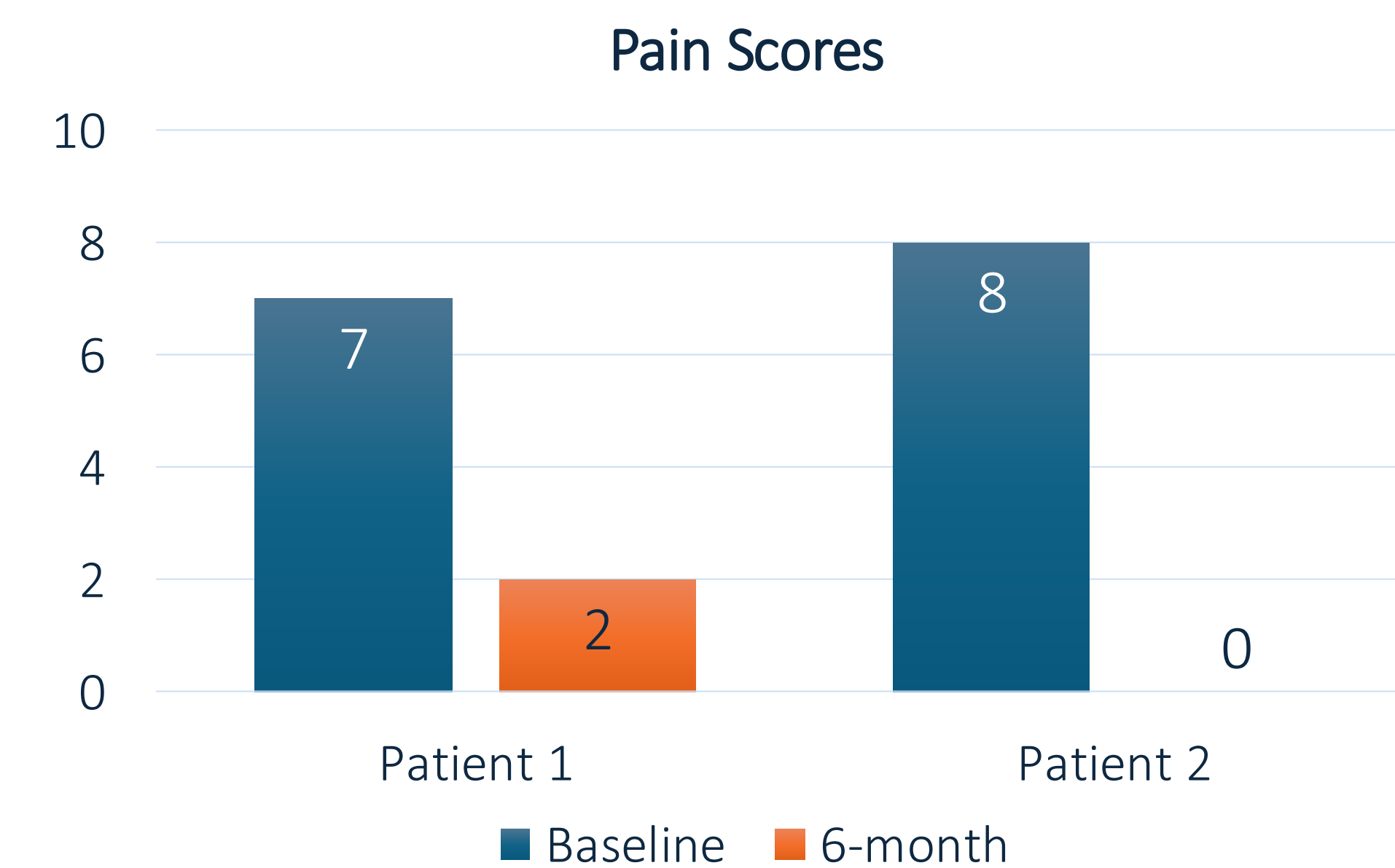
- Spinal cord stimulation (SCS) is a well-established, efficacious therapy for chronic, neuropathic pain¹⁻⁸.
- However, evidence supporting the use of traditional SCS for upper extremity pain is limited⁹⁻¹¹.

Traditional cervical spinal cord stimulation is fraught with inconsistent stimulation and painful paraesthesia with ADLs, irrespective of high-rate or low-rate programs.

