

## Narcolepsy

The importance of sleep is always a big factor in people's day to day lives. The amount of wakefulness affects how people interact, and lack of sleep in general can be unhealthy for the human body. In narcoleptic patients, no matter how much sleep they get, the level of wakefulness is never as great as those without narcolepsy. This can not only negatively impact a narcoleptic's life, but can also negatively affect their health. When narcoleptics first start showing symptoms, they undergo testing to diagnose the disease. Once the diagnosis is made, doctors try to figure out the best medication or lifestyle changes to relieve any of the symptoms. As narcolepsy varies from person to person, there has been a lot of research into what causes the disease and who the disease affects. Discovering the cause of narcolepsy in each patient can give the doctors a better opportunity for helping the patient deal with the symptoms.

Narcolepsy has been said to feel the same as staying awake for a few days at a time, which causes those with narcolepsy to fall asleep within seconds, anywhere and at any time. Some individuals with narcolepsy will continue to go about whatever they were doing when these sleep attacks occur. They could be putting things away or simply just talking, and will have no recollection of what occurred whilst they were in the sleep state. This sleep state can occur for a very short period of time, including under a

minute, or can last an hour. (Brandt and Laberge 3528). This can cause major issues in regards to work, school, and other daily activities. The feeling of sleepiness throughout the day, excessive daytime sleepiness (EDS), is a major symptom that most if not all narcoleptics deal with. Narcoleptics can indirectly cause depression and loss of independence depending how EDS affects people. When EDS takes over, any work or schooling may get pushed aside. This makes it much more likely for narcoleptics to have to depend on someone to do daily functions or narcoleptics may become depressed because they are unable to do everyday things as they are constantly fatigued. These feelings may be more intense during pre diagnosis as narcoleptics have yet to start managing this feeling. Due to the fatigue experienced by narcoleptics, it is important that narcoleptics inform the department of motorized vehicles, as narcolepsy can be dangerous when vehicles are involved. Improvement of the fatigue felt with excessive daytime sleepiness does not get resolved right away. Even with medicines it may be more beneficial for narcoleptics to incorporate various nap times throughout the day to allow them to get the sleep they need. Obviously this can only be somewhat obtainable varying on the daily functions people have.

Another major symptom of narcolepsy is cataplexy. Not all narcoleptics have cataplexy, but it is a major struggle for those who do suffer from it. Around sixty-five percent of patients who have been diagnosed with narcolepsy have cataplexy. (Reading 30). Cataplexy is essentially muscle weakness, ranging from knees buckling and neck going slack all the way to becoming paralyzed and falling to the floor. For some who suffer from cataplexy beginning in childhood, it can be misdiagnosed as epileptic

seizures in young kids.(Kowalski et al. 102). Cataplexy, just like the daytime sleeping that occurs in narcoleptic patients, occurs randomly throughout the day and lasts anywhere from seconds to half an hour. Cataplexy attacks seem to onset upon the presence of strong feelings, including excitement or anger. (Brandt and Laberge 3528). These attacks occur suddenly, and can take place from under a minute to thirty minutes of this muscle weakness. Cataplexy attacks can also occur so often and can affect a person's life so much that two fifths of people with cataplexy begin therapy specific for these symptoms of cataplexy. (Reading 31).

Narcoleptics can also experience other symptoms accompanied with the rapid eye movement (REM) stage of sleep. Such things include vivid dreams, hallucinations, and even sleep paralysis. (Kowalski et al.100). These symptoms can make it difficult to get a goodnight's sleep, which will also cause more of the fatigue that narcoleptics experience. Despite the fact that narcolepsy is known as a disease that makes people sleep, there are quite often times that narcoleptics experience insomnia or difficulty actually sleeping.

Most of figuring out what causes narcolepsy is first beginning with who is most affected by the disease. In terms of gender, it seems to affect the same amount of men and women, but more people are affected in Japan than in Israel. In terms of America, however, a ratio of one out of two thousand people are affected by the disease. (Brandt and Laberge 3527). There is also a higher risk for people who suffer from migraines to also suffer from narcolepsy, but not enough evidence has been gathered to prove that entirely (Yang et al. 10) Narcolepsy can also be onset as a secondary diagnosis,

following tumors, injuries, or any other brain and spinal cord changes. (Kowalski et al. 101).

There is still not enough evidence to prove any particular thing causes narcolepsy. Many studies have been done to see any common factors in narcoleptic patients. Narcoleptics have low levels of a hormone called hypocretin. (Brandt and Laberge 3527). This seems to be due to a lack of neurons that produce this hormone. Hypocretin controls the feelings of being awake and sleepiness, and since narcoleptics lack hypocretin they don't have the wakefulness feeling that non-narcoleptic people have. The hypocretin also establishes nocturnal blood pressure levels, making a narcoleptic's blood pressure levels a lot lower than normal during the night. (Sieminski et al. 2) There is also a specific allele, or group of genes, that make up the human leukocyte antigen (HLA) that many people with narcolepsy seem to have. More than four-fifths of people who have narcolepsy have the allele, which is HLA DQB1\*0602. Many people with the allele also seem to have cataplexy. (Brandt and Laberge 3528). In addition, narcoleptics seem to enter the REM stage of sleep a lot quicker than non-narcoleptic people enter REM sleep. Narcoleptics also seem to enter REM sleep multiple times throughout the day, even when they are not sleeping. This causes those with narcolepsy to experience vivid and realistic dreams. There also seems to be an increased risk of narcolepsy in people who have had the H1N1 Influenza in children and adolescents, but not enough evidence to deem it a cause of narcolepsy. (Kowalski et al. 101).

