Examining the Success Rate of Dorsal Root Ganglion Stimulation Trials: Are they Necessary?

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Introduction

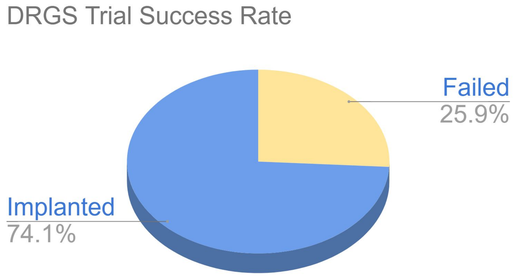
Evidence for implanting spinal cord stimulators (SCS) without a prognostic trial period is growing (1). There is also research demonstrating superior benefit of dorsal root ganglion stimulation (DRGS) (2) compared to SCS. We hypothesised that the potential superiority of DRGS would result in higher trial-to-implant success rates which could potentially support patients selected for DRGS in proceeding directly to full implant without a trial period. This could potentially reduce cost, complications (including infection), reduce resource use, avoid delays and improve patient satisfaction.

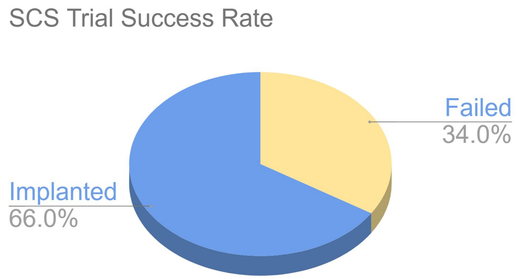
Methods

We performed a retrospective analysis of SCS and DRG trial-to-implant success rate at Toronto Western Hospital (TWH) between 2019 and 2026. All 27 patients who had undergone technically successful DRG trials at TWH were included. A contemporaneous SCS cohort undergoing stimulation for limb (not axial) pain was included for comparison. The primary end-point was trial success rate between the two groups with patient-reported questionnaire outcomes also examined as secondary end-points.

Results

Data was collected for trials performed from 2019 to 2026. 20 of the 27 patients who underwent DRGS trial went on to have a full implant (74.1% success) versus 33 of 50 patients who underwent SCS trials (66% success) (p=0.61). At one year after implant, the mean reduction in pain intensity was 55.63% for patients with DRGS implants and 38.49% for patients with SCS implants (p=0.1). The SCS group scored worse generally at baseline. Percentage improvement in outcomes at one year was greater in the DRG group except in EQ-5D although these differences were not statistically significant. There was also trend for a higher incidence of lead-related malfunction (e.g. microfractures) in patients receiving DRGS implants.





Discussion

Despite the absolute superiority of DRGS trials, the results were statistically insignificant which could be attributed to the relatively small number of DRGS trials. Our DRGS trial success rate fell within the ranges of trial-to-implant success rates seen in our literature review (62.7%-100%) (3)(4), with an overall weighted mean success rate of 83.06%. Our study is underpowered to show the greater change in NRS and the trend towards greater changes in secondary outcomes with DRGS. Neither our data nor the literature, appear to support foregoing the traditional trial period before a full implant. Larger prospective trials will be required to answer this question more reliably.

Study	Indication	Total Trials	Permanent Implants	Conversion Rate (%)
Chapman et al 2020	Back pain	17	17	100
Chapman et al 2022	Salvage	60	56	93
Morgalla et al 2017	Inguinal pain	34	30	88
Huygen et al 2018	Various	66	56	85
Hunter et al 2018	Various	217	183	84
Al Kaisy et al 2019	Various	39	32	82
Morgalla et al 2018	Various	62	51	82
Deer et al 2016	CRPS	76	61	80
Love-Jones et al 2015	Stump/Phantom Limb	22	16	73
Mol et al 2018	Various	9	6	67
Liem et al 2015	Various	51	32	63

Table 2: DRG Trial Success in the Literature

	SCS baseline (mean)	SCS 1 year mean	SCS mean change	SCS mean change (% difference)	DRG baseline (mean)	DRG 1 year mean	DRG mean change	DRG mean change (% difference)	Absolute difference (p)	% difference (p)
NRS	7.57 ± 1.29	4.66 ± 2.06	2.91 ± 2.03	38.31 ± 24.34	5.88 ± 1.17	2.60 ± 2.20	3.13 ± 2.07	55.63 ± 35.71	0.73	0.10
ODI	52.80 ± 15.40	36.97 ± 21.40	15.83 ± 22.02	23.88 ± 58.86	30.00 ± 14.32	22.29 ± 17.53	7.71 ± 17.32	25.69 ± 85.47	0.13	0.42
GAD-7	9.74 ± 5.76	6.11 ± 4.66	3.63 ± 6.95	17.78 ± 76.23	5.50 ± 5.53	4.00 ± 4.46	1.50 ± 4.43	27.27 ± 63.34	0.15	0.87
PHQ	12.29 ± 5.04	8.06 ± 6.44	4.23 ± 7.99	21.42 ± 75.69	8.06 ± 6.78	4.82 ± 4.86	3.24 ± 6.12	40.17 ± 62.69	0.53	0.90
DN4	5.77 ± 2.58	3.83 ± 2.68	1.94 ± 3.05	37.75 ± 37.52	4.73 ± 2.89	3.00 ± 2.40	1.73 ± 2.79	36.62 ± 47.21	0.76	0.57
PCS	23.60 ± 12.54	14.85 ± 12.59	9.17 ± 11.50	41.85 ± 46.31	14.41 ± 10.06	9.00 ± 11.33	5.41 ± 12.71	37.55 ± 92.74	0.31	0.32
PSQI	11.97 ± 4.80	9.61 ± 4.58	2.15 ± 3.98	13.64 ± 40.00	10.69 ± 5.15	7.82 ± 4.72	2.86 ± 4.16	26.80 ± 32.82	0.67	0.40
NPSI	50.26 ± 21.82	39.35 ± 23.37	10.59 ± 24.17	-13.31 ± 149.63	30.35 ± 14.82	30.35 ± 21.69	0.00 ± 18.91	0.00 ± 79.21	0.09	0.72
EQ-5D	0.51 ± 0.16	0.62 ± 0.21	-0.11 ± 0.21	-29.44 ± 55.59	0.66 ± 0.13	0.70 ± 0.24	-0.03 ± 0.23	-5.09 ± 37.26	0.13	0.04

Table 1: One Year Outcome Data

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