Dirty Electricity and Electrical Hypersensitivity: Five Case Studies

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Abstract

Deteriorating power quality is becoming increasingly common in developed countries. Poor power quality, also known as dirty electricity, refers primarily to a combination of harmonics and transients generated primarily by electronic devices and by non-linear loads. We have assumed, until recently, that this form of energy is not biologically active. However, when Graham/Stetzer™ filters were installed in homes and schools, symptoms associated with electrical hypersensitivity (such as chronic fatigue, depression, headaches, body aches and pains, ringing in the ears, dizziness, impaired sleep, memory loss, and confusion) were reduced. Five case studies are presented that include one healthy individual; one person with electrical hypersensitivity; another with diabetes; and a person with multiple sclerosis. Results for 18 teachers and their classes at a school in Toronto are also presented. These individuals experienced major to moderate improvements in their health and wellbeing after Graham/Stetzer filters improved power quality in their home or work environment. The results suggest that poor power quality may be contributing to electrical hypersensitivity and that as much as 50% of the population may be hypersensitive; children may be more sensitive than adults and dirty electricity in schools may be interfering with education and possibly contributing to disruptive behavior associated with attention deficit disorder (ADD); dirty electricity may elevate plasma glucose levels among diabetics, and exacerbate symptoms for those with multiple sclerosis and tinnitus. Graham/Stetzer filters and meters enable individuals to monitor and improve power quality in buildings and they provide scientists with a tool for studying the effects of dirty electricity. For the first time we can progress from simply documenting electrical hypersensitivity to alleviating some of the symptoms. These results are dramatic and warrant further investigation. If they are representative of what is happening worldwide, then dirty electricity is adversely affecting the lives of millions of people.

Key words: ADD, ADHD, electrical hypersensitivity, EHS, dirty electricity, diabetes, Graham/Stetzer filter, multiple sclerosis, MS, power quality, tinnitus, Stetzerizer

Introduction

We are living in an increasingly complex electrical environment and are inundated daily with electromagnetic frequencies ranging from less than 20 Hz (electric trains) to greater than 1 billion Hz (wireless telecommunication). Most of these frequencies are man-made and were not present until the invention and subsequent commercialization of electricity (early 1900s), radio (1920s), radar (1940s), television (1950s), computers (1970s), and cell phones (1980s). Whether, and at what intensities, these frequencies have biological effects has been a subject of scientific debate for decades.

The present paper is restricted to the electromagnetic spectrum associated with the distribution of electricity and the poor power quality that results from electronic devices that generate high frequencies and transients that ride on top of a normal 50/60 Hz sine wave. Graham/Stetzer filters (G/S filters[1]) are able to improve power quality by reducing microsurges [refer to website for definition, www.stetzerelectric.com] in the frequency range of 4 to 100 kHz on electrical wiring. This paper documents the response of individuals to the removal of dirty electricity in their home or work environment. Five case studies are presented. They include a healthy individual; a person who has symptoms of electrical hypersensitivity; a person with multiple sclerosis; one with diabetes; and the response of 18 teachers and their students to improved power quality in their school.

Dirty Electricity

Since the introduction of electricity and the rapid growth in our use of electronic devices the quality of electrical power flowing along conductors (wires) within the home and workplace has been deteriorating. The public became aware of poor power quality, also known as dirty electricity, when home computers became popular. These computers would periodically "malfunction" and these malfunctions were associated with power surges on the electrical wiring. Surge suppressors are now commonly used as a consequence of poor power quality to protect sensitive electronic equipment.

In most homes today the 50 or 60 Hz sine wave, when viewed with an oscilloscope, is often distorted by microsurges or high frequency harmonics and transients (Figure 1). Computers, television, dimmer switches, and energy efficient lighting and appliances within the home and arching on distribution lines, caused by contact with tree branches, as well as non-linear loads on power lines contribute to dirty electricity. Even the 25 MHz burst of energy every 1.5 seconds from strobe lights (without an RF choke) on cell phone towers has been measured on the ground and on wires more than 5 km away.

