

Nightwalkers

In Search of a Good Night's Sleep

RLS: A Rising Star at NIH

Some might assume that the planets are now in alignment; the more likely scenario is that the years of effort on the part of RLS Foundation staff and volunteers are finally coming to fruition. Either way, RLS has certainly captured the attention of a number of people at the National Institutes of Health (NIH). With its mission to “uncover new knowledge that will lead to better health for everyone,” the NIH is charged with wisely investing taxpayer dollars “for the support and conduct of biomedical research.” Between the May workshop to be held at the National Institute on Aging (NIA), Bob Waterman’s appointment to the National Institute of Neurological Disorders and Stroke’s (NINDS) Council, the number of RLS grants being funded, and the recently released program announcement, we’re making inroads into this vast universe known as the NIH.

NIH workshop

As this newsletter is going to press, final arrangements are being made for a workshop to be held May 1-3, 2002, on the NIH campus. With Dr. Andrew Monjan from the NIA leading the efforts, and additional support from the NINDS, National Center on Sleep Disorders Research, and the National Institute on Mental Health and sponsorship from the RLS Foundation through an unrestricted grant from Pharmacia Corporation, the meeting will bring together specialists in RLS from throughout the world. Those attending will include many professionals who have been working on and have published scientific papers on diagnostic and epidemiologic issues related to RLS, as well as experts who will assist the RLS specialists with this development. The scientists will meet in large and small groups to help refine the criteria used to diagnose RLS and to develop questions to be used in studies that will help identify the epidemiology or rate with which RLS occurs in a given group of people. According to Richard Allen, PhD, “Addressing the issues of the diagnosis of RLS and the diagnostic and epidemiologic tools will facilitate and enhance the current rapid development of RLS research.”

Bob Waterman appointed to NINDS Council

Secretary of Health and Human Services, Tommy G. Thompson, has appointed Bob Waterman, Chair of the Board of Directors of the RLS Foundation, to the National Advisory Neurological Disorders and Stroke Council. As the major advisory panel of the NINDS, the Council meets three times each year to review applications from scientists seeking financial support for biomedical research and research training on disorders of the brain and nervous system. Members also advise the Institute on research-program planning and priorities.

Waterman joins an august group of 18 physicians, scientists, and

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representatives of the public. “The Council has benefited greatly in the past from the contributions of members who are drawn from outside the usual medical, scientific, and academic areas,” said Constance W. Atwell, PhD, Director of the NINDS Division of Extramural Research. “We think Bob Waterman’s expertise in management and his



Bob Waterman

interest in training of physician scientists will make a very strong addition to the Council and look forward to a productive term during his tenure.”

As one of the 19 institutes at the NIH, the NINDS is specifically charged with reducing the burden of neurological disease—a burden borne by every age group, by every segment of society, by people all over the world.

NIH funds multiple grants related to RLS

As reported in earlier issues of *NightWalkers* Guy Rouleau, MD, PhD, received funding from the NINDS for his work on the genetics of RLS in 1998. This project resulted in the publication of his work in the December 2001 issue of the *Journal of Human Genetics*. Please see the February 2001 issue of *NightWalkers* for additional details.

Christopher Earley, MD, PhD, has received two grants from the NIH to study various aspects of RLS. In the first, Dr. Earley and his fellow researchers began studying the relationship between symptoms of RLS and iron. They theorize that because RLS is often treated with dopaminergic agents and iron is required for the production of dopamine, a defect may exist in the transport or storage of iron in people with RLS. Dr. Earley will also explore relationships between iron and measures of dopaminergic activities in the cerebrospinal fluid (the nutrient-rich fluid that continuously bathes the brain and spinal cord), information that could ultimately provide the basis for entirely new research and treatment approaches to RLS.

The second NIH-funded project, begun two years ago, seeks to determine the genetic cause of RLS. Through their preliminary work, which involved 96 families with RLS, Dr. Earley and his colleagues

found a particularly strong familial component in people who had RLS symptoms before the age of 45. The ultimate goal of this project is to obtain “reliable data from a carefully characterized family study sample,” paying particular attention to the age of onset of the RLS symptoms. The researchers have three aims: 1) to compare family-history studies between all first- and second-degree relatives of 130 people with RLS with those of a group of controls (people without RLS); 2) to test the theory that it’s possible to both identify a subset of people with familial, early-onset RLS and determine the most likely age of onset for defining such a group; and (3) to use a genetic technique known as segregation analysis to determine the gene or genes responsible for causing RLS.

Christopher S. Leonard, PhD, professor of physiology at New York Medical College, is working on a study that is related to RLS. The long-term objective of his proposal is to determine the molecular identity and function of ion (calcium, potassium, etc.) channels and receptors expressed by sleep-related nerve cells in order to understand the molecular mechanisms controlling sleep generation. His focus is on a family of potassium channels subunit genes that are believed to play an essential role in the generation of wakefulness and rapid eye movement sleep. Using genetically altered mice, he hopes to both increase our understanding of the molecular basis of sleep and continue developing an animal model for future studies.

Program announcement

The recently released program announcement on RLS (see the February 2002 *NightWalkers*) has already resulted in a significantly increased number of applications on RLS to the NIH. Although the results of those submissions are not yet available to the public, we are encouraged by this initial response.

When compared to the amount of NIH funding and interest generated by disorders such as Parkinson’s disease, RLS remains a speck in the NIH cosmos; however, we’re pleased with our trajectory. RLS is on the NIH radar screen and set to launch into the stratosphere.



Foundation Announces 2002 Research Grants

NightWalkers

is the official publication of the Restless Legs Syndrome Foundation

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NightWalkers is published in February, May, August, and November. Ask the Doctor questions, Bedtime Stories, address changes, contributions, and membership inquiries should be sent to *NightWalkers*, RLS Foundation, 819 Second Street SW, Rochester MN 55902.

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Warning and Disclaimer

Persons suspecting that they may be afflicted with RLS should consult a qualified healthcare provider. Literature that is distributed by the Restless Legs Syndrome Foundation, Inc., including this newsletter, is offered for information purposes only and should not be considered a substitute for the advice of a healthcare provider.

The RLS Foundation proudly announces the recipients of the 2002 research awards. Two of the investigators are familiar faces—Felipe Espinosa, DVM, PhD, and David Rye, MD, PhD. Dr. Yuan-Yang Lai is working in the laboratory of Dr. Jerome M. Siegel at UCLA.

Espinosa

Pleased with the progress that Dr. Espinosa has made on his research to develop an animal model of RLS, members of the Scientific Advisory Board and Board of Directors have renewed his fellowship funding for a second year. Please see the February 2002 issue of *NightWalkers* for additional details on Dr. Espinosa's mouse that has been bred to be missing two potassium channels.



