Transcript Details

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The Role of Augmented Intelligence in Electrodiagnostic and Neuromuscular Medicine

Announcer:
Welcome to *NeuroFrontiers* on ReachMD. On this episode, we'll discuss the future of artificial intelligence in neuromuscular and electrodiagnostic medicine with Dr. John Morren. Dr. Morren is the Program Director of Neuromuscular Medicine Fellowship at Cleveland Clinic and an Associate Professor of Neurology at Cleveland Clinic Lerner College of Medicine of Case Western Reserve University. He also presented a session on this topic at the 2024 American Association of Neuromuscular and Electrodiagnostic Medicine Annual Meeting. Let's hear Dr. Morren now.

Dr. Morren:
So as you would imagine, AI has a large potential role in electrodiagnostic and neuromuscular medicine because our field is so data heavy. Electrodiagnostic and neuromuscular physicians were never scared of technology. We were the ones hauling electrical equipment to the bedside from many decades ago. And patients still tell us when they see that EMG machine, "Wow, what a piece of technical apparatus you got there." So we were accustomed to dealing with digital data as well. So this is a very ripe field to apply a lot of the machine learning and deep-learning techniques. So for example, a lot of the studies looking at machine and deep learning in electrodiagnostic medicine focuses on EMG signals, especially needle examination data signals, and it's very rich. It's what we call highly dimensional data in the AI space. And a lot of the studies started showing proof of concept that the technology could separate out patients who are normal versus having a myopathic muscle disorder condition versus ALS pretty good, up to approaching 100 percent accuracy, which sounds unbelievable because that's much more than us humans do in interpreting these data, but the truth is a lot of these studies are based on very small samples, and they suffer a form of bias called overfitting. Me recognizing that, I was able to launch a program here at the Cleveland Clinic where we're studying this more rigorously, and we're using real-world data. At the Cleveland Clinic, we have the largest-known clinical EMG database pipeline for AI research, and at the moment, we're using these different AI methodologies to classify up to five different neuromuscular disorders.

Ensuring patient safety, especially as it pertains to diverse patient populations, is of paramount importance and priority because there are a lot of early AI models that performed well for many patients and then, when applied more broadly, didn't perform so well. And we saw this during the COVID pandemic, for example, when some of the prediction models didn't identify certain minority patients at high risk, and they had poor outcomes because of it. So what's called human-centered AI is something that I would promote, and it's really showing to be the best way to address some of these potential exacerbation of disparities that can happen. I would say AI really doesn't cause disparities and inequities in itself. It really is a mirror to us human folk who have these deeply entrenched biases and inequities and disparities, so it just magnifies it.

I think another important takeaway from the session was a whole concept of augmented intelligence. When we think of AI, we think of artificial intelligence, but AI could also mean augmented intelligence, and I prefer that term because what augmented intelligence really encapsulates is the fact that there should be a human in the loop at all times, especially for high stakes like healthcare. So you could think of augmented intelligence as a mathematical equation. Augmented intelligence equals human intelligence plus artificial intelligence, and in this equation, the total impact is more than the sum of the individual components there, so that's true synergy. It's not just an additive benefit but a synergistic benefit. And of course, there are a lot of questions about will we be replaced by AI as neuromuscular specialists and electrodiagnostic specialists, and one particular slide impacted the audience significantly based on the feedback. I said, "AI will not replace human experts but more likely will be human experts who leverage AI replacing those who do not."

Announcer:

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That was Dr. John Morren discussing his session at the 2024 American Association of Neuromuscular and Electrodiagnostic Medicine Annual Meeting that focused on the potential future directions of artificial intelligence in neuromuscular and electrodiagnostic medicine. To access this and other episodes in our series, visit *NeuroFrontiers* on ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening!

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