

Beyond the 50% Threshold: A Two-Stage Decision Framework for Conversion to Permanent Dorsal Root Ganglion Stimulation

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Background

- Trial success for dorsal root ganglion stimulation (DRGS) is defined by achieving at least 50% pain relief.
- Yet many patients meeting this threshold elect not to proceed with permanent implantation. The factors underlying this discordance remain poorly understood.

Objective

- This pilot study evaluates if pre-trial patient expectations and psychological phenotype distinguish patients who convert to permanent DRGS implantation from those who do not, despite comparable analgesic response.

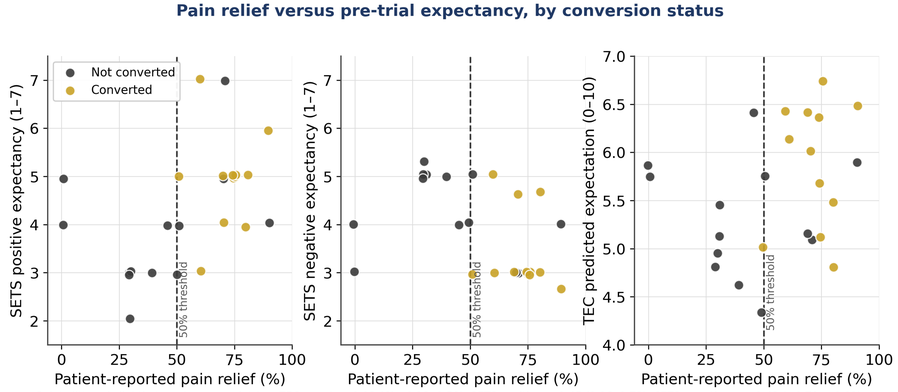
Material and Methods

- Prospective observational study of 27 consecutive DRGS trial attempts for chronic pain; 2 were aborted due to technical issues with spine fusion hardware
- Baseline assessments: pain intensity (NRS), Stanford Expectations of Treatment Scale (SETS), treatment expectations in chronic pain (TEC) scale, depression (PHQ-9), catastrophizing (PCS), and kinesiophobia (TSK-11).
- Primary outcome: conversion to permanent implantation percentage.
- Secondary outcome: patient-reported percentage pain relief during the trial
- Descriptive statistics characterized patient expectation profiles comparing converters versus non-converters, effect size (Cohen's d) and excluding inferential modeling

Table 1. Completed DRGS Trials Stratified by Conversion (n=25)

Variable (range)	Not converted (n = 13) mean (SD)	Converted (n = 12) mean (SD)	Cohen's d [95% CI]
SETS positive expectancy (1–7)	3.85 (1.28)	4.92 (1.00)	0.93 [0.05, 1.80]
SETS negative expectancy (1–7)	4.26 (0.86)	3.42 (0.83)	−0.99 [−1.87, −0.11]
TEC ideal expectations (0–10)	5.64 (0.63)	6.21 (0.65)	0.90 [0.02, 1.77]
TEC predicted expectations (0–10)	5.33 (0.60)	5.88 (0.66)	0.87 [−0.00, 1.74]
TEC mismatch (ideal − predicted, 0–10)	0.31 (0.37)	0.33 (0.55)	0.06 [−0.77, 0.88]
Mean trial pain relief (%)	41.2 (26.0)	71.7 (10.7)	1.51 [0.56, 2.46]
≥50% pain relief, n (%)	5/13 (38.5)	12/12 (100)	—
PHQ-9 total (0–27)	17.0 (5.9)	3.33 (7.1)	−2.10 [−3.15, −1.06]
PCS total (0–52; ≥30 sig.)	32.2 (5.5)	6.67 (10.5)	−3.10 [−4.35, −1.84]
TSK-11 total (11–44)	27.3 (5.5)	12.0 (3.5)	−3.30 [−4.60, −2.00]
Opioid use, n (%)	8/13 (61.5)	8/12 (66.7)	—
Age (years)	68.8 (14.2)	56.8 (21.5)	−0.66 [−1.51, 0.19]
Baseline average NRS (0–10)	8.46 (1.39)	7.75 (0.87)	−0.61 [−1.46, 0.24]

Figure 2. Pre-Trial TEC, Positive and Negative Expectations vs. Trial Pain Relief by Conversion Status



Points jittered slightly to reduce overplotting. TEC panel: r=0.23 (CI −0.18, 0.58); SETS positive r=0.45 (0.06, 0.72); SETS negative r=−0.42 (−0.70, −0.03).

Results

- From 25 completed trials, 68% (17/25) achieved ≥ 50% pain relief, while only 48% proceeded to permanent DRGS; highlighting that analgesic response alone did not determine conversion.
- No patient with less than 50% pain relief underwent implantation
- Converters showed higher pre-trial positive expectations (mean 4.92 vs 3.85) and lower negative expectations (3.42 vs 4.26) than non-converters (Table 1).
- Trial pain relief was higher among converters (71.7%) versus non-converters (41.2%); discordance persisted, as several patients with ≥ 50% relief did not convert (Figures 2).
- TEC expectation mismatch was nearly identical between groups
- Converters exhibited lower depression (PHQ-9), catastrophizing (PCS), and kinesiophobia (TSK-11), while non-converters demonstrated consistently higher scores across all psychological domains (Table 1).

Conclusion

- Achieving at least 50% pain relief appears necessary but insufficient for conversion to permanent DRGS
- This pilot study supports a two-stage decision framework in which analgesic response establishes candidacy, whereas patient expectations and psychological phenotype influence the final implantation decision
- Incorporating expectation assessment and psychological screening into DRGS evaluation may enhance patient selection, counseling, and shared decision-making.
- Larger studies are warranted to validate this decisional framework