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## *Epilepsy and sleep disorders diagnostic test: Dr. Rodolfo César Callejas explains the relationship between them*



**N**eurovirtual: Tell us about your professional and academic trajectory. How was your specialization in epilepsy?

Dr. Callejas: Upon graduating, neuroscience is something that has always been of interest to me. Perhaps the only decision I had to make was choosing between basic science and clinical. However, those aspects were always there: sleep and epilepsy. I started working with an animal model that evaluated both disorders. During social work studies, I had the opportunity to work in a neurophysiology clinic center. At that moment, I decided to go with the clinical part, assisting and working with people.

Meaning that the same neurology training led me to clinical neurophysiology. And thanks to the guidance of my mentors, I managed to get closer to the world of epilepsy. Universities have also always supported us with scholarship access, and the possibility to go abroad for training, not only in neurophysiology but also in video encephalograms.

We had the opportunity to spend some time at the Cleveland Clinic Epilepsy Center (USA). We were also in Germany, where we met the International group known as League Against Epilepsy, which gave us access to their courses offered in Latin America, specifically in Brazil, and also Europe, mainly in Italy.

So, the community presented us with a wide range of opportunities to develop epilepsy and sleep, almost naturally.

**Neurovirtual: What are the relationships that can be set between epilepsy and sleep disorders?**

Dr. Callejas: If we consider that epilepsy is a disease that will be with us throughout our lives, and more than a third of our lives which is spent sleeping, then it is understood that this relationship is intrinsic. This irregular electrical activity in our brain often disrupts sleep in regular phases.

At the clinic on a daily basis, it is very common to find people with epilepsy who also suffer from sleep disorders. The existence of sleep disorders unrelated to epilepsy is also very high. It is estimated that in Latin America, 30% of the population suffers from sleep disorders.

Therefore, the probability of being diagnosed with epilepsy and having a sleep disorder is also high. What we are doing now across forums, conferences, courses, and marketing is emphasizing that we have to intentionally look for sleep disorders in those already diagnosed with epilepsy.

**Neurovirtual: Nocturnal epilepsy usually occurs during childhood or adolescence. What are the main long-term effects for those who suffer from this disorder?**

Dr. Callejas: I want to emphasize that this type of epilepsy, in addition to being common at those ages, is also frequent in adults and the elderly. Maybe the difference is that, depending on the stage of life, manifestation can change.

The main issue with school performance in children is that, if they do not receive relative care in ensuring adequate sleep, they tend to have a lower employability rate in the future, which research shows in different countries as an issue. We need to be certain that children's education allows them to chance to have productive adult lives.

**Neurovirtual: What are the main difficulties faced by patients with nocturnal epilepsy?**

Dr. Callejas: First, it is the lack of diagnostics. Diurnal manifestations, which appear during the day, are usually attributed to some other cause. This can be due to fatigue, stress, or anxiety, never considering that it could be a diagnosis of epilepsy. In fact, it could be epilepsy itself that is causing sleep problems. As I said, what we need to take into consideration is the intentional search for sleep disorders in those who already have a diagnosis of epilepsy.

**Neurovirtual: Could you tell us which difficulties you face in finding a diagnosis?**

Dr. Callejas: What worries us the most in this environment that I am currently working on in my country, Mexico, is the access to health resources. This is something that we have as an international community, but here in Mexico, we are still trying to close the diagnostic gap, not just the treatment gap. I could summarize like this: even though we are trying to advance, access to diagnostic studies is still difficult. We are, with the support of medical organizations and academies, dedicated to making these studies accessible to the general population.

**Neurovirtual: When we talk about patients who have epileptic seizures, is there a different protocol for performing these sleep tests? Are there any special precautions that should be taken into account?**

Dr. Callejas: What interests us is that people understand how important it is to do this test. When we discuss this, I particularly enjoy speaking with epileptic patients and families about test details such as sensitivity and specificity. It's something we would normally reserve just for healthcare personnel, but sharing this information with the person who has epilepsy and his family makes them understand the importance of doing comprehensive studies.