We have learned to protect sensitive electronic equipment with surge suppressors and have assumed, until recently, that this form of energy is not biologically active. Evidence suggests otherwise.

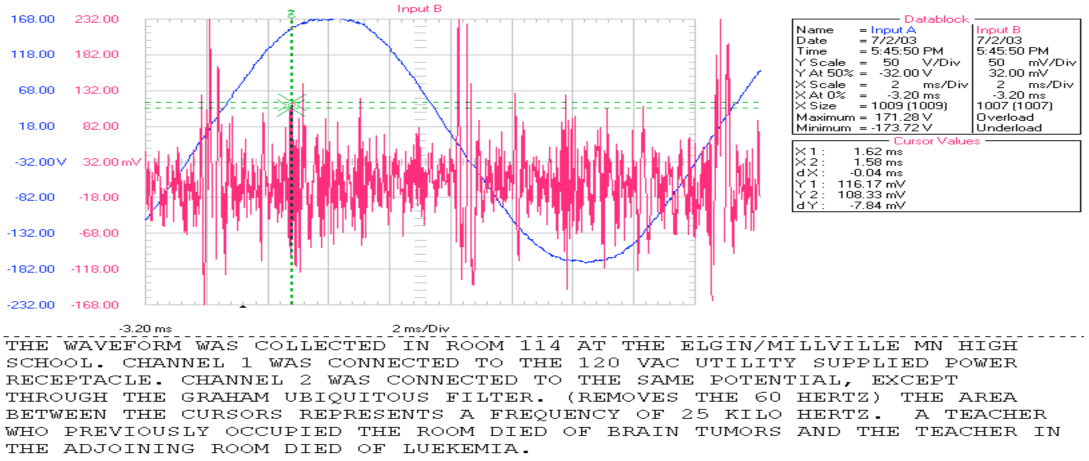
Filters smooth out high frequency noise on electrical wires. Graham/Stetzer filters were designed to reduce microsurges on indoor wiring and they work most effectively within the frequency range of 4 to 100 kHz.

Various models have been designed to predict the flow of electromagnetic energy around and through living organisms. According to the Cornell Cow Model (Reines et al. 2000), at frequencies below 1 kHz 80% of the energy is dissipated on the skin and 20% is dissipated internally; and at frequencies above 2 kHz all the energy is dissipated internally. A similar human electrical model (Reilly 1992) predicts that 75% of the energy is dissipated internally at lower frequencies and all is dissipated internally at higher frequencies. The frequency transition points tend to vary based on the path of the current, the wetness of the skin etc. The G/S filters, therefore, remove frequencies that are most likely to be internalized. The Republic of Kazakhstan has Sanitary Norms that state that a person should not be exposed to more than 25 V/m under 2 kHz and no more than 2.5 V/m between 2-400 kHz. The same is

[1] G/S filters are capacitors that reduce the amplitude of harmonics and transients on indoor wiring.

true for the magnetic component, which goes from 250 nT to 25 nT for the same frequencies (HSSP 2003)