Felipe Espinosa, DVM, PhD

Lai

Dr. Lai's goal is also to establish an animal model of RLS and PLMD. In their previous studies, she and her colleagues found that lesions of specific areas of the brain [namely the ventral mesopontine junctions (VMPJ)] produce periodic muscle twitches. These twitches can be calmed by injecting a substance known as glutamate into another area of the brain. This finding suggests that descending projections from the VMPJ are important in the control of muscle activity.

Dr. Lai's pilot data indicate that producing a lesion of the VMPJ with another substance (NMDA) causes periodic muscle twitches during slow wave sleep. The muscle twitches in slow wave sleep seen in the lesioned animal resemble RLS/PLMD in humans.

Dopamine agonists are effective in the treatment of RLS/PLMD in humans. However, the neural substrate responsible for this effect is unclear. Dr. Lai's theory is that descending dopaminergic projections from the VMPJ play a crucial role in the control of muscle activity in sleep. She will investigate the role of the VMPJ

in motor control across the sleep-wake cycle. This proposed work should help us to understand the abnormalities of neural function that underlie RLS/PLMD and will also provide guidance toward developing treatments that are more precisely targeted to these abnormalities.

Rye

Dr. Rye is not only taking his RLS research in a new direction from his previous work, he's taking it to a new country. He will be collaborating with scientists at deCode Genetics in Iceland.



Yuan-Yang Lai, PhD

Continued on next page

Because Iceland has a very isolated population with detailed family histories, each person can be traced back to a few founders. RLS is present in this population, but it has not been systematically studied or identified. Dr. Rye will work with deCODE Genetics, an Icelandic company, and local



Iceland's star attraction, Gullfoss, is the country's most famous waterfall.

Icelandic sleep specialists to identify the gene or genes that cause or modify RLS. deCODE has a track record of identifying gene candidates for a number of complex disorders, including schizophrenia, stroke, and late-onset Parkinson's disease.

The investigators will use four questions to screen a large group of people for symptoms of RLS. A nurse practitioner, who has been trained in the diagnosis of RLS by Dr. Rye, will examine each potential participant, as well as "unaffected" family members, and obtain blood samples and family histories of RLS. The blood samples will be mapped in the deCODE laboratories. The researchers will also use a portable device to document periodic limb movements.

The true power of this project can be realized through the use of deCODE's proprietary software and Icelandic phenotyping, which will allow for ready screening between databases to establish interrelationships between multiple genes and interactions between genes and the environment (for example, RLS and anxiety, RLS and ADHD, and RLS and iron). deCODE has ongoing projects looking for the genes for anxiety and ADHD. Upon completion of preliminary recruitment and genotyping, the investigators anticipate applying for independent funding through the National Institutes of Health or the National Science Foundation.

Ask the Doctor

Q I have a family history of pernicious anemia and probably of RLS. For many years I gave my mother B₁₂ injections because she was diagnosed with pernicious anemia. My maternal grandfather died of pernicious anemia before a treatment had been found. My mother, although never diagnosed, almost certainly had RLS. With this history of B₁₂ deficiency, I have often wondered if there is a relationship between pernicious anemia and my own severe RLS. Would it make sense to have a trial course of parenteral B₁₂ to see if it would help to alleviate the severe RLS symptoms that I experience?

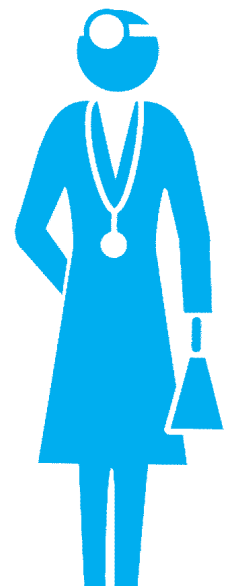
A Because vitamin B₁₂ is important in maintaining normal nerve function in both the peripheral and central nervous system, I would not be surprised that vitamin B₁₂ deficiency was at least associated with aggravation of RLS. There is some increased risk of RLS with peripheral nerve damage; therefore, to the degree that vitamin B₁₂ deficiency causes nerve damage, it might be expected to increase the risk of RLS. However there are no studies specifically tying vitamin B₁₂ deficiencies to RLS. All patients with vitamin B₁₂ deficiency should be on treatment with vitamin B₁₂ supplements and that should be the case whether you have RLS or not. To see if you have vitamin B₁₂ deficiency, you can have your blood levels checked by your family doctor.

*Christopher J. Earley, MD, PhD
Johns Hopkins Medical Institute*

Q I have had migraine headaches for more than 30 years. About 10 years ago, I developed RLS. Is there a connection between the two disorders and, if so, what might that be?

A There is no clear-cut relationship between migraine headaches and RLS. Both, however, do have strong hereditary components.

*Charles H. Adler, MD, PhD
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Moscow is Healthy Sleep Capital

The National Sleep Foundation recently named Moscow, Idaho, the *2002 Healthy Sleep Capital of America*. As the second site in Stanford University's

Primary Care Sleep Education Project, Moscow has embraced the motto of *Sleeping for Success*.

When researchers surveyed people in this community more than 5 years ago, they discovered an unusually high rate of positive responses to questions related to RLS symptoms. Because of that, scientists from the Stanford University Sleep Research Center approached the RLS Foundation in 1998 to expand their work in seeking to identify the prevalence of RLS in Moscow. An RLS expert from Johns Hopkins Medical Institute and primary-care physicians at the Gritman Medical Clinic in Moscow joined the efforts, and the RLS Foundation provided financial support through an unrestricted grant from Pharmacia Corporation to make this research possible.

Ultimately, the two-year-long project, in which adult patients who visited the Gritman Clinic completed questionnaires about their sleep, provided not only the data to identify the true prevalence of RLS in this population, but also additional information about the impact of RLS on quality of life and the effects of treatment. Almost 25% of participants were found to have a likely diagnosis of RLS. Through further scrutiny and follow up, 10% of the patients are now receiving treatment for their RLS and have an improved quality of life (see *NightWalkers* August 2001).



Debee Nichols, MS, receiving the National Sleep Foundation's (NSF) 2002 Healthy Sleep Capital of America award, with Richard Gelula, NSF executive director on her left and Jim Walsh, PhD, president of the NSF on her right.

HealthBeat Radio

I suffered from confusion, irritability, and inability to stay on task. I was not able to participate in any what I call 'R&R' activities. It became impossible to go on a long road trip in an automobile. Flying in a plane was completely out of the question until I was treated.

