



Introduction:

Spinal cord stimulation (SCS) has been historically used for CLBP for over twenty years, and its use continues to grow as therapeutic indications expand. Optimal patient selection remains one of the most important factors for SCS success. However, despite increased utilization and the existence of general indications, predicting which patients will benefit from neuromodulation remains one of the main challenges for this therapy.

Therefore, this study aimed to identify variables that may correlate with nonresponders to high-frequency (10kHz) SCS to distinguish the subset of patients less likely to benefit from this intervention.

Methods:

This was a retrospective single-center observational study of subjects who underwent 10kHz SCS trial and subsequent implant at The University of Kansas Medical Center.

Institutional Review Board (IRB) approval was obtained. Subjects were divided in responders and nonresponders based on the 50% cut-off value that is the well-established definition of success.

Outcome measures collected at baseline were: NRS, ODI, MME, PCS, TKS, PROMIS. Descriptive statistics and statistical analysis was performed by a statistician for all continuous and categorical variables between the two groups to calculate statistical significance between the two groups. A p-value <0.05 was established as statistically significant

VARIABLES ASSOCIATED WITH NONRESPONDERS TO 10kHz SPINAL CORD STIMULAITON

Vinny Francio, John Alm, Logan Leavitt, Daniel Mok, Victor Yoon, Niaman Nazir Christopher Lam, Usman Latif, Timothy Sowder, Edward Braun, Andrew Sack, Talal Khan, Dawood Sayed.

Department of Physical Medicine and Rehabilitation
Department of Anesthesiology and Pain Medicine
Department of Population Health
The University of Kansas Medical Center

KEY FINDINGS:

- Statistically significant higher levels at baseline within the nonresponders group of:
- Disability (ODI)
 - Pain (NRS)
 - Kinesiophobia/fear-avoidance behavior (TKS)

CONCLUSION:

Our study is the first in the neuromodulation literature to report an association of high levels of kinesiophobia preoperatively with nonresponse to 10 kHz SCS. This has been well-documented in the spine and joint surgery literature suggesting a relationship with poor outcomes.

As such, it may be appropriate to utilize movement behavior screening tools, such as the TKS or fear avoidance behavior questionnaire preoperatively to help optimize patient selection.

Furthermore, completion of a pain psychology patient education program on the potential implications of kinesiophobia has been shown to reduce kinesiophobia and disability levels.

Therefore, this may be applicable prior to SCS implantation to potentially enhance patient satisfaction and outcomes in neuromodulation.

Results:

The study population comprised of 237 subjects, which 67.51% were responders and 32.49% were nonresponders.

Demographics and discrete variables associated with responders and nonresponders.

Variable	Total	Group [Non-responders] Mean (Std. Dev)	Group [Responders] Mean (Std. Dev)	P-value (2 sided)
Oswestry Disability Index (ODI)	210	47.94 (13.27)	43.64 (15.22)	0.0385*
Numeric Rating Scale (NRS)	237	6.29 (1.90)	5.58 (1.97)	0.0087*
Tampa Kinesiophobia Scale (TKS)	40	44.76 (8.97)	38.83 (7.13)	0.0318*

*denotes statistically significant finding

Our results suggested a statistically significant association with **high levels of fear-avoidance behavior, high/kinesiophobia, high disability and pain levels at baseline in the nonresponders’** compared to the responders group.

Of particular interest, a **few variables deemed potentially relevant were not statistically significant** such as age, gender, history of spinal surgery, diabetes, alcohol use, tobacco use and psychiatric illness. There was also not statistically significance associated to PROMIS at baseline. However, other studies have suggested that these factors may be associated to SCS therapy response.

Table 3. Descriptive statistics comparing variables at baseline between nonresponder and responder groups, stratified by clinically relevant levels of kinesiophobia (TSK>37).

Variable at baseline	Nonresponders (%)	Responders (%)
Clinically relevant kinesiophobia (TSK >37)	76.47%	56.52%
Mild kinesiophobia	0%	30.43%
Moderate kinesiophobia	41.17%	43.47%
Severe kinesiophobia	58.82%	26.08%
PCS mean average	31.53	22.33
Clinically relevant pain catastrophizing	53.84%	36.36%
ODI mean average	42.00	41.00
ODI Minimal disability	8.33%	8.33%
ODI Moderate disability	25%	41.66%
ODI Severe disability	58.33%	33.33%
ODI Crippling back pain	8.33%	16.66%
NRS mean average	6.24	4.13
MME mean average	48.84	43.38