



## POSTER Presentation



### Writing a Review Paper on Concentric Ring Electrode Technology

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#### Abstract:

The expansion of knowledge concerning concentric ring electrodes (CREs) allowed for enhanced clinical applications and improvements to key parameters of electrophysiological measurement such as signal-to-noise ratio, spatial resolution, and selectivity. These accomplishments are related to the ability of CREs to estimate the second spatial derivative of a measured potential, the Laplacian. While previous work has covered studying various aspects of optimizing CRE configurations, comparing different CRE and disc electrodes, applications of CREs to numerous areas of electrophysiological measurement, and manufacturing techniques and considerations, no work to date has compiled the available literature into a comprehensive review for ease of access and synthesis of this technology's diverse applications. This abstract presents considerations involved into writing such a review of CRE technology. In particular, a detailed outline structuring our review paper in accordance with the most important aspects of electrode design and applications and a process for sorting and distilling papers on CREs as contributions to particular portions of the review paper's structure for later assembly into a cohesive manuscript were developed.

The review paper's structure will consist of the following major sections: background, design considerations, implementation, applications, and cutting edge and future work. Each major section consists of multiple subsections. For example, applications section is separated into subsection corresponding to electroencephalograms, electrocardiograms, electrohysterograms, electromyograms as well as recordings from intestines, bladder, etc. Moreover, subsections are further subdivided into subsections. For example, subsection on electromyograms is further subdivided into applications related to diaphragmatic, masseter, swallowing, general skeletal muscles, MUAPs as well as removal of artifacts. Compared to some of the other established linear approaches to structuring review papers such as PRISMA our approach offers the advantage of offering researchers in different areas a clear pathway to the portion of the review most relevant to their specific field.

The sorting and distilling process for relevant CRE papers starts with individually reviewing them. Next, applicable sections, subsections, and subsections of the outline to which current paper belongs are identified. Finally, brief summaries are written individually for each subsection highlighting the most relevant aspects and contributions of the paper as related to that specific subsection. These summaries serve as building blocks of the resulting subsections, which in turn form subsections, and, ultimately, sections of the resulting review paper.

While this is not a research project in the strictest sense a substantial amount of research has been involved in developing both a detailed paper structure and a process for sorting and distilling papers and insights gained may turn out to be useful to others planning to take on a similar task in their field. Moreover, the process of writing a review paper as well as its main component of familiarizing oneself with up to a hundred journal papers on CRE technology published over the course of the last two decades turned out to have an additional benefit of increasing the research capacity via skill development related to distilling scientific publications to their core findings as well as to structuring and integrating large bodies of scientific knowledge.