Does this story sound familiar to you? Sheila Connolly, past chair of the RLS Foundation's Board of Directors, recently shared this message and others with listeners of *Healthbeat Radio Network*, an award-winning series of 60-second health news and information radio programs. Produced by the National Heart, Lung, and Blood Institute at the National Institutes of Health, HealthBeat segments are available free of charge to radio stations throughout the US. Stations can log on to www.healthbeatradio.net and search for *RLS* to find five programs: *Restless Legs Syndrome: A Neurological Disorder That Affects Sleep*, *Restless Legs Syndrome: Help Is Available for Restless Legs Syndrome*, *Restless Legs Syndrome: Trouble Sitting Still?*, *Restless Legs Syndrome: Daytime Sleepiness? It Could Be RLS/PLMD*, and *Restless Legs Syndrome: Researchers Studying Causes of RLS*.

These programs can be downloaded from the web site, or stations can register with the NHLBI and receive a complimentary CD-ROM for their use. Contact your local radio stations, encourage them to download and air these programs. You can help make universal awareness of RLS a reality.



Social Security Disability and RLS

If you are unable to work because of RLS, you may be entitled to receive monthly disability payments under either of two disability programs administered by the Social Security Administration (SSA). The first program is Social Security disability insurance (SSDI), which is based on the taxes you've paid into the system. The second, supplemental security income (SSI), is based on financial need. Severe, uncontrollable RLS can be disabling itself or it can be a contributing factor when there are additional impairments that limit your capacity for work. Unfortunately, it's difficult to prove that you have RLS, and even more difficult to prove that it prevents you from working. If you apply for disability benefits, you should know how the system works, and you should be prepared to take a proactive approach toward shepherding your claim through the process.

In most states, disability decisions are made at five levels: the initial level, the reconsideration level, the Office of Hearings and Appeals (OHA), the Appeals Council, and the court system. Some cases have been appealed and won in the US Supreme Court. The first two levels (initial and reconsideration) are adjudicated by state agencies called *Disability Determination Services* (DDS). A new system that streamlines the process and eliminates the reconsideration step is being tested in ten states.

The SSA disability system is generally fair, if not fast. If you can't work because of physical or mental medical conditions, you will normally receive benefits—eventually. People who apply for benefits on the basis of RLS are often unsuccessful until they appear before an Administrative Law Judge (ALJ) at the OHA. It may take a year or more to obtain an OHA determination, and attorneys' fees may absorb a large portion of any retroactive award. The trick is to have benefits awarded at an early stage.

There are three basic obstacles to an early favorable outcome on a disability claim based on RLS.

1. Your description of your symptoms is not enough to qualify you for benefits. You must have a *medically determinable impairment*.

A disability decision is based on medical evidence. There are no diagnostic tests or a specific set of signs and symptoms that establish a diagnosis of RLS. The diagnosis is typically based on the clinical history taken by a knowledgeable treating physician who is familiar with both RLS and your particular circumstances.

Your own treating physician is always the preferred source of information. The SSA will attempt to secure this information, but it is frequently either inadequate or unobtainable for various reasons. If SSA can't obtain sufficient information from existing sources, they will arrange and pay for a disability examination with a consulting physician. In most cases, the consulting physician will not be familiar with your circumstances and probably won't find any physical evidence of RLS to support your claim.

2. Despite advances in recent years, the medical community remains poorly educated concerning the functional effects or even the existence of RLS.

Although a relatively common disease, RLS remains unknown to many in the medical field. Disability adjudicators, review physicians, and ALJs may not realize what a devastating impact RLS can have on one's ability to work, and they may not know how to evaluate it appropriately under the complex SSA regulations. You may have to educate them by including material such as the RLS Foundation's *Medical Bulletin* along with your disability application.

3. The SSA does not have specific criteria for the assessment of RLS, PLMD, or other sleep disorders.

The SSA has a *Listing of Impairments*, which consists of a broad spectrum of impairments that are considered *disabling*. If you don't *meet a listing*, you can still qualify if you have an impairment or combination of impairments that impose functional limitations *equivalent* to one of the listed impairments. Unfortunately, there's no listing for RLS or even a listing that is comparable. It's important to furnish SSA with a detailed description

of your own particular limitations since it will have to stand on its own merits.

If you don't qualify on the basis of medical considerations alone, SSA uses a complex process that assesses your *functional limitations*. If you can't resume your usual work activity, SSA will consider your age, education, and relevant work experience to determine if you have *transferable skills* to other forms of work.

The good news is that there is a renewed emphasis on incorporating into the decision-making process the opinions of treating physicians and the testimony of disability applicants themselves.

You may shorten the assessment process, improve your chances of a favorable decision, and avoid unnecessary examinations if you obtain a report from your own physician and submit it when you file your application. (Be sure to make a copy.)

A simple statement that you have RLS and are *disabled* is not sufficient. Your physician's report should include a treatment history, relevant clinical observations, test results, dates first and last seen, frequency of visits, and a diagnosis and prognosis plus a functional assessment of how your problem or problems limit your ability to work.

This functional assessment or *medical source statement* is one of the most important pieces of information in any disability

case. The SSA is less concerned with the nature of your impairment than they are with how it affects your ability to function. Your treating physician's opinion concerning what work-related activities you can no longer perform will serve as the *controlling factor* in the decision-making process unless there is clear evidence that refutes it.

Functional assessments are generally expressed as quantified estimates of how long or how much you can sit, stand, walk, lift, carry, bend, stoop, climb, etc. Other work-related limitations that may be associated with RLS include daytime fatigue, drowsiness and lack of energy, impaired ability to concentrate, remember instructions, stay within a schedule, maintain attendance, arrive at work on time, or keep up an acceptable pace. Your physician's report should include an appraisal of such factors when relevant.

Some RLS medications can be very potent. The report should address any significant physical or mental side effects that you may be experiencing from drugs or any other therapy. If you have secondary depression or anxiety, an assessment of how these problems further impact your ability to work is important. It would be worth your time to make a list of your functional limitations before visiting your physician rather than trusting your memory.

You can apply for benefits by calling or visiting your local

Social Security office. They will take information over the telephone and send you an application, or they may give you an appointment to come in for an interview. All items on the application forms are important and should be completed carefully. You should be prepared to furnish accurate names, addressees, and telephone numbers (including FAX numbers) of your doctors, hospitals, or therapists. The specific dates of treatment and the exact type of treatment or tests you've had are also important. A list of the medications that you take, along with an explanation of why you're taking them, can be very beneficial. You'll also be asked to provide the dates and descriptions of all jobs you've held for the past 15 years.