When we want to assess sleep, it has to be an all-night test, so that we can, even for diagnostic purposes, although it may seem counterintuitive, identify a crisis during the exam. This turns out to be ideal for the diagnosis of nocturnal epilepsy. Or we can record the fragmentation in sleep phases for a night, which ends up diagnosing sleep problems associated with epilepsy. More important than talking about the necessary measures and safety protocols applied during the

***“In cases where these two coexist – sleep disorders and epilepsy – the probability of having anxiety and depression is very high. And what matters is, once again, early identification. That is, from the first appointment, and the moment they come back again, we should always be looking for symptoms of anxiety and depression in the patient. ”***

***– Dr. Rodolfo César Callejas***

study, which is highly recommended, both for the patient and his family, is to explain the importance of carrying out a complete exam.

**Neurovirtual: Can sleep epilepsy go along with psychological disorders such as anxiety or depression?**

Dr. Callejas: The short answer is yes. And it is because the anatomical place is the same, and frequencies in the field that use the temporal lobe are the most frequent. And, of course, in those structures are the amygdala, the hippocampus... which has to do with memory, anxiety, and mood.

Therefore, it is common for people diagnosed with epilepsy to have a higher risk of developing anxiety or depression. For those who have a sleep disorder, the risk of having anxiety and depression is double.

In cases where these two coexist – sleep disorders and epilepsy – the probability of having anxiety and depression is very high. And what matters is, once again, early identification. That is, from the first appointment, and the moment they come back again, we should always be looking for symptoms of anxiety and depression in the patient. There are now very short questionnaires, about 2 minutes long, in which we can identify anxiety or depression in people with epilepsy.

**Neurovirtual: There has been a huge increase in the number of diagnoses of sleep disorders due to the pandemic environment in which we find ourselves. Do you also see an increase in nocturnal epilepsy?**

Dr. Callejas: In fact, we are already seeing studies that have been carried out, through validated questionnaires. At least here in Mexico, we know that, due to the pandemic, the statistics of mood disorders rose from 27% to 60%. And these

numbers are reflected regardless of the diagnosis. In other words, we are seeing the same number, the same increase in those who already have a diagnosis of epilepsy. And often, in the daily appointments, we are identifying people who came in due to a sleep disorder triggered by anxiety or depression, but who had underlying non-motor epilepsy that had not been diagnosed, for example.

**Neurovirtual: Did working with the Neurovirtual team facilitate the diagnosis?**

Dr. Callejas: The answer is yes. It is because it allows us to do a video electroencephalogram with polysomnography at the same time. We have the opportunity in 9 hours, to see the electrical activity of a person's brain while they sleep. This not only helps us to see stages of sleep that are so important in the assessment of disorders but also allows us to increase the sensitivity of the same encephalogram by up to 94%.

**Neurovirtual: Could you tell us about your experience so far using the Neurovirtual equipment?**

Dr. Callejas: Quite well, I would say. Our technicians are also very comfortable using Neurovirtual equipment. They are very intuitive, very friendly, and perhaps the key point is the 24/7 support, which often makes it possible for doctors to

***“Yes, I would recommend the Neurovirtual brand. It offered us not only the possibility of training our employees, but also facilitating our daily work.”— Dr. Rodolfo César Callejas***

step away for a moment and solve some problem that the technician may have during a study in the middle of the night, making the day to day a lot easier.

**Neurovirtual: Would you recommend the Neurovirtual brand?**

Dr. Callejas: Yes, I would recommend the Neurovirtual brand. It offered us, not only the possibility of training our employees, but also facilitating their daily work. Precisely, as I mentioned before, making studies accessible at the end of the day, and having a differential diagnosis in a single moment, in a single study, in a single night.

“Are we experiencing a sleep disorder? Are we facing a diagnosis of epilepsy? Maybe it is both?” It became much easier to do both assessments in a single test.

