March, 2022

Dr. Raffaella Bosurgi  
Executive Editor, *PLOS Medicine*

Dear Dr. Raffaella Bosurgi,

We would like to submit an original article titled “***Deep learning model for needle electromyography electro-diagnosis in comparison with physicians: A retrospective study***” for publication in *PLOS Medicine*.

Electromyography (EMG) is an essential procedure in diagnosing neuromuscular disorders. Despite its effectiveness, the clinical diagnosis using EMG is dependent on the manual inspection of a skilled physician, which leads to low inter-rater reliability, insufficient accuracy, and heavy workload. Amidst the need for automated, and accurate means of EMG electro-diagnosis, previous works have been mainly focused on analysis of needle EMG in a resting state or surface EMG. While previous studies applied deep learning to EMG, needle EMG signals from volitional state needs to be investigated since it contains key clue for diagnosis of the neuromuscular disease of the patient.

We investigated the neuromuscular disorder classification performance of our deep learning model using volitional needle EMG data from Seoul National University Hospital. The performance of our deep learning model and electro-diagnosis results by 6 physicians were compared. Our results demonstrated that deep learning model outperformed the physicians in all classification metrics. We believe our deep learning model could shed light on automated and accurate electro-diagnosis of neuromuscular disease patients.

This manuscript has not been published or presented elsewhere in part or in whole and is not under consideration by any other journal. All authors have approved the manuscript and agreed to its submission to *PLOS Medicine*. There are no conflicts of interest to declare.

Thank you for your consideration.  
Sincerely,

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