- Patients must make manual adjustments to therapy settings to avoid these transient events. This can result in under stimulation leading to suboptimal pain relief, over-stimulation, or patients avoiding certain activities.
- We present 2 cases of patients with a InceptivTM ECAP sensing spinal cord stimulator system capable of multiple waveforms.
- Both patients were implanted with at least one Medtronic VectrisTM Surescan Compact lead, each connected to a Medtronic InceptivTM IPG with closed-loop technology.
- Both patients had a direct to implant procedure with on-table paraesthesia mapping.
- We assessed patient reported outcome measures at 6 months in terms of pain relief, analgesic use, and comfort during activities of daily living.

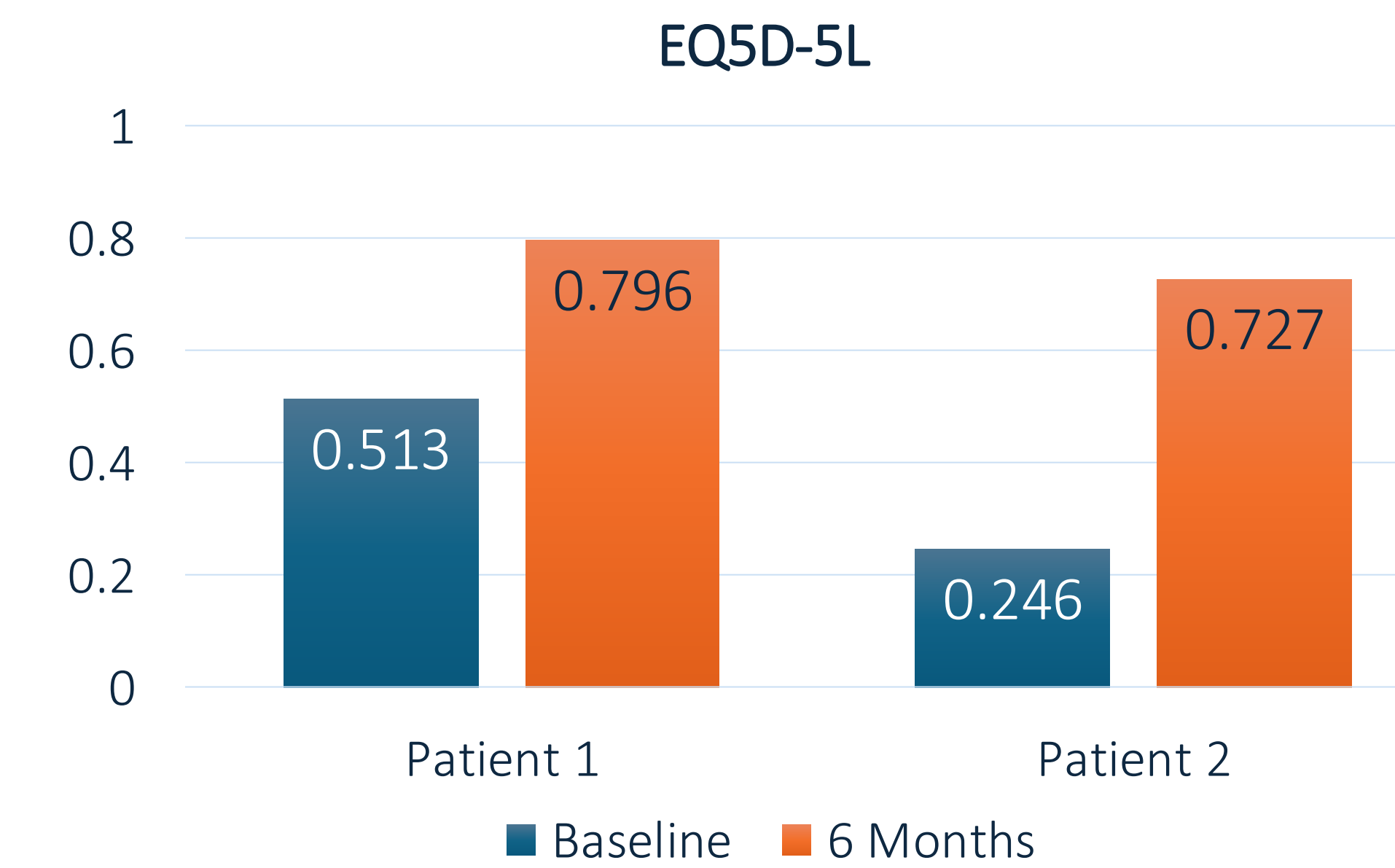
Case 1

- A 47-year-old male.
- Severe neuropathic pain in both forearms
- 7/10 on a numerical rating scale.
- Right Ulnar and radial nerve release in the past.
- On Pregabalin 450 mg/ day, Celecoxib 200 mg b.d., Escitalopram 5 mg/day & Paracetamol 1 gm p.r.n.
- No abnormality on MRI & EMG.
- Lead tip at C4.