The disability adjudication process is actually much more complex than this brief summary might indicate. You can obtain more details by accessing the SSA web site at <http://www.ssa.gov>. (Find the header "Benefits Information" and click on *disability*.) Information is also available through the SSA hotline at 800-772-1213. Service representatives are on duty from 7 AM to 7 PM, and recorded information is available 24 hours per day. You can obtain the booklet *Disability Benefits* (Publication 05-10029) by calling or visiting any Social Security office.

In the News

The following articles have been adapted from recently published reports in medical journals. To obtain a copy of the original article, please contact the author, whose name is listed at the end of the article.

Comella CL. Restless legs syndrome: Treatment with dopaminergic agents. Neurology 2002;58:S87-S92

Beginning with Dr. Akpınar's serendipitous observation in 1982 of the effects of levodopa and benserazide (like carbidopa, benserazide helps block the peripheral effects of levodopa), Dr. Comella outlines the published studies that have provided support for the use of both levodopa and dopamine-receptor agonists. She also highlights the potential side effects of the various drugs. Augmentation and rebound are common adverse effects, with the likelihood of the patient developing these two phenomena often being dependent upon the agent used to treat the RLS, as well as the dosage of the drug and the severity of RLS symptoms.

Augmentation—the occurrence of RLS symptoms earlier in the day than those that occurred before the institution of dopaminergic therapy—is most common with the use of short-acting agents like Sinemet (in one report, it occurred in up to 87% of patients). In a 2-year study of pergolide (Permax) 27% of the patients developed augmentation, and an observational study on the use of pramipexole (Mirapex) found an 18% augmentation rate in 50 patients.

According to Dr. Comella's review of the literature, although dopamine-receptor agonists may be the first line of therapy for patients with RLS who require drug treatment, "there is no evidence indicating the superiority of one direct agonist over another."

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Walters AS. Is there a subpopulation of children with growing pains who really have restless legs syndrome? A review of the literature. Sleep Med 2002;3:93-8

Could growing pains be the childhood manifestation of RLS? Dr. Karl Ekbom, the physician who coined the term *restless legs syndrome* in 1945, published a paper in 1975 that addressed

the relationship between RLS and growing pains in a single patient. Recently, Arthur Walters, MD, reviewed the published literature about growing pains and shared his findings.

Dr. Walters found that the term *growing pains* was first used more than 150 years ago to describe various muscular aches and pains among adolescents. In the early half of the 20th century, three groups of researchers published articles about growing pains, frequently not identifying what they meant by the term—some included joint pain, one didn't identify the location of the pain, and yet another addressed the relationship between growing pains and rheumatic fever. From 1950 to the present, additional more-detailed work has been published that encompasses studies in more than 5000 children. As the work ensued, the researchers identified the fact that growing pains occur predominantly in the legs, rarely in the arms, and most often at night—or during the day and night rather than exclusively during the day. Two groups of researchers found that children and adolescents who had growing pains were not infrequently found to have headaches and abdominal pain as well. Various remedies to treat growing pains included using analgesics, applying a hot water bottle, sleeping, and rubbing the legs.

Dr. Walters also identified three articles that specifically addressed the relationship between RLS and growing pains, including Dr. Ekbom's 1975 publication. Although Dr. Ekbom, in this paper, presumed that RLS and growing pains were separate entities, he did state that he had treated adults with RLS who were told when they were children that they had growing pains. Interestingly both Dr. Walters in a previous publication and Dr. Brenning, another Swedish neurologist, found that children with growing pains were much more likely to have a parent with RLS than were children without growing pains.

The author concludes that it is "unlikely that all patients with growing pains have RLS." However, in seeking to identify a subgroup of children with growing pains who subsequently, as adults, have RLS, Dr. Walters has identified issues that should be addressed in future studies: the use of polysomnography to identify PLMS, which is uncommon in children; the identification of the gene or genes that cause RLS; and the inclusion of

the four standard criteria for diagnosing RLS to identify the overlap in RLS and growing pains.

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Jakobsson B, Ruuth K. Successful treatment of restless legs syndrome with an implanted pump for intrathecal drug delivery. Acta Anaesthesiol Scand 2002;46:114-7

From Sweden comes a case report on the use of an implanted pump to treat RLS. Drs. Jakobsson and Ruuth describe their results in two patients: a 67-year-old man and a 52-year-old woman, both of whom had had RLS since adolescence. Their symptoms were now intractable, and traditional medications were no longer effective.

The physicians inserted a silicone catheter through the skin and the dura (the covering of the spinal cord) into the intrathecal space (with the tip of the catheter ultimately located in the thoracic region). The catheter was then connected to a pump with a reservoir that delivered a combination of an opiate (morphine HCl) and a local anesthetic (bupivacaine HCl); the anesthetic was discontinued after six months. By the first day after the operation, the patients reported complete relief from all of the symptoms of RLS, and the treatment remained effective during the follow-up period (16 months for the man, and 42 for the woman).

The authors of this paper caution that although a variety of intrathecally administered drugs have been used for the

long-term treatment of chronic pain, even in a well-studied population, this technique should be reserved as a treatment of last resort. A multicenter study needs to be completed in patients with RLS before this technique is used on a broader scale. In addition, physicians need to carefully evaluate patients to exclude any treatable causes of RLS, and they recommend that methods be developed to identify patients for whom the procedure has the least risks with the greatest benefits.

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Kryger MH, Otake K, Foerster J. Low body stores of iron and restless legs syndrome: a correctable cause of insomnia in adolescents and teenagers. Sleep Med 2002;3:127-32

Although increasing evidence is linking symptoms of RLS and low iron stores—as indicated by serum ferritin levels—previous publications have only addressed the issue in adults. Dr. Kryger and his collaborators recently published their findings of iron treatment for RLS in three adolescents: two 14-year-old males and a 19-year-old female.

Though all of the patients had severe insomnia and typical symptoms of RLS, none had evidence of anemia on traditional blood tests. When their ferritin levels were checked, however, all were found to have low body stores of iron (ferritin levels were 22, 26, and 3) and abnormal values on testing of total iron binding capacity and percent iron saturation. After undergoing polysomnographic studies to

rule out other causes of sleep disturbance and to confirm the presence of PLMS, all three patients began taking iron supplements. At follow-up (between four and five months), the three teenagers were found to have increased ferritin levels, complete resolution of RLS symptoms, decreased sleep latency (time to fall asleep), increased total sleep time, and improved school performance.

