

## Polysomnography: One Tool in Helping in the Diagnosis and Treatment of Fibromyalgia

Stop! and imagine for one moment that your body is being savagely and brutally attacked by chronic pain. This pain is so intense that you become less active. As you become less active you start to develop muscle weakness. Just trying to do normal daily activities such as, working, housekeeping, cooking, playing with the kids, shopping, walking the dog and sleeping has become an extreme ordeal. All is not peaceful in the Land of Nod.

In fact, you as a fibromyalgia (FM) sufferer are downright restless. As of this writing, fibromyalgia is the most misdiagnosed and misunderstood syndrome of the 21 century. Because it mimics other diseases and conditions, many people with FM initially have often been diagnosed as having multiple sclerosis, scleroderma, rheumatoid arthritis or lupus. Fibromyalgia has also been closely associated with chronic fatigue syndrome, it shares many of the same qualities.

Since so many fibromyalgia sufferers have been misdiagnosed, experts have categorized fibromyalgia as a syndrome rather than a disease. A syndrome is defined as "an aggregated of signs and symptoms associated with any morbid process."

Although it does occur in men, women in their late 40's and older are at least four times more likely to develop the disorder.

Pain, it is the most common symptom and complaint of the FM sufferer. Some people experience pain, fatigue, muscle stiffness and swelling in their joints, especially in the morning. This stiffness can be quite distinct and be accompanied by pain in key areas of the body, usually in the neck, shoulder, lower back and buttoch.

Irritable bowel syndrome has been reported in approximately 40-70 percent of these patients. It is not unusual for those afflicted to have diarrhea, constipation or a frequent need to empty their bladder. Fatigue and restlessness in FM patients can cause poor concentration, memory loss, non-restorative sleep and secondary endocrine malfunction involving the hypothalamic pituitary and adrenal glands.

Approximately 50 percent of FM sufferers experience some sort of increase sensitivity to stimuli, such as, flashing lights (photophobia), increase sounds (phonophobia), and various odors. Some patients often present with a chronic runny nose, congested head cold, and a throat clearing cough. Another common complaint is restless leg syndrome. When a FM sufferer presents to their doctor their are two things they want more than anything in this whole wide world. They want their pain alleviated and one of the greatest pleasures known to all creatures, the ability to get a good night of rest and sleep.

### Fibromyalgia and Sleep

Sleep is vital to our very existence, it is during sleep that our temperature decreases conserving energy, sugars are stored for future use, our immune system is blasted into action and growth hormones are released fostering the repair of cells and tissues. That important journey into sleep is a beautiful time for our bodies and brains to heal themselves from the vigorous wear and tear of daily living. But, numerous studies have been conducted which reveal that persons with fibromyalgia have a sleep disturbance that prevents them from receiving these healing powers. Many physicians are unaware of the importance of getting a sleep study done on their FM patients.

Here's what we know, a landmark study published in 1975 discovered that 70 percent of patients with FM had NREM (non-rapid eye movement) stages of sleep "contaminated" by an abnormal EEG pattern called alpha-delta sleep, in which incurrent alpha waves (seen when you are awake) are riding on large, slow delta waves. This constant alpha-delta intrusion robs the body of deep sleep (stage 3 and 4 sleep). It is during this stage of sleep that our body is being repaired. There is also some evidence indicating that fibromyalgia syndrome and sleep disorders are intimately related, but know one is certain which causes the other. Many FM sufferers exhibit bruxism (tooth-grinding), periodic limb movement (PLM), and obstructive sleep apnea (OSA). The absence of stage 3 and 4 sleep in FM can also cause chronic sleep deprivation and may contribute to the rapid physical decline many doctors see in their patients.

Diagnosing FM is not an easy task. To actually receive a diagnosis of fibromyalgia, the American College of Rheumatology, identified 18 separate points on the body called "tender points," by applying pressure with the index, third and fourth fingers of the examiner's hand at nine key bilateral surface sites. These include the side of the hip joint, and buttock and the inside of the knee.

In addition, the patient must complain of widespread pain lasting at a duration of 3 months or more. the pain must be radiating on both sides of the body, and be above and below the waist.

### Fibromyalgia and the Polygraph

There is no cure for fibromyalgia. The only relief FM sufferers can hope for is the treatment of their symptoms. Majority of FM patients complain that no matter how long they sleep, it is never restful. Their sleep may be interrupted by frequent awakenings, or they wake up gasping for air, or in pain. Even more common most patients complain of waking up day after day feeling exhausted.

Many of the symptoms that FM patients experience are shared by those with other sleep disorders. As sleep care professionals, we do know the symptoms. Now we must raise awareness to patient and doctors treating FM, that their lack of sleep can be caused by so many factors. Such as, pain, sleep apnea, PLM and bruxism.

But how, (you ask) would a doctor know for sure in a patient complaining of sleep deprivation that their lack of sleep is because of pure fibromyalgia versus fibromyalgia overlap with another sleep disorder?

Here's your answer, "Polysomnography." The polygraph can be used as one of the tools to help doctors battle the problem. In order for you to better understand how fibromyalgia works in sleep. I invite you to come along with me and peek in on the inner workings of the fibromyalgic brain.

I had been working in sleep medicine as a polysomnography technician for only six months when I saw my first client with fibromyalgia. LT was a forty-eight years old female, mildly over-weight and in poor overall health. Her chief complaint was, (Yep you guess it), pain and lack of sleep.

