

Semi-automated vs automated ESI in epilepsy surgery: a quantitative retrospective experience

Karmele Olaciregui-Dague

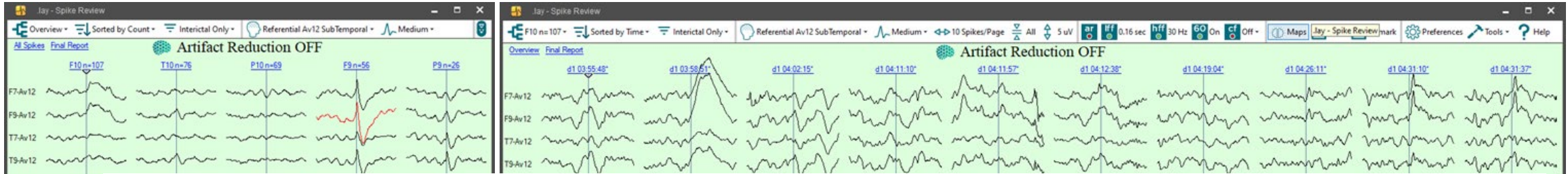
Centre for Eudaimonia (Oxford) & Klinik für Epileptologie (Bonn)

Automated vs semiautomated Electrical Source Imaging (ESI)

EEG recordings from 140 patients with focal epilepsy due to focal cortical dysplasia (FCD) who underwent resective surgery at our institution were analyzed blinded to lesion localization and surgical outcome, using the automated and semiautomated approach in Epilog by Persyst.



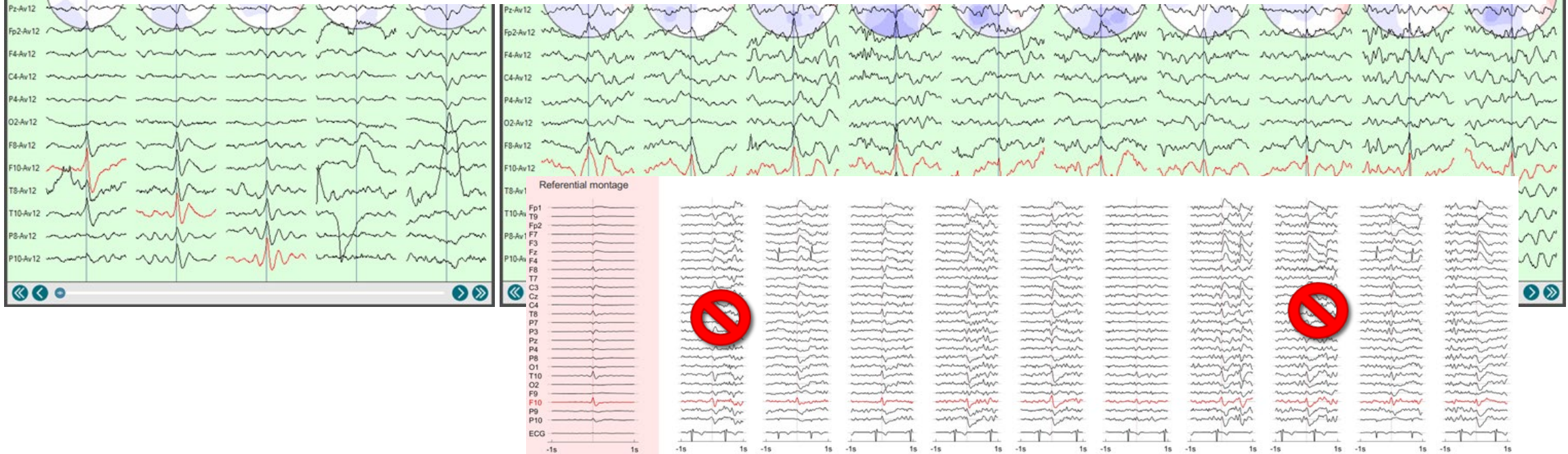
Semiautomated ESI



The cluster's electrode maximum and number of spikes is provided.