The researchers emphasized that teenagers with difficulty falling and staying asleep should be evaluated for the presence of RLS symptoms. If symptoms of RLS are identified, the evaluation should include iron status, and underlying causes of low iron stores should be ascertained and treated. If treatment with iron supplements is instituted, patients should be followed for a period of several months to make certain that an iron overload does not occur.

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Ondo WG, Vuong KD, Jankovic J. Exploring the relationship between Parkinson disease and restless legs syndrome. Arch Neurol 2002;59:421-4

At the Movement Disorders Clinic at the Baylor College of Medicine in Houston, Texas, 320 people with Parkinson's disease (PD) completed a questionnaire to help identify symptoms of RLS. For a variety of reasons, 17 people were unable to fulfill the criteria to participate in the study, leaving the remainder to fill out additional questionnaires and surveys and to undergo blood

tests for measurement of serum ferritin levels.

The investigators reviewed medical records, determined the patients' mental status and PD severity, and compared the PD patients with RLS and the PD patients without RLS to each other, as well as to a group of patients with RLS and without PD (n, 146). They found that of the 20.8% (n, 63) of their PD patients who had RLS, only 5.3% (16) had a previous diagnosis of RLS. This number is astounding given the fact that the physicians who work in the clinic are very familiar with and have published extensively on RLS. When he followed up on the reasons why this was possible, Dr. Ondo discovered that the RLS symptoms tended to be mild and that patients usually believed that the RLS symptoms were part of their PD.

Their findings included the following results: For those patients with PD who with certainty could identify an onset of RLS symptoms, 8 began having both RLS and PD at the same age, 54 experienced PD symptoms first, and 25 had RLS symptoms before those of PD. All of the patients with PD and a family history of RLS experienced the RLS symptoms first. Compared to those patients with RLS only, the patients with RLS and PD less often had a family history of RLS, were older when they began having RLS symptoms, and had lower serum ferritin levels.

This study highlights the fact that RLS is a common disorder, particularly among people with PD. The diagnosis of RLS, however, requires additional scrutiny and questioning of patients about their symptoms, not only among the general population, but among special populations as well.

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Grewal M, Hawa R, Shapiro C. Treatment of periodic limb movements in sleep with selegiline HCl. Mov Disord 2002;17:398-401

A group of researchers in Toronto recently published their retrospective analysis of the use of selegiline in the treatment of PLMS in patients without RLS. All of the 31 patients who took part in the study were recruited from two sleep clinics, where they had originally gone for evaluation of insomnia or excessive daytime sleepiness. They underwent two nights of recording in the sleep laboratory, where a diagnosis of PLMS was made in

those who had a periodic limb movement index (PLMI) of five or greater.

Once the diagnosis was made, patients were given selegiline, an inhibitor of the monoamine oxidase enzyme, which ostensibly increases dopamine activity by obstructing dopamine reuptake at the synapse (the space between the ends of two nerve cells). All patients began taking the medication at a dose of 5 mg twice a day for two weeks, 10 mg twice a day for two weeks, and then 15 mg twice a day for two weeks. After the six-week period, they were instructed to continue on the dose that they found to be most effective with the least number of side effects and then maintain that dose for the duration of the study. Between three and seven months after beginning treatment, all of the patients went back to the laboratory for another overnight sleep study.

With increasing doses of selegiline from 5 mg to 15 mg, the sleep latency increased, the PLMI decreased, but the sleep efficiency decreased slightly as well. At the end of the study period, 21 of the patients preferred the 15-mg dose of selegiline over the two lower doses.

According to the publication, the researchers now use clonazepam as a first choice for patients with PLMS who primarily have a disruption in their nighttime sleep and use selegiline for those whose PLMS is associated with daytime fatigue.

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Michaud M, Lavigne G, Desautels A, Poirier G, Montplaisir J. Effects of immobility on sensory and motor symptoms of restless legs syndrome. Mov Disord 2002;17:112-5

According to the International RLS Study Group's criteria, an increase in symptoms at rest is required for a valid diagnosis of RLS to be made. These symptoms include components that are both motor—an urge to move—and sensory—frequently described as pulling, electric, creeping, etc. Several years ago, Dr. Montplaisir and his associates in Montreal developed an assessment tool known as the SIT, or suggested immobilization test, that counts leg movements during one hour just before a person's normal bedtime. In their latest report, these researchers added another component to the SIT to measure discomfort levels.

Nineteen patients who fulfilled all four International RLS Study Group criteria and did not have secondary RLS participated in this study, as did 19 age-matched controls. The SIT began at 9:15 PM, when the participant was instructed to recline in the hospital bed at a 45-degree angle, refrain from moving, and score his or her leg discomfort using a 0-to-100-point, visual-analog scale every five minutes in response to a signal. After the SIT, each participant then underwent one night of recording in the sleep laboratory; all of the RLS patients had at least 10 periodic limb movements per hour of sleep; none of the controls had PLMS.

When analyzing the results of the SIT, the researchers found that RLS patients' level of discomfort and number of periodic limb movements increased with the duration of their immobility, but controls' did not. In 16 of the RLS patients, the maximum discomfort occurred in the second half of the testing period, a finding that the researchers say supports the

Study Group's contention that both sensory and motor symptoms are worse when people with RLS are at rest.

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Chervin RD, Arnold KH, Dillon JE, Pituch KJ, Panahi P, Dahl R, Guillemainault C. Association between symptoms of inattention, hyperactivity, restless legs, and periodic leg movements. Sleep 2002;25:213-8

Because parents often report that their children with attention-deficit hyperactivity disorder (ADHD) have disturbed sleep, these investigators used a series of questionnaires to assess the sleep of 866 children from two general pediatrics clinics, not sleep centers. None of the children were referred for sleep or behavior problems. In their previous work, the authors had validated a questionnaire-based scale that was sensitive (79%) and specific (56%) in detecting five or more periodic limb movements per hour of sleep in children.

The researchers compared the parents' and children's responses to questions regarding

inattention and this six-item scale that they included as part of a larger pediatric sleep questionnaire. They found that children with high scores on the scales of inattention and hyperactivity had higher PLMS scores and higher RLS scores than did the children who had lower inattention and hyperactivity scores.

The authors conclude that "inattention and hyperactivity among general pediatric patients are associated with symptoms of PLMS and RLS. If either condition contributes to hyperactivity, the magnitude of association suggests an important public health problem." In addition, they stress the need for additional research into the underlying cause of RLS and PLMS, particularly in children, and urge the scientific community to develop methods to identify RLS and PLMS in children.