Case 2

- A 50-year-old female.
- Severe neuropathic pain in the right upper & both lower extremities
- 8/10 for arm and 9/10 for legs.
- On Duloxetine 120mg per day, Gabapentin 2400 mg per day, Lidocaine 5% plasters, Morphine 40mg per day and Siponimod.
- Lead tip at C4 and a second lead tip at T10.



Additional Results:

- Both patients reported improvements across all the Promis-29 domains.
- Both the patients reduced medications significantly.
- Patients did not report feeling of shocks or jolts and do not avoid coughing, laughing, walking, standing up, exercising, self-care, playing with children or any other activities.

Conclusions

- The InceptivTM ECAP-controlled CL-SCS system has provided profound pain relief for these patients with cervical lead placements.**
- No variation in the paraesthesia intensity or any painful stimulation.**
- Additionally, patient reports not needing to use their therapy controller to adjust therapy settings.**

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Example Closed-loop System Adjustments

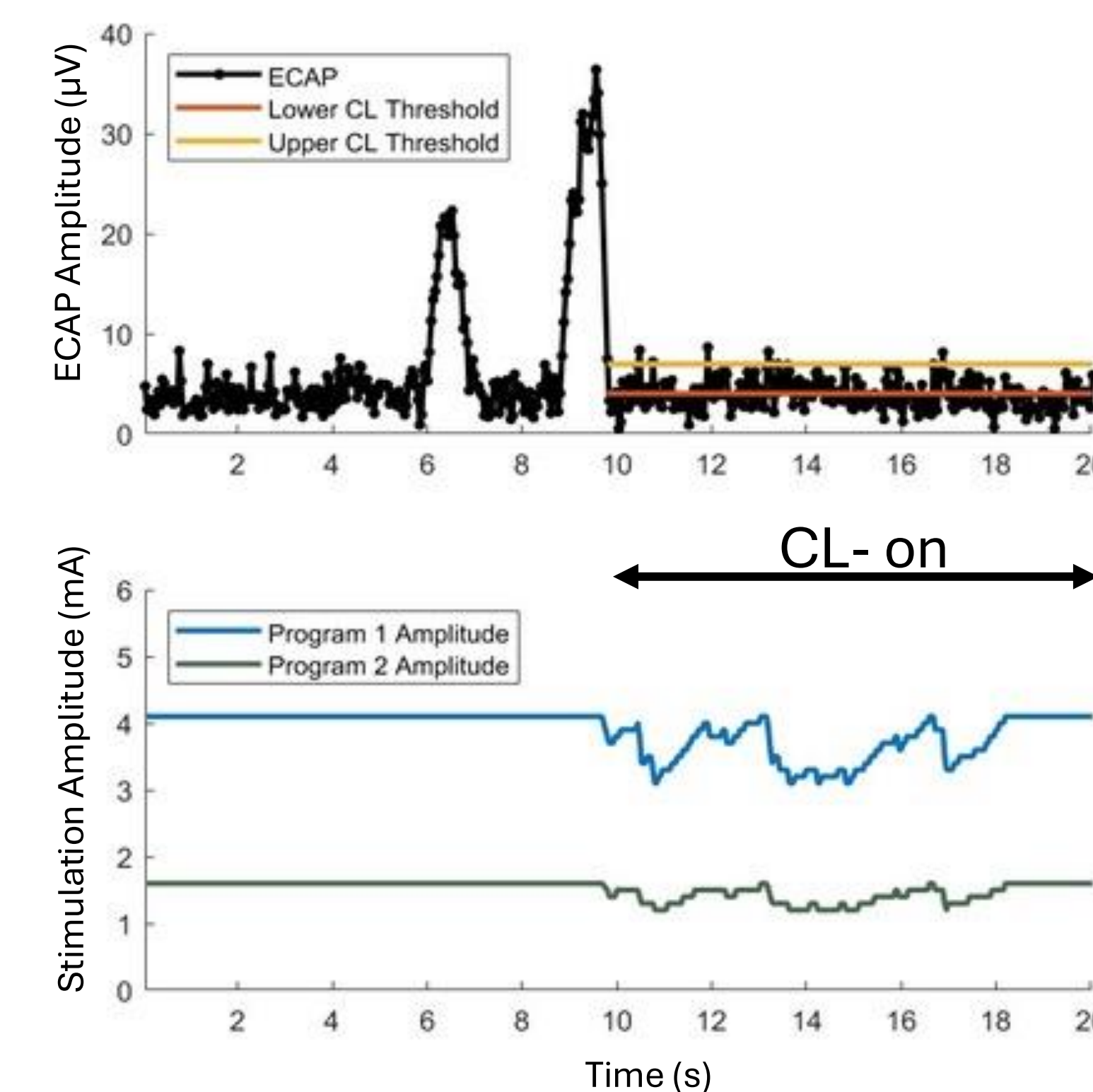


Fig.2 ECAP variation during movements with open loop (0-10s) and with closed loop (10-20s) in the clinic.

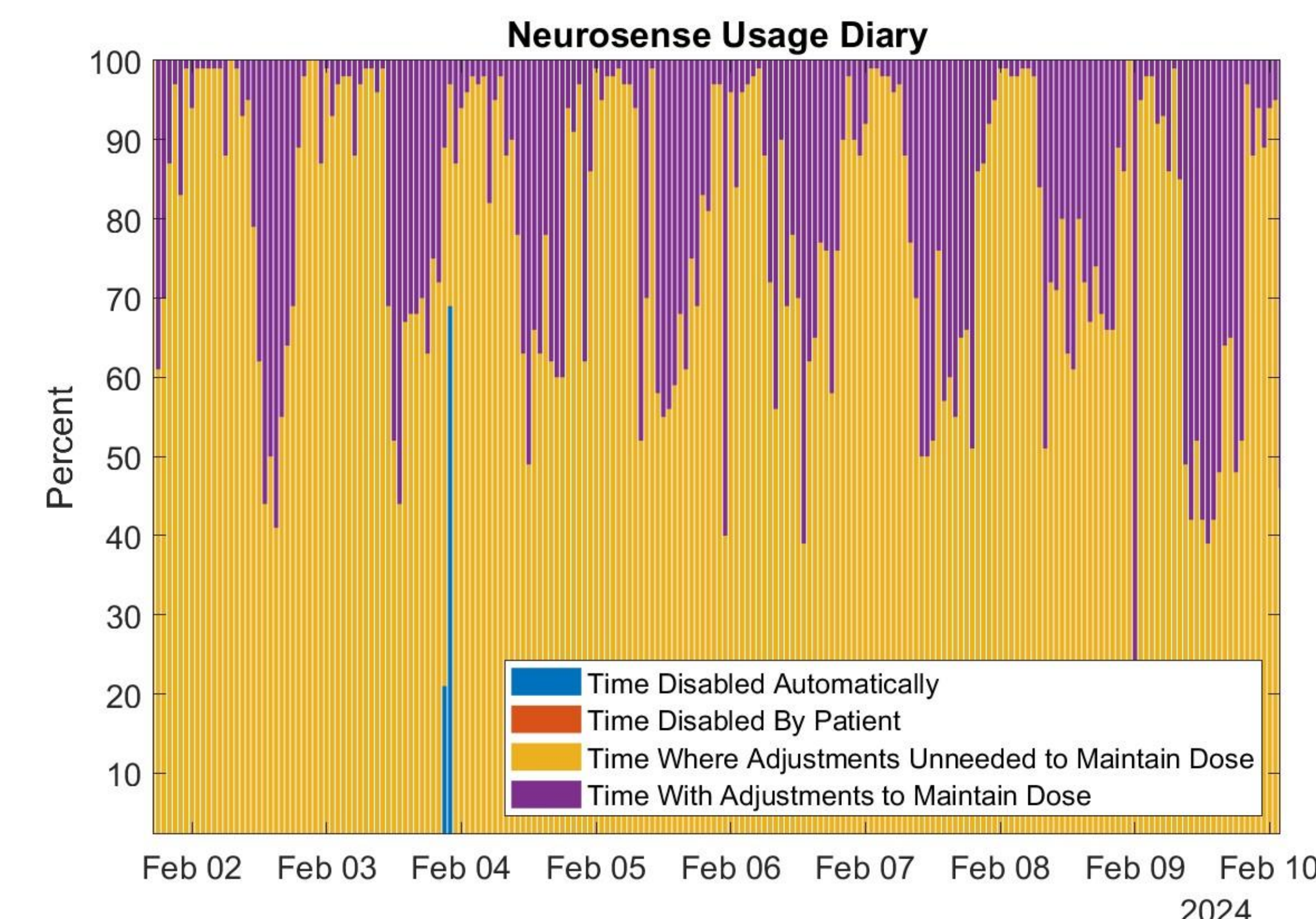


Fig.3. hourly histogram of the engagement of the closed-loop algorithm over the week