**Neurovirtual: In your interview with Business Leader, in 2020, you commented on the project to include Transcranial Electrical Stimulation Therapy (tDCS) in the Neuro Sleep Clinic. Would it be a beneficial alternative for epileptic patients during sleep?**

Dr. Callejas: Yes. There are currently areas of investigation on how to improve, including sleep, in other neurodegenerative diseases using Direct Transcranial Stimulation. There are also many lines of research in many parts of the world, including Mexico, on how Transcranial DC Stimulation is beneficial for people with epilepsy. This new equipment allows us to formulate both possibilities, which also enables us to do what we call “high definition or highly selected montages,” which allows us to apply therapies during sleep in people with epilepsy using electrical stimulation.

I think it is part of what has to come, and we will be watching as it develops, but it is something we are already implementing in Neuro Sleep Clinic.







## Neurovirtual participates in the Congress of the Brazilian Academy of Neurology



Dr. Marta Alice Pires and Alex Oliveira (Commercial Manager Neurovirtual Brazil).



Dr. Tercio L. Barbosa and Alex Oliveira (Commercial Manager Neurovirtual Brazil).

The Brazilian Academy of Neurology promoted a great event, the most recent edition, the Ceara, was the scene. In the city of Fortaleza, this congress took place from September 21st to the 24th, 2022. Neurovirtual was an exhibitor and sole representative of the EEG and PSG equipment in this market, known as Neuro 2022.

With the sharing of knowledge and the exchanging of experiences and information, the event was divided into different sessions with diverse themes. Participants were able to discuss neurology through common clinical cases in daily practice, see prominent national and international speakers addressing current issues, and be in hands-on courses as well as workshops. As a new approach, congress created a session named *Baião Neurológico*, where neurology history was discussed through cinema and arts.

With so many contributions to neurology, Neurovirtual was there as a company that really cares about the sector. There to present the Electroencephalographs BWIII EEG Plus ICU Monitoring EEG, BWMini EEG, BWIII EEG Plus, and BWIII EEG, were the commercial director, Alex Oliveira, and the clinical director, Sandro Senra.

Sandro tells us a little about the experience of the event: “It was a great honor to participate in the XXX Brazilian Academy of Neurology Congress and have the opportunity to share knowledge and learn more with Neurologists from all over.” The next step is participation at the Neurology Congress in Argentina, demonstrating that no matter the country, Neurovirtual’s commitment to medicine is unsurpassed.

***“It was a great honor to participate in the XXX Brazilian Academy of Neurology Congress and have the opportunity to share knowledge and learn more with Neurologists from all over”.– Neurovirtual spokesperson***



Dr. Giuliana Macedo, Dr. Alexandre Martori and Sandro Senra (Clinical Specialist).





## Colombia hosts the 2022 edition of the Latin American Congress of Epilepsy



Ed Faria (CEO & President Neurovirtual) and Dra. Elza Márcia Targas Yacubian.



Andrea Parra (Sales Manager Latam), Joseph Pardo (Sales Mexico), Dr. Diego Tapia and Katerin Laverde (Sales Colombia).



Andrea Parra (Sales Manager Latam), Ed Faria (CEO & President Neurovirtual), Joseph Pardo (Sales Mexico), Dr. Rosana Huerta, Katerin Laverde (Sales Colombia) and Andrés Rodríguez (Sales Peru).



Katerin Laverde (Sales Colombia), Andrés Rodríguez (Sales Peru), Ed Faria (CEO & President Neurovirtual), Andrea Parra (Sales Manager Latam), Joseph Pardo (Sales Mexico) and Dr. Kadie Paz.

Topics discussed at the XII Latin American Congress of Epilepsy included epilepsy in the elderly, genetics, neuropsychology, and epilepsy in adults and children.

All were examined by professionals from the congress, which was organized by the International League Against Epilepsy in Medellin, Colombia. Neurovirtual was at the event exhibiting their neurodiagnostic equipment. The company brought together representatives from Neurovirtual's team, who are dedicated to their brand of EEG equipment.

Neurovirtual's CEO and President, Ed Faria, was on hand to greet and receive the doctors and visitors who tested out the equipment and software: BWAnalysis EEG/ICU/LTM and BWCenter. Medellin, Colombia was a wonderful setting for the four days, enhancing the exchange of information on medical, social, and scientific advances in epilepsy. Participants enjoyed outstanding courses, workshops, and conferences coordinated by renowned international and regional professors.