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RLS at Neurology Meeting

At the April 2002 meeting of the American Academy of Neurology experts in RLS presented research findings to their peers. The information provided here is based upon abstracts that the scientists submitted in advance of their presentations. When reading this information, please keep in mind that the data have not been peer-reviewed, as are articles published in medical journals.

Increased CSF Hypocretin-1 (Orexin-A) in Early- vs Late-Onset Restless Legs Syndrome (RLS): Effects of Iron Status and Amount of Activity. Allen RP, Mignot E, Ripley B, Nishino S, Earley CJ.

RLS likely involves the dopamine system. Hypocretin, a newly discovered neurotransmitter, has an effect on the dopamine system and increases alertness; therefore, these investigators examined the cerebrospinal fluid (CSF) from three age-matched groups of people: 8 controls, 7 people with early-onset RLS (before the age of 45), and 7 people with late-onset RLS. They also recorded leg movements through the use of leg activity meters.



Continued on next page

The researchers found that patients in both RLS groups had higher levels of hypocretin in their CSF than did controls, but only the early-onset group showed a significant correlation. No connection was found between hypocretin levels and sleep time or leg activity among the RLS patients. They did find, however, a significant correlation between hypocretin and transferrin (a marker of iron transport) levels.

The authors conclude that this study shows the first true difference between patients with early- and late-onset RLS. They also speculate that the elevated hypocretin levels may help explain the fact that even though people with RLS are often sleep deprived, they rarely exhibit traditional signs of sleepiness.

Sleep Laboratory Diagnosis of Restless Legs Syndrome. Michaud M, Paquet J, Lavigne G, Desautels A, Montplaisir J.

Traditionally, the diagnosis of RLS is based upon clinical history. No objective tests are available to confirm the diagnosis; tests supportive of the diagnosis include the measurement of leg movements during sleep studies and the suggested immobilization test ([SIT] see article on page 10).

These researchers attempted to identify the sensitivity and specificity of these two tests to differentiate between people with RLS (n, 100) and controls (n, 50). They measured five parameters: from the sleep study—PLMS, periodic limb movements during wakefulness (PLMW), and the index of PLMS associated with arousal—and from the SIT, the

PLM index and mean discomfort level (MDS).

They found that although all five of these parameters showed significant differences between the RLS and control groups, the PLMW index and the MDS had the best sensitivity (87% and 82%) and specificity (80% and 84%) in distinguishing the RLS patients from the controls.

Dr. Michaud and colleagues conclude that while the assessment of the PLMW and MDS can both be used to objectively support the diagnosis of RLS, if a sleep study is not available or feasible to perform, the SIT can be used alone.

The Development and Validation of the Restless Legs Syndrome Quality of Life (RLSQoL) Questionnaire. Abetz L, Vallow SM, Allen RP, Washburn T, Earley CJ.

People with RLS often have a decreased enjoyment of life. This group of investigators developed a tool to assess the quality of life among this population; they also performed test-retest examinations to validate the responses over a two-week period.

The 18-item questionnaire, known as the RLSQoL, was completed by 85 patients with primary RLS and assessed the impact of RLS on daily life, sleep, emotional well being, and social and work life. In addition, patients completed the RLSQoL again at two weeks after baseline, rated their RLS severity, and reported any change in RLS symptoms at the follow-up visit.

The researchers found that 17 of the 18 items showed internal consistency, were able to distinguish between levels of RLS severity, and were sensitive

to change over the course of the two weeks. They concluded that the RLSQoL was a valid and reliable instrument for measuring the impact of RLS on patients' quality of life.

Augmentation of Restless Legs Syndrome after Long-Term Treatment with Pramipexole and Cabergoline. Ferini-Strambi L, Oldani A, Castronovo C, Zucconi M.

The phenomenon known as augmentation typically occurs with the use of dopaminergic agents. When augmentation develops, people experience RLS symptoms earlier in the day than they did before they began using these drugs. In an earlier study of 60 patients treated with pramipexole ([Mirapex] half-life of 6 hours), this group of researchers identified an augmentation rate of 8.3%.

Augmentation has been shown to occur in up to 25% of patients treated with pergolide (Permax), a dopaminergic drug with a half-life of 7 to 16 hours.

The current study assessed the augmentation rates that occurred in 102 patients treated with Mirapex and 16 treated with cabergoline (half-life of more than 65 hours [Dostinex or Cabaser]). Most patients in the study had previously used other medications, including clonazepam, gabapentin, l-dopa, pergolide, and others, to treat their RLS.

In the pramipexole-treated group, 8% of patients developed augmentation—typically within the first four months of treatment, unrelated to the dosage, and primarily in patients with secondary RLS. In the cabergoline-treated group, no patients developed augmentation.

The investigators conclude that cagergoline can be used even in those patients who develop augmentation when treated with other dopaminergic agents and that the elimination half-life of the drugs may not be the main factor in determining whether patients develop augmentation.

Idiopathic Restless Legs Syndrome: Distal-Proximal Temperature Gradient and Clinical Symptoms in a Modified Constant Routine Protocol. Clavadetscher SC, Guger M, Blum C, Roth C, Kräuchi K, Wirz-Justice A, Bassetti CL.

In healthy people, the veins in the legs and arms dilate, heat loss occurs, and sleep onset takes place in a typical circadian pattern. This heat loss can be indirectly measured by assessing the distal to proximal gradient (DPG)—the difference in temperature between the body core and the limbs.

In a study in which the participants were kept in a controlled environment called a modified constant routine protocol, the researchers sought to determine differences between the DPG of seven RLS patients and that of two control subjects; they also assessed whether RLS symptoms correlated with core body temperature. In addition, they evaluated the results of patient-completed symptom scales and used 12 temperature probes to measure skin and core temperatures.

The investigators found that as core body temperature decreased, RLS symptoms increased. Compared to controls, patients with RLS had a larger change in subjective leg temperature, a smaller increase in the DPG in the 1h hours immediately before lights off, no change in DPG after lights off, a lower distal skin temperature, and a longer sleep latency.

A Family Study of RLS: Presence of an Elevated Prevalence of Affected First and Second Degree Relatives. Hening WA, Washburn T, Allen RP, Earley CJ.

Recently published investigations have supported the notion that RLS is a genetic condition. Whether RLS is a dominantly or recessively transmitted disorder is still open to debate. To help clarify the understanding of the mode of transmission, these researchers conducted interviews with all first- and second-degree relatives of patients with RLS and with control families.

Patients with idiopathic RLS (meaning without a known cause) from the investigators' institution were invited to participate and were asked to

provide contact information for their relatives. These patients, referred to as *proband*s in genetic lingo, were also asked to find a nonrelative who did not have RLS and was readily available to be interviewed and who would serve as a *control proband*. Using a validated telephone interview, Dr. Hening contacted all of the relatives of probands and control probands and established a diagnosis of definite, probable, or no RLS for each person.