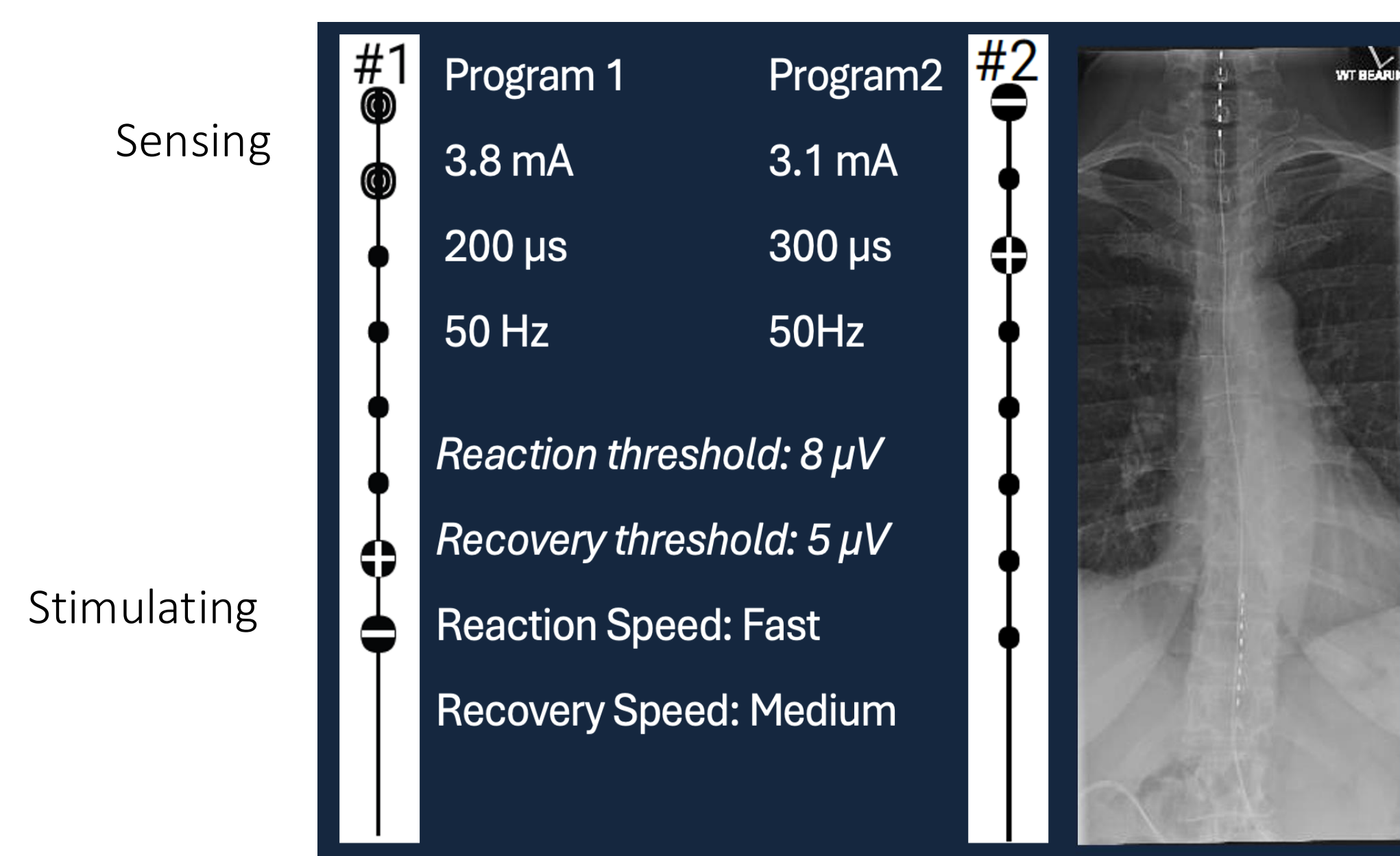


Fig.1. An example programmed closed-loop group (left) and x-ray of lead placement (right)