Narcolepsy symptoms generally start appearing during adolescence and early adulthood, but aren't diagnosed until roughly ten years later. Narcolepsy is diagnosed by the appearance of excessive daytime sleepiness as well as cataplexy, so people with narcolepsy without cataplexy can often go undiagnosed even longer. (Brandt and Laperle 3528).

To diagnose narcolepsy, there are a few different studies that can be done. There is the use of electrocardiography to measure when the rapid eye movement stage of sleep is entered during a night's sleep. (Brandt and Laperle 3528). As narcoleptics tend to enter REM sleep earlier than those without narcolepsy, this can be something that determines whether a patient has narcolepsy. There is also the MSLT, or the multiple sleep latency test. The MSLT pays attention to how much time narcoleptics spend in the rapid eye movement stage during naps, but isn't reliable as a method to completely diagnose narcolepsy as the test can be skewed based on the patient's previous night sleep or the type of medicine they used. (Reading 30). Another test is the sleep onset REM periods, or SOREMP, which also pays attention to how quickly REM sleep is entered. While this may prove narcolepsy, it is not one hundred percent accurate as those without narcolepsy might enter REM quicker depending upon how little sleep they may have received prior to the test. (Kowalski et al. 103).

In addition to these tests to determine or help determine whether a patient has narcolepsy, there are also other tests that can be done. There are blood tests, which in potential narcoleptic patients measure the amount of hypocretin present. Ultimately, though, no one test will determine whether a person has narcolepsy or not accurately

enough on it's own. A few tests are used, and when enough are positive for narcolepsy, then the diagnosis is made.

There has not yet been a cure discovered to treat narcolepsy, nor is there anyway to prevent the disease. Despite this, many medicines have been created to try to diminish the symptoms of narcolepsy as much as possible. This takes a while, as narcolepsy affects every person differently and so do medications. Patients might be prescribed "amphetamine-like stimulant drugs" to control any fatigue. (Brandt and Laberge 3529). Some narcoleptics find antidepressants to work well, as those with depression don't get enough REM sleep and antidepressants can be used to control that. Other patients try stimulants to control the feelings of excessive daytime sleepiness or to promote the feeling of wakefulness. The most common drug for EDS is modafinil, although it has been reported to cause extreme rashes in kids. (Reading 31). Narcoleptics might instead be prescribed dexamphetamine or methylphenidate, which are psychostimulant drugs. These drugs are taken separately or both are taken together in lower doses. (Reading 31).

In addition to medications, doctors might suggest managing lifestyles. Scheduling naps throughout the day to combat EDS works for some patients. (Brandt and Laberge 3529). There is also the option for hypocretin replacement therapy, which focuses on raising the quantity of hypocretin in the bloodstream. Immunomodulatory drugs strive for the same result, but by "limiting the degeneration of hypocretin neurons". These drugs include prednisone and intravenous immunoglobulins. (Kowalski et. al. 104).

While there are medications to make being awake easier for those with narcolepsy, there are also medicines that focus on allowing narcoleptics to sleep. These medicines have the intention of giving narcoleptics a good night's sleep in the hopes that narcoleptics don't feel as tired during the day. They try to achieve this by promoting the nonREM sleep stage.

The feeling of wakefulness or the ability to sleep is not the only thing medications strive for. Patients with cataplexy find this the more debilitating of their symptoms, and therefore try to resolve this issue first. A sodium oxybate medication, xyrem, has been used since 2002 to treat narcoleptics with cataplexy. (Brandt and Laberge 3529). Medications such as venlafaxine and clomipramine are also used for cataplexy, although clomipramine seems to cause more side effects. Drugs to combat cataplexy are controversial and somewhat rarely prescribed as they have been used for date-rape purposes instead. (Reading 31).

As there are many medicine options and treatment options, the choice depends mostly on the person. Every person is affected differently than the next, so whichever symptom is most debilitating to the patient is what determines which treatment option is used. (Kowalski et al. 104). From there, the person can see which medicine works for them and figure out more ways to manage any other symptoms.

The symptoms of narcolepsy can become extremely difficult to deal with, as it includes extreme fatigue, it makes people fall asleep suddenly, and it can even cause weakening of the muscles. This depends on how narcolepsy affects the patient specifically, seeing as there is narcolepsy with cataplexy and without. Either way,

though, narcolepsy takes a toll on a person's state of wakefulness and creates issues in working, schooling, or any other daily activities. Many medications have been created to try to relieve some of the symptoms of narcolepsy. Beyond medicine, those who have been diagnosed with narcolepsy must also try to manage the symptoms to try to maintain their day to day functions.



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