When analyzing the results from 21 RLS-proband families and 3 control-proband families, the researchers found that 85% of the RLS and 33% of the control families had one or more first-degree relatives with RLS. The younger the proband with RLS was when their RLS began, the more likely they were to have family members with RLS. The prevalence of RLS was 53% in families in which the onset of RLS symptoms in the proband was younger than 45 years, and 45% for over those older than 45 years at symptom onset; 55% of the children of RLS probands had RLS.

The investigators concluded "that RLS is a strongly familial disorder, especially for patients with an earlier age of onset." Inheritance patterns are yet to be determined.

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Looking for Leaders

Whether you've recently discovered that you have RLS or have had RLS for years, you can be a support group leader. Many major cities, and even entire states, lack a support group to provide advocacy, education, and support to the millions of people who are living with RLS. The RLS Foundation provides assistance to you in starting and maintaining your group and, for the first time this year, will offer leader training at the national meeting in St. Louis.

If you are considering becoming a leader, please contact Annie Riley, Director of Education, Outreach and Development at the RLS Foundation by phone at 507-287-6465 or riley@rls.org.

Bedtime Stories

Bedtime Stories are the opinions of the authors only and not of the RLS Foundation, its employees, or the Board of Directors. Publication in *NightWalkers* does not imply endorsement by the RLS Foundation. Stories may be altered for length or clarity.

I used to suffer with restless legs at night or when I sat too long. My legs would jump and I had no control over them. I couldn't sit too long and I couldn't sleep because they just would not stop jumping.

I took hot baths and my husband would rub my legs for me. I tried everything that I could find in the drugstore for the pain, hoping that something would help, but it didn't; I cried many a night. I even went to different doctors, hoping one of them could help me. All they would say was they didn't know much about restless legs.

Then one day we read the articles by Robert Yoakum in *Modern Maturity* (Sept. – Oct. 1994, "Night Walkers") and in *The Saturday Evening Post* (Nov.-Dec. 1998, "Night Walkers: Victims of a Hidden Epidemic"). It was exactly what I was going through. We learned about some medications that helped other people with this same problem.

I took these articles back to see my doctor. He read them, said he had never heard of the medications, but he would think about it and let me know; he kept putting me off.

I ended up going back to our family doctor and giving him the articles. He looked over the articles, and he said he would write a prescription for me to try. It was for Requip. I tried it and it works.

I can't tell you enough about how I feel. It is so wonderful to be able to sleep at night without my legs jumping. I can sit in church and visit with friends without being embarrassed about my legs jumping. Thanks to Requip—one every night before bedtime—and the articles on RLS.

*Elaine Mee
Lehigh Acres, FL*

I started experiencing restless legs in 1964 with my second pregnancy although it was MANY years after that before it was diagnosed. At first, the periods of discomfort were infrequent and only at night on hot summer evenings. By 1984, I had restless legs every night and it was very difficult to get enough sleep. A physician prescribed Dilantin, which did not help at all, and I had adverse reactions to it.

By 1995, I had been to several other doctors and they really seemed to feel it was all "in my head," and I also felt it was something that I would just have to put up with. I tried Restoril with no relief except I felt drugged.

In 1997, I went to a phlebology clinic and underwent a number of painful injections and wore surgical hose for 3 months. This physician took me off estrogen as he said that made my restless legs worse. These procedures didn't help at all either. Then I was referred to a neurologist

who actually had heard of restless legs. He started me out on Sinemet, then the time-released version, followed by clonazepam, Ambien, Mirapex, Requip, and finally Permax. The Permax really helped, but like the Sinemet, I had augmentation and had to take a stronger dose more frequently. I had to request that he write prescriptions of medications that I had seen in *NightWalkers*.

By September of 2001, I had to take 2 1/2 0.25-mg tablets of Permax daily, as I would wake up each morning with the unbearable need to move. Then my orthopedic physician prescribed Vioxx for arthritis in my knee and, miracle of miracles, all daytime restlessness is gone! I still need one 0.25-mg tablet of Permax at bedtime, and I almost never have any discomfort. We just got back from a trip to Hawaii and I was able to make the 9-hour plane ride with no restless legs!

I have no idea why the combination of Vioxx and Permax works and it may not work for anyone else. However, if readers do take medication for arthritis and can take Permax, they could discuss this with their physicians. I only pray that this will continue to free me of restless legs!

*Jan Toles
LaFayette, GA*

I have been treated for restless legs for many years by June Fry, MD, PhD, of Lafayette Hills, PA. Recently I had to go into the hospital for major surgery. I did not make any special arrangements with the hospital physicians to continue my restless leg medications (Mirapex, methadone, and Ambien for sleep), and as a

result, by the second day after the operation, I was starting to feel my “tingles.” To counteract them, I took some of the Mirapex that I had brought with me to the hospital, but I confess that I took too much too fast. Eventually, the tingles developed into full-blown muscle spasms that were occurring at the rate of about one every 10 or 15 seconds. The hospital neurologists were unfamiliar with the condition, and Dr. Fry, unfortunately, was away for the weekend, so the neurologist tried to treat me with what were basically tranquilizers. Needless to say, they didn't work, and finally they had to give me something powerful enough to knock me out until the next morning, when Dr. Fry could be consulted.

My point in setting this down is that before people suffering with restless legs go into the hospital for major surgery, or perhaps even minor surgery, they should work out a plan for controlling their restless legs. Otherwise, it is possible to develop problems, which, in my case, almost overshadowed the surgery itself. *Lawrence E. Wood
Chadds Ford, PA*

The first time I remember having RLS was while I was a student at the University of Minnesota in 1952. I was trying to get some sleep, and my roommate continued to type on an old-fashioned typewriter until the wee hours of the morning. I became more and more restless each night and soon realized I had more trouble than just a noisy

roommate. Many years later I found out that I had RLS. Mine comes and goes. Some nights are worse than others, but after suffering with it for this long it seems that all of us try to find some relief some way. This may sound silly, and my wife says it is a ploy, but it is for real. When the desire of movement of my legs just will not stop, an episode of lovemaking will usually be the cure. I will usually fall asleep right after the “good time” and sleep right

through the night like a little baby. Once in a while, if I do not go right to sleep, the RLS will return, but it works about 90% of the time. Of course when one is 70 years old, one cannot use this remedy every night, but with a willing spouse, a peaceful night now and then is welcome.

