

# Clinical Case Study: Clinic-Based TSS with ExaStim<sup>®</sup> Improves Performance, Satisfaction, and Functional Capacity in a C4 AIS D SCI Patient

## 1. CASE TITLE

Improved Performance, Satisfaction, and Upper-Extremity Function Following Use of ExaStim in a 36-Year-Old Woman with C4 AIS D Spinal Cord Injury.

## 2. PATIENT BACKGROUND

- Patient: Female, 36 years old
- Injury History: Motor vehicle accident in 2010
- Diagnosis: C4 AIS D spinal cord injury (sensory-motor incomplete)
- Baseline Function: Required assistance with selected activities of daily living (ADLs)/instrumental activities of daily living (IADLs); impaired fine motor control and upper-extremity strength, limiting independence in self-care and household tasks
- Previous Treatments: Intermittent outpatient therapy and home-based programs with fluctuating progress; no prior use of ExaStim

## 3. CLINICAL CHALLENGE

More than a decade post-injury, the patient continued to experience difficulty with upper-extremity strength, coordination, and functional task performance. Despite ongoing home- and clinic-based exercises, she remained limited in ADLs and IADLs such as grooming, child-rearing, and household management. Additionally, she lived with chronic pain and chronic fatigue. An adjunct intervention was sought to enhance motor recruitment, increase training intensity, and promote measurable improvements in daily function.

## 4. TREATMENT APPROACH

### Rationale

The patient presented with residual voluntary activation but insufficient strength and endurance for higher-level grasp, reach, and manipulation tasks. ExaStim was incorporated to augment neuromodulation during high-intensity, activity-based therapy.

### Intervention Details

- Duration: 8-week intervention period
- Frequency: 3 sessions per week
- Total Sessions: 24 sessions
- Session Length: 60 minutes each
- Parameters: Pulse width 0.5–0.8 ms; frequency 20–40 Hz; amplitude adjusted to submotor threshold

### Concurrent Tasks:

- High-intensity interval training
- High-repetition reach, grasp, and functional manipulation
- Grooming and cooking simulations
- ADL/IADL-based tasks (pouring, writing, object transfers)
- Upper-extremity strengthening and endurance drills

Assessment Timepoints: Baseline, Week 4, Week 8 (end of treatment), Week 12 (4-week follow-up)

## 5. OUTCOMES

### Canadian Occupational Performance Measure (COPM) Performance (0-10 scale)

Baseline	Week 4	Week 8	Week 12	Change from Baseline
4.25	6.0	7.0	9.75	+5.5

### UEMS (Upper Extremity Motor Score)

Baseline	Week 4	Week 8	Week 12	Change from Baseline
40/50	41	47	47	+7

### CUE-T (Capabilities of Upper Extremity Test)

Baseline	Week 4	Week 8	Week 12	Change from Baseline
100	104	107	112	+12

### Health Survey (Short Form-36 Questionnaire)

Pain Subtask	Baseline	Week 8	Week 12	Change from Baseline
	32.50	80.0	80.0	+47.5 (indicating reduction in pain)

Energy/Fatigue Subtask	Baseline	Week 8	Week 12	Change from Baseline
	60	75	75	+15 (indicating reduction in fatigue)

FIGURE 1:

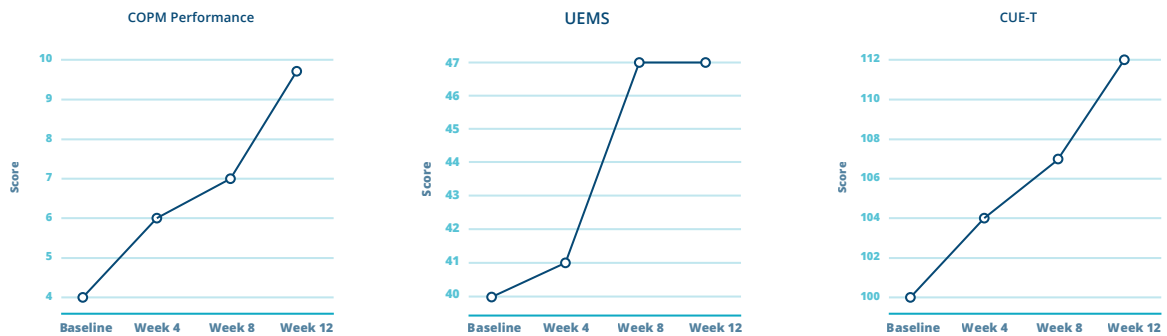


Figure 1: COPM, UEMS, and CUE-T performance change across baseline, 4, 8, and 12 weeks.

FIGURE 2:

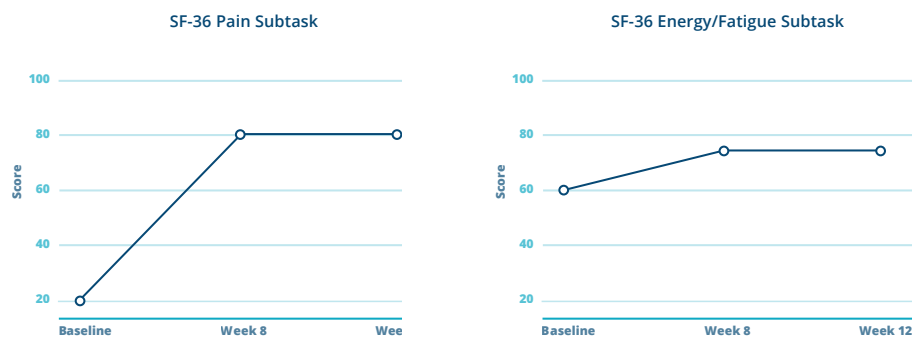


Figure 2: SF-36 Subtasks of Pain and Energy/Fatigue symptoms change across baseline, 8, and 12 weeks

## 6. SAFETY & TOLERABILITY

The patient completed all 24 sessions without device-related adverse events. No skin irritation, discomfort, or unexpected responses were observed.

## 7. DISCUSSION

Over the 8-week intervention period, the patient demonstrated continuous gains in performance-based motor and functional measures, with additional improvement retained or enhanced at the 12-week follow-up. The substantial +5.5-point increase in COPM Performance reflects meaningful and patient-perceived functional progress in ADLs and IADLs. Improvements in UEMS (+7) indicate strengthened upper-extremity motor function, while CUE-T (+12) highlights enhanced capability across complex real-world tasks. Notably, the patient continued to improve post-intervention, suggesting the potential lasting benefit of high-intensity training paired with ExaStim-facilitated neuromodulation.

## 8. CONCLUSION

In this chronic C4 AIS D spinal cord injury case, integrating ExaStim with high-intensity, activity-based therapy was associated with measurable improvements in upper-extremity motor function, performance, and daily task capability. Gains observed across COPM, UEMS, and CUE-T were meaningful and maintained or improved at 4-week follow-up. While a single-patient experience cannot be generalized, these findings suggest ExaStim may be a valuable adjunct for supporting functional recovery and participation in individuals with chronic, incomplete SCI.

### ANEUVO

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### Indications for Use:

The ANEUVO ExaStim® Stimulation System is indicated for stimulation of the spinal cord to improve and restore upper extremity motor function in adult patients with paralysis due to spinal cord injury.

### Disclaimers:

ExaStim® is CE marked in Europe and FDA 510(k) cleared in the United States. It is not commercially available outside these markets.

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