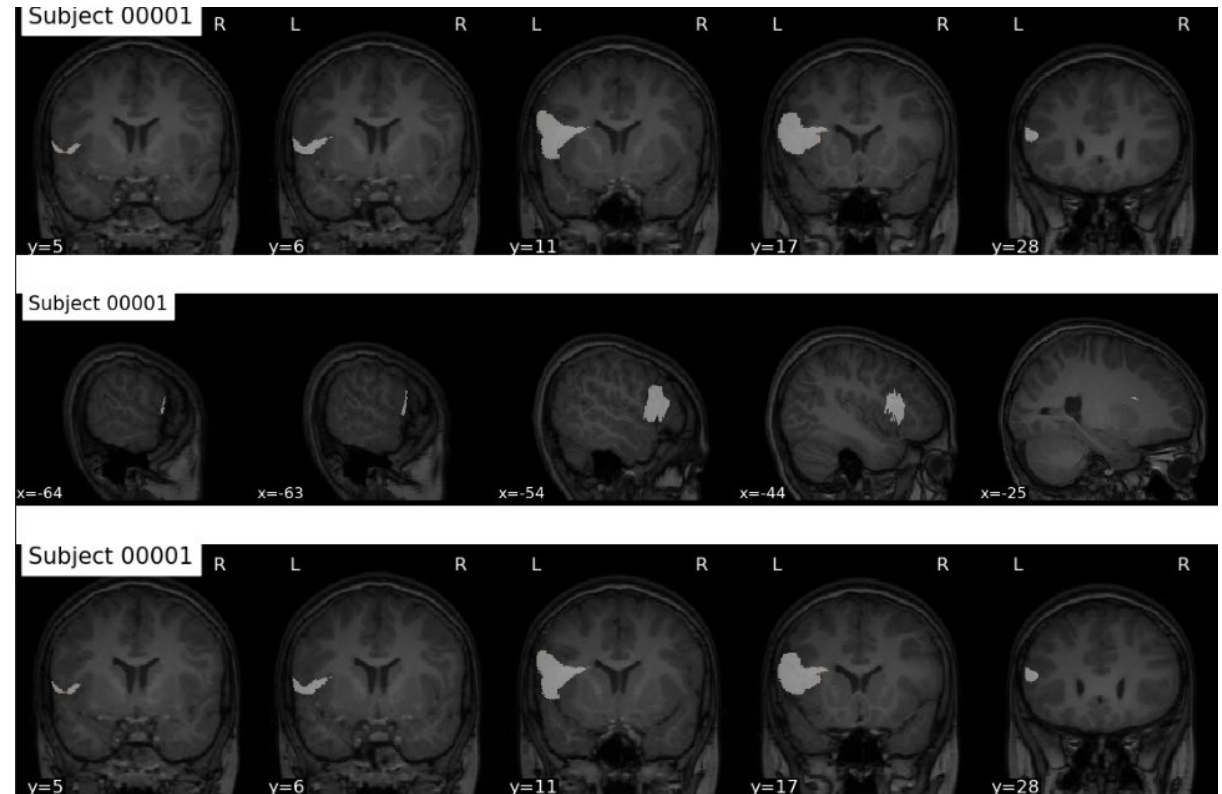
Per cluster, both the average and individual detections are displayed using the bipolar and referential montages.

A physician blindly evaluated the automated ESI results and selected spikes based on morphology and quality, resulting in the semiautomated approach.



Evaluation

To evaluate the outcome of each approach (semiautomated vs. automated) quantitatively and qualitatively we established a ground truth for each individual, defined by an FCD lesion mask.



Results

Automated approach

- A **sublobar concordance** (category A) was observed in **6 - 8,8%** of patients, with spike half-rising having the best localizing value (8,8%)
- **Lobar concordance** (category B) was achieved in **18 – 21%** of cases (spike peak 21,3%)
- **Multilobar concordance** (category C, considered non-localizing) was observed in approximately 30% of cases, all spike phases performed very similarly

	method	A_cat	B_cat	C_cat	D_cat
halfrising	auto	8,82%	20,59%	30,15%	36,76%
halfrising	semi	10,29%	47,06%	69,12%	89,71%
onset	auto	6,62%	18,38%	31,62%	36,76%
onset	semi	7,35%	39,71%	67,65%	89,71%
peak	auto	8,09%	21,32%	31,62%	36,76%
peak	semi	11,03%	45,59%	77,94%	89,71%