*Maurice Lind
Trussville, AL*

Willis Daggs Memorial Research Fund



Though most members never had the opportunity to meet Will Daggs in person, he touched many lives. Will joined the Board of Directors of the RLS Foundation in 1998 because of his passion to raise funds for research. With his keen mind and dedication, he was constantly on the lookout for methods to unearth these dollars. One of the ways in which he did so was also the way in which most people with RLS came to know him—through the San Diego videotapes. Will starred in one segment of the film, encouraging people to support research into the cause of and a cure for RLS. With professional recording equipment, Bob Daggs, Will's son, attended the San Diego meeting, recorded the proceedings, edited the tape in his studio, and continues to donate copies of the tape to the Foundation. Bob performed this service to honor his father, and his father's commitment to RLS research, by asking that proceeds from the sale of the tapes go to RLS research.

Will Daggs died on January 22, 2002, at the age of 97. In continuing to honor Will's commitment to finding the cure for the millions of people who suffer from RLS, the RLS Foundation, in conjunction with his family's wishes, has established the Willis Daggs Memorial RLS Research Fund. If you would like to contribute to this fund, you may send your gift to the RLS Foundation; please note that you would like this donation to be restricted to the Willis Daggs Memorial RLS Research Fund.

Memorials and Honoraria

The RLS Foundation is sincerely grateful for the donations that we have received in memory and in honor of the following people.

*Carl Aberly **
*Barbara Angarita **
*Robert Carey **
*Doris Baird **
*Willis Daggs **
*Mary Dimperio **
Edna Dodge
*Mary Frazier **
*Dick Garratt **
Jill Gunzel
*William Hoffmeyer **
*Margaret H. Jackson **
*Carol Kellogg Coombs **
*Frank Labaty **
*Robert Marran **
Dr. Jeff Marshall
*Emory Miles **
*Fern Morris **
*Rose Morrison **
*John Penhale **
*Mary L. Potter **
Restless Legs Syndrome Foundation Staff
Beth Bailey
Georgianna Bell
Jill Kelly
Teena Kramer
Kaye Merkel
Catherine Murray
Allan O'Bryan
Jenny Pagel
Sheila Rainey
Annie Riley
Lois Silker
*Alice Rolfson **
*Harold Ross **
*Mary Rubino **
*George Rupp **
*Jeanne M. Schell **
*Susan Swanson **
*Clayton Sweek **
*Ralph Thompson **
*Maryann Vaillancourt **
Carol U. Walker
*Robert Wolff **
*Stephen Zelenski **

* deceased

International RLS Groups

The following independent groups, located outside of the US, work in cooperation with the RLS Foundation.

AUSTRALIA

Warriewood
Sleep Disorders Australia
Beverly Yakich
02-9415-6300

AUSTRIA

Austrian Support Group
Waltraud Moldaschl
0664/2633100
waltraudmoldaschl@everyday.com

CANADA

Sleep/Wake Disorders Canada
800-387-9253 (in Canada)
416-483-9654

ENGLAND

Thorpe Bay, Essex
Ekbom Support Group
Eileen Gill
44 (0)1-702-582-002
gill@ekbom-88.demon.co.uk
www.welcome.to/ekbom

FINLAND

Helsinki
Levottomat jalat-RLSry
Markku Partinen, MD, PhD
www.uniliitto.fi

GERMANY

Munich
Deutsche Restless Legs Vereinigung
Mrs. Lilo Habersack
089/17 11 18 30
zihapat@t-online.de
Mr. Jürgen Schmidt-Evers
089/55 23 11 21
schmidtev@t-online.de
www.restless-legs.org

HOLLAND

Zaanstad
Stichting Restless Legs
c/o Ms. Joke Jaarsma
31-20-679-6234
j.jaarsma@planet.nl

NEW ZEALAND

Nelson
Convenor of Richmond RLS Support Group
Moira Robinson
64-3-544-6312

SWEDEN

Stockholm
Ellmari Jagbrandt
rlsforbundet@hotmail.com
Olof Hansson
olov.j.hansson@swipnet.se
46-1651 97 06
www.restlesslegs.nu

SWITZERLAND

Zurich, Wil, Aarau
Support Group Switzerland
Anni Maurer
056-2825403
Marta Hofer
055-211-13-26
www.restless-legs.ch



RLS Foundation Publications

QUANTITY TOTAL

MEMBERSHIP

In addition to knowing that your membership contributions help support the research and education efforts of the RLS Foundation, you will also receive *NightWalkers*, the Foundation's quarterly newsletter; enrollment of your healthcare providers in the Foundation's education program; and free shipping and handling on all publications. **US-\$25, Canada-\$30, other international delivery-\$40**

_____ \$ _____

BROCHURES

Living with Restless Legs: This booklet—written for those with RLS, family members, and others in search of more information about RLS—highlights the symptoms and treatments and identifies secondary causes of RLS. (©2001)

_____ \$ **FREE**

Medical Bulletin and Bibliography: This material is intended for medical professionals and is mailed free of charge upon request to members' healthcare providers. (©2001)

_____ \$ **FREE**

WeTalk: The WE MOVE Web-chat Newsletter: This material contains a transcript of an on-line session from November 1998, when Drs. Richard Allen and William Ondo answered questions about RLS. (©1999)

_____ \$ **FREE**

BOOKS

Sleep Thief—Restless Legs Syndrome by Virginia N. Wilson, with Arthur S. Walters, MD, ed: Written by one of the founders of the RLS Foundation, this book contains both a lay perspective of living with RLS, as well as professional essays from a variety of medical experts. (©1996) **\$16.95**

_____ \$ _____

NOTECARDS

When Robert Waterman, Jr., Chair of the Board of Directors of the RLS Foundation, can't sleep at night because of his RLS, he often paints in his studio. To raise funds for research, the RLS Foundation has created a boxed set of 10 notecards based on one of Bob's paintings, *North Coast*. **\$20.00**

_____ \$ _____

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MEMBERS PAY NO SHIPPING AND HANDLING CHARGES. NON-MEMBERS, PLEASE CONSULT THE CHART.

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Regional Program

Saturday, June 15, 2002
1:00 - 4:00 PM

Washington State Convention & Trade Center
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800 Convention Place
Seattle, WA 98101-2350

Guest Speakers:

Eric H. Chudler, PhD
Patrick J. Hogan III, DO
Deborah Nichols, MS

For more information visit our web site at www.rls.org
or contact Kaye Merkel at 507-287-6465
or via e-mail at merkel@rls.org



The RLS Foundation gratefully acknowledges the following corporations as
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Rochester MN 55902-2985

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