

# Consensus for experimental design in electromyography (CEDE) project: Checklist for reporting and critically appraising studies using EMG (CEDE-Check)

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## Summary

This study describes the development of a checklist for reporting electromyography by the Consensus for experimental design in electromyography (CEDE) project. The checklist is designed to improve the reporting of EMG to ensure the scientific rigor in EMG-based research.

## Introduction

The diversity in electromyography (EMG) techniques and their reporting present significant challenges across multiple disciplines, including neurology, neuroscience, electrodiagnostic medicine, physiology, sleep medicine, sports science, ergonomics and rehabilitation, biofeedback, and control of artificial limbs, where EMG is commonly needed. To address these challenges and enhance the consistency and reproducibility of studies using EMG, the Consensus for Experimental Design in Electromyography (CEDE) project has developed a checklist (CEDE-Check) through a multi-stage Delphi process.

## Methods

The method used for the development of this checklist followed a similar process employed in previous CEDE matrices. We followed a three-step process: 1) initial listing and rating of potential items via an online survey; 2) development of the checklist draft; 3) Delphi process for consensus. Consensus for included items was defined as 70% or more of the respondents indicating that an item should be reported 'most of the time' or 'always'; fewer than 15% scoring it as 'unsure' or 'never'; and an interquartile range <2 points.

## Results and Discussion

From the 17 CEDE experts who agreed to participate in the Delphi process, 16 (94%) replied to the first- and second-round questionnaires, and consensus was achieved afterwards. A few additional amendments were made to the checklist after a pilot test assessment. The final CEDE-Check consists of 40

selected items covering four critical areas in EMG recording and reporting – the task investigated (10 items), electrode placement (6 items), characteristics of recording electrodes (13 items), acquisition and pre-processing of EMG signals (11 items). Figure 1 is a link to download and use the CEDE checklist.



**Figure 1:** The full CEDE Checklist can be downloaded using this QR code.

## Conclusions

The CEDE-Check aims to guide researchers in accurately reporting and critically appraising EMG studies, thereby promoting a standardised critical evaluation, and ensuring scientific rigor in EMG-based research. This approach not only aims to facilitate comparisons between studies but will also contribute to the advancement of research quality and its clinical application. We encourage researchers to adopt and adhere to the checklist [1] in their future EMG studies and advocate for journal editors to endorse the checklist as a reporting guideline.

## Acknowledgments

## References

- [1] Besomi M, et al (2024) J Electromyogr Kinesiol. 76:102874. doi: 10.1016/j.jelekin.2024.102874.