I meticulously place each EEG electrode on her scalp making sure I properly prep and measure each site. I attached two effort belts, one on her chest, the other on her abdomen. Leads were placed near her eyes and chin. Leads were placed on her legs, and EKG leads were placed on her chest. A thermistor airflow was placed at her nares and a pulse oximeter probe on her finger. The setup procedure took about an hour, to pass the time away she and I "chatted" about our families and recent news events

Once in bed the client was hooked up to the EEG machine and monitor. She was allowed to watch a little television around 10:30 PM she started getting sleepy. She lets out one big yawn and shuffled between the covers. On the computer screen I notice LT is drifting in and out of sleep (microsleep). She's not totally asleep yet, but her body is relaxing and preparing itself for sleep. It is during this time that her body temperature drops, and her pineal gland at the base of her skull is slowly releasing melatonin in her bloodstream, signaling to her brain that it's time to make that wonderful transition into sleep.

Now this is where the fun for me as a sleep technologist begins. On a computer screen I get to observe all the wonderful electrical activities of the brain. When she was awake I observed those fast, low-voltage type of brain waves called beta waves. But as she closed her eyes, the waves change to a slow-high voltage brain rhythm called alpha waves. Alpha waves danced across the screen for several more minutes, then suddenly right before my eyes the alpha waves were quickly replaced by a new wave pattern called theta. Her mind is no longer thinking about her day, LT has now drifted from a state of conscious wakefulness to that wonderful abyss called stage 1 sleep.

Stage 1 sleep is the lightest stage of sleep. Considered transitional sleep, stage 1 will move LT into a deeper and rewarding sleep state. Her eyes began to roll slightly from side to side, she no longer hear the sounds of cars and trucks passing her window. Or the mild humming noise coming from the fan. But yet if I were to enter her room and lightly touch her arm, she would be easily aroused and not have a sense that she had been sleeping at all.

After 5-7 minutes in stage 1 sleep, LT slowly enters stage 2, during this stage of sleep two identifiable sleep-specific wave forms pop on the screen. Sleep spindles and K-complexes, these are two beautiful wave forms floating across the polygraph. I love vintage cars so every time I look at a sleep spindle, I am reminded of old spoke tires on a Ford Model T. K-complexes are quite different than a sleep spindle, it is a super large wave form that appears seconds before a sleep spindle, and looks like the QRS complex on a EKG tracing, with a well delineated negative upward spike which is immediately followed by a positive downward spike. Both of these wave forms appear and disappear across the screen in seconds. LT's legs begins to twitch several times. She now is definitely showing signs of PLM.

15 minutes later she falls into stage 3 sleep or deep sleep. In stage 3 sleep she is not easily aroused. In this stage of sleep between 20-50 percent of the waves are transformed into delta waves. Over size slow tee-pee shape waves ripple across the EEG computer and appear again and again. When all of a sudden (out of the blue) delta waves are constantly being bombarded by alpha waves. Until finally for every delta wave seen an alpha wave intrudes on its territory. LT is no longer asleep, the alpha-delta intrusion causes her eyes to pop open. After twenty minutes staring at the ceiling, she then takes her first bathroom break, why not, her restful sleep has been interrupted.

Once in bed, her sleep debt built up from her arousal causes her to fall quickly back into stage 1 sleep again. Throughout the night she will repeatedly travel up and down the stages of sleep, never reaching stage 4 or REM sleep because of alpha-delta intrusion and PLM. This constant interruption in her sleep can hamper the proper release of serotonin, (which is necessary for the activation of an important immune system cell called "natural killer cells") and growth hormones that aid in rebuilding damaged cells. LT's sleep test ends at 6:00 AM, she had several complaints from being tired, to increase pain, to being unhappy. These are all typical complaints of a FM sufferer.

A trained and experienced polysomnographic technologist then analyzed and scored LT's sleep data. The report indicated she had frequent leg movements in stage 1 and 2 sleep, consistent with the disorder premature leg movement (PLM), along with frequent arousals and alpha-delta intrusion.

A month later, a follow-up phone call was conducted by the sleep center. Therapy for LT included low dose antidepressant, physical fitness training and benzodiazepines such as clonazepam which help in promoting better sleep, by relaxing skeletal muscles and reducing her premature leg movements. Every fibromyalgia patient is different and may require a different individualized treatment, (some patients may suffer from sleep apnea or bruxism.) But, for LT these combination of treatment seemed to help and she was happy with the outcome.

## Conclusion

I hope this small glimpse into fibromyalgia will help explain why patients need and will benefit from a sleep center. Precise diagnosis is essential to establish the existence of fibromyalgia and distinguish this disease from other sleep disorders. Once the diagnosis is made, a multifaceted approach is then required to ensure healing and restful sleep. The consequences of fibromyalgia can be significant for those affected as well as bed partners and family members. Although many patients try to self-manage their lack of sleep, most will eventually seek treatment if symptoms are progressive and/or unrelenting. I extend this one challenge to every doctor and that is to ask their fibromyalgia patient one question, "How are you sleeping?"

## About the Author

Shirise J. Wilson is a health professional and founder of [cpapcompare.com](http://cpapcompare.com), where you can find great information on snoring and sleep apnea products. Her newest ebook is FREE!

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