

Supplemental Digital Content 1

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Supplemental Figures

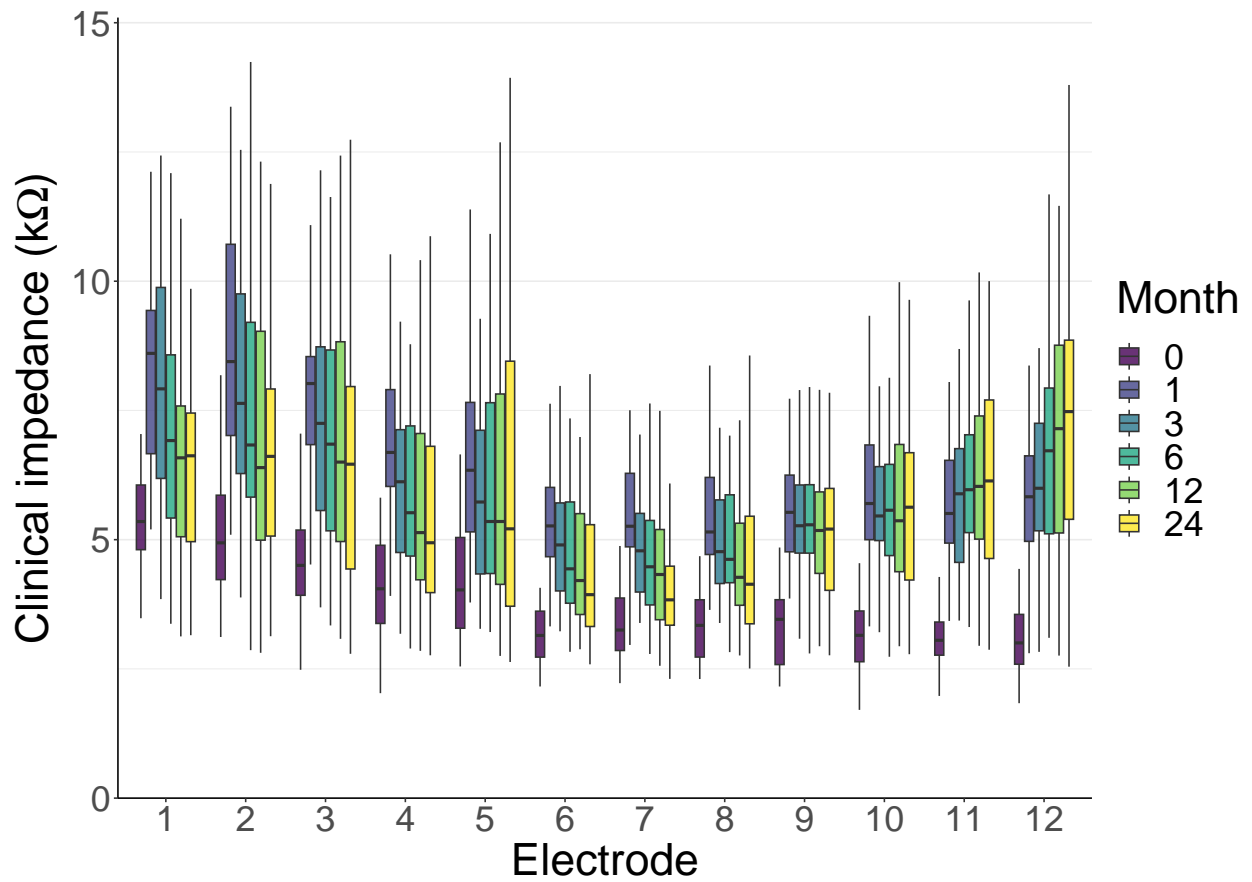


Figure S.1: Clinical impedances of 32 cases for all electrodes at the intraoperative measurement (month 0), first activation session (month 1), and follow-up fitting sessions (months 3-24).

