



**Anesthesia, Critical Care and
Pain Medicine**
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Programming Characteristics of Spinal Cord Stimulation for Failed Back Surgery and Non-Operated Spinal Stenosis: Prospective Analysis of 72 Patients

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Introduction

Optimal programming is an integral part of spinal cord stimulation for chronic low back and leg pain. Paresthesia mapping is based on clinical features of pain and patient preference, and is affected by anatomical variation. It has been postulated that simple dipole and/or “guarded cathode” arrays may offer optimal coverage for low-back and leg pain (Holsheimer et al., 2007).

We investigated whether there might be significant differences in programming variables between patients receiving SCS for non-operated spinal stenosis, as opposed to low back pain following spine surgery (FBSS).

Methods

Over a period of 7 years, we collected data on patients undergoing permanent SCS; patients were followed up to 48 months after implant. Intraoperative paresthesia mapping was used to finalize electrode position. We report on the characteristics of initial settings and 12-month follow-up.

All patients received percutaneous cylindrical or paddle electrodes (Octrode and Lamitrode, St. Jude Medical, St. Paul, MN, USA).

Stimulation settings were adjusted at 1, 3, 6, 12, 24, 36 and 58 months after implants, in order to keep tonic stimulation as pleasant as possible while maximizing paresthetic coverage.

Categories of stimulation arrays

	-		+		+	+	-
		-	+		-	+	-
		+	-		+	-	+
				-		+	+
				+			-
				+			-
				-			
Cathode	Dipole	Wide dipole	Double dipole	Guarded cath	Wide guard cath	Complex	

Results

Data were obtained for 36 patients with stenosis and 36 patients with FBSS. All patients received 50–60 Hz tonic stimulation. The most prevalent tip locations were at the body of T9 (44.8% of FBSS and 54.7% of stenosis patients) and T8 (32.3% and 33.7%, respectively).

Median (95% confidence interval) current intensity threshold decreased significantly from 3.2 (2.4 – 3.8) mA to 2.5 (2.2 – 3.0) mA (p=0.01), with no differences between indications. Pulse widths were 314 (311 – 426) ms at implant and did not change significantly at 12 months, nor were they different between groups. Figure 1 shows the prevalence of different categories of active lead arrays.

Conclusion

Satisfactory paresthesia coverage of the low back and leg may be obtained in FBSS and non-operated stenosis patients with similar approaches when using conventional tonic stimulation.

With respect to predictive models in the literature, which identify dipole or guarded cathode arrays as optimal for LBP/leg coverage, we noted a higher prevalence of “wide dipole” arrays in both our populations.

Prevalence of stim array categories at 12 m