(a) Before G/S filters were installed



(b) With G/S Filters installed

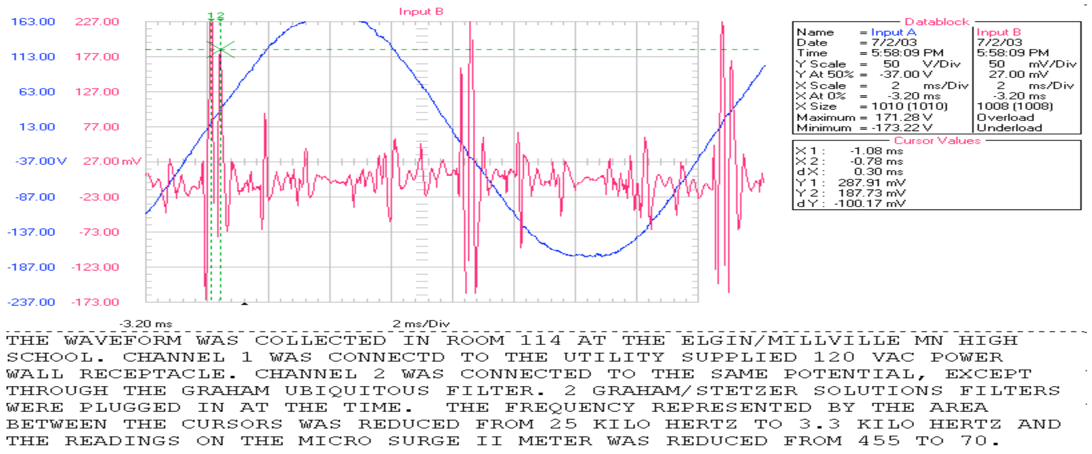
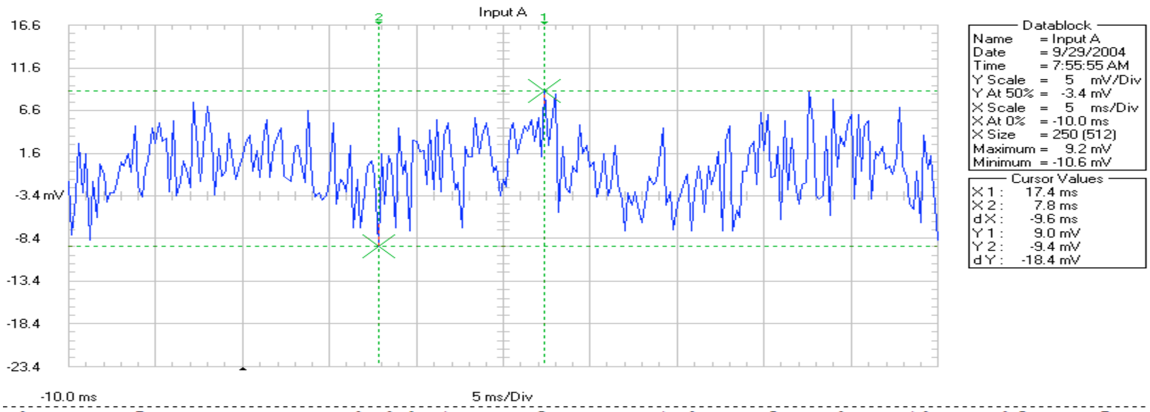


Figure 1. An oscilloscope waveform showing the 60-Hz (blue) sine wave (channel 1) and the high frequency (pink) microsurges (channel 2) on indoor wiring at a school in Minnesota. Top graph (a) is without Graham/Stetzer filters and bottom graph (b) is with Graham/Stetzer filters installed.

It should be noted that high frequency currents tend to become ground currents (Hughes 2004) and an object that is in contact with the ground becomes part of the circuit, as shown in Figure 2 for a man standing in his kitchen with EKG patches on his ankles. The 60-Hz sine wave is distorted with high frequency microsurges that travel up one leg and down the other.

In summary, high frequency microsurges (dirty electricity), generated by, among other things, electronic devices, travel along the electrical distribution grid (wires inside buildings and between buildings) and along the ground. Conducting objects, including living organisms, in contact with the ground become part of the circuit. Frequencies above 2 kHz are likely to penetrate living organisms, while those below 1 kHz dissipate externally (heating the skin). Graham/Stetzer filters reduce the amplitude of microsurges on indoor wiring and thus reduce the frequencies most likely to be biologically active.



The waveform was recorded between 2 EKG patches placed on the ankles of XXXXXX XXXXXXXXX standing in front of his kitchen sink at his home near Bright Ontario. It shows a distorted 60 cycle sine wave containing high frequencies applied to each foot, allowing high frequency current to freely oscillate up one leg and down the other. XXXXXX has been diagnosed with prostrate cancer since moving to the house in less than a year. He was standing with feet shoulder width apart, wearing shoes, at the time of the readings. The amplitude increased as the feet were placed farther apart.

Figure 2. Oscilloscope waveform on the ankles of a man standing in his kitchen in Ontario.

Case Studies:

Case #1: 51-year old female, no health complaints; Ontario, Canada

A healthy 51-year old female installed the G/S filters in her home and in her office at work. She completed a wellness questionnaire daily for 1 week prior to