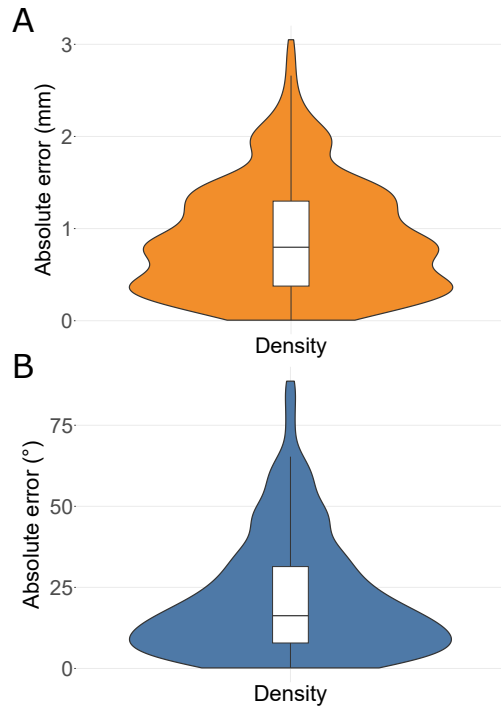


Figure S.2: Violin plot of the absolute error of linear (A) and angular insertion depth estimates (B) with respect to ground truth of 47 cases with a fully inserted electrode array.

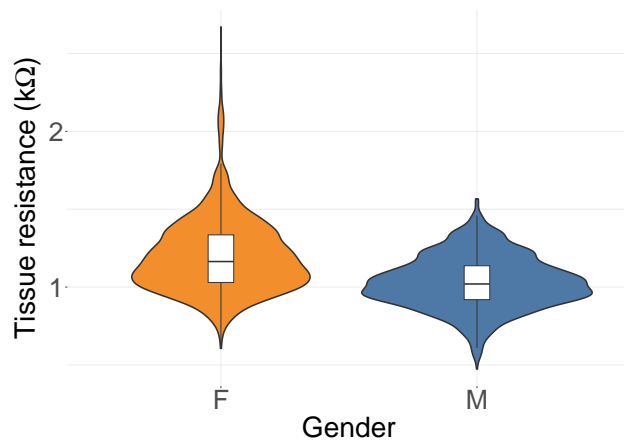


Figure S.3: Violin plot of tissue resistance (in $k\Omega$) for males and females for 42 cases with a fully inserted electrode array. F, female; M, male.

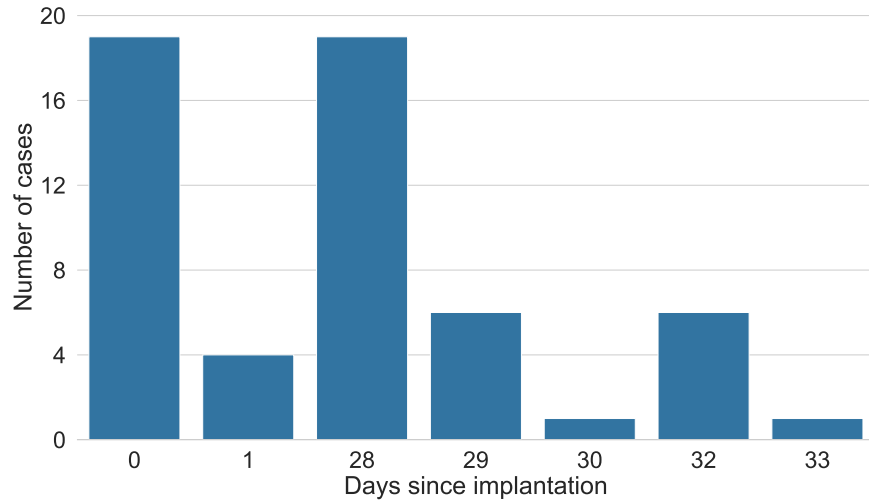


Figure S.4: Histogram of postoperative computed tomography (CT) scan acquisition days since implantation. Data are from 56 cases with fully (N=47) or partially (N=9) inserted electrode array.