According to the president of the Latin American Region of Epilepsy, Dr. Mario Arturo Alonso Vanegas, this congress "was the perfect platform, giving the area of epilepsy the publicity it needs, which is a public health problem in the region." We look forward to providing continued medical education to all neuroscience participants, upgrading also the treatment of people with severe disabilities. Doctors from different Latin American countries were present at the event, which managed to gather a total of 600 participants. This demonstrates not only the success of the congress but also the assertiveness of Neurovirtual in supporting this meeting since 2017.





## Neurovirtual participates in the Mexican Chapter of the International League Against Epilepsy 2022 meeting



Diego Barrientos (Sales Mexico) and Andrea Parra (Sales Manager Latam)



Ed Faria (CEO & President Neurovirtual), Dr. Daniel San Juan, Joseph Pardo (Sales Mexico), Ruben Ramirez and Andrea Parra (Sales Manager Latam).

The daily objective of the Mexican Chapter of the International League Against Epilepsy (CAMELICE) is working to push more research about epilepsy in Mexico. This is also the purpose of its Annual Meetings, in which Neurovirtual always has a big presence.

The XLIV edition of this huge congress took place in Guadalajara, Mexico, between August 10th and 13th. In a hybrid format, the event brought together active members, correspondents, and companies interested in actively contributing to medical studies in Mexico and one of them was Neurovirtual.

Neurovirtual welcomed to their booth well-known neurologists and neurosurgeons from Mexico and abroad. Representatives for Neurovirtual presented BWIII EEG PLUS and BWIII EEG equipment, available there. ILAE and CAMELICE presidents, Dr. Mario Arturo Alonso Vanegas and Dr. Daniel San Juan, respectively, were some of the names that were able to check these solutions' functionality inside this commercial space.

A sponsor since 2015, Neurovirtual has always been part of several social spaces available during the event. During the welcome cocktail hour, the company's CEO, Ed Faria, dedicated a few thank you's to all assistants and to the constant CAMELICE support. To further strengthen the networking and experience exchange, Neurovirtual organized a dinner, led by Ed Faria, during the congress. This was another fundamental meeting for the path of international neurological medicine participants in the best way.



Joseph Pardo (Sales Mexico), Andrea Parra (Sales Manager Latam) and Dr. Mario Alonso Vanegas.



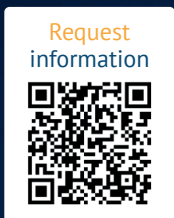
Ed Faria (CEO & President Neurovirtual), Dr. Paul Shkurovich Bialik, Andrea Parra (Sales Manager Latam) and Joseph Pardo (Sales Mexico).



Neurovirtual participates, on average, in 20 to 30 congresses and conferences in different countries around the globe. Taking our goal to humanize the diagnostic, we pride ourselves on being part of this community and being able to give our contribution to clinicians and patients.

Below you will find the list of events for 2023 where Neurovirtual will be presenting its solutions to make neurology and sleep diagnostics more human! We hope to see you there!

The **BWIII EEG Plus ICU Brain Monitor** is an all-in-one cart based system which can perform routine EEG, LTM, and ICU Monitoring for increased mobility demands.



## USA

### SLEEP 2023

Indianapolis, IN  
June 3-7, 2023

## MEXICO

### UNAM World Sleep Day

Mexico City  
March 17, 2023

## BRAZIL

### XIV Paulista Congress of Neurology

Santos, SP  
May 31 - June 3, 2023

### 32nd Annual Congress of the Mexican Society of Pediatric Neurology

Chihuahua  
May 13 - 20, 2023

## LATAM

### World Sleep Society

Rio de Janeiro, RJ  
October 21-25, 2023

### Latin American Symposium on QEEG and Video EEG

Lima, Peru  
April 13 - 15, 2023

## COLOMBIA

### 15th National Congress of Sleep Medicine

Barranquilla  
March 8-11, 2022

### XVI Pan-American Congress of Neurology

Lima, Peru  
June 8 - 10, 2023

### 15th Colombian Congress of Pediatric Neurology

Colombia  
June 9-12, 2022

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