		Test	
		(Early)	(Late)
Calibration	(Early)	1.06 mm ± 0.55 mm	0.94 mm ± 0.61 mm
	(Late)	0.92 mm ± 0.5 mm	0.78 mm ± 0.59 mm

Figure S.5: Cross-tabulation of electrode insertion depth estimation performance of the early (N=19 cases) and late (N=28) phenomenological model. Electrode arrays were fully inserted in all cases. Calibration is the data used to create the model, and Test is the data whose insertion depth was estimated using the model. Performance is given as the mean ± standard deviation of the absolute error compared to ground truth values from CT scans.

Outlier detection

Outlier detection in standardized tissue resistances z_t was based on the median absolute deviation (MAD), which is the median over the absolute deviations from the median. For each electrode, an outlier was defined as a data point outside of $t = \text{median}(z_t) \pm 4 \cdot \text{MAD}(z_t)$. A case was excluded from further analysis if standardized tissue resistances associated with the first postoperative CT scan were marked as outliers at more than one electrode – an outlier at only one electrode was accepted.

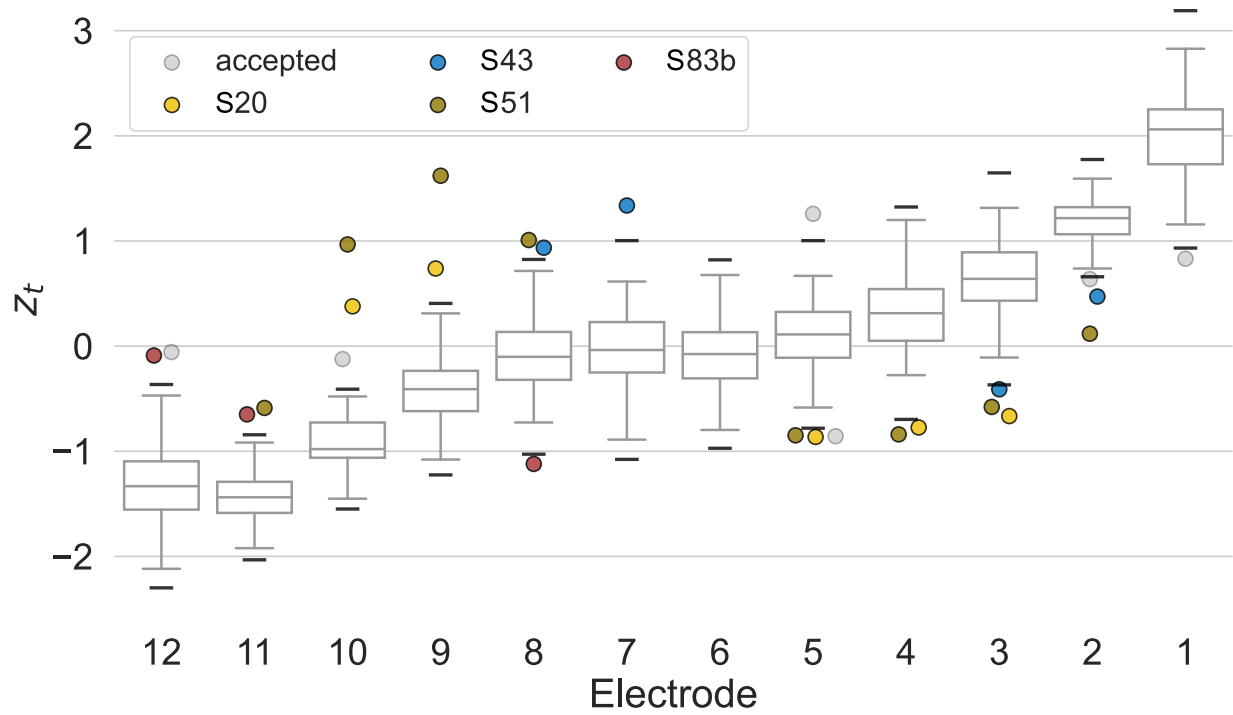


Figure S.6: Box plot of standardized tissue resistances z_t per electrode from early and late impedance field telemetry (IFT) recordings. Data are from 51 cases with a fully inserted electrode array. The black whiskers represent the thresholds for outlier detection. Electrodes are numbered from apical to basal (1-12) and cases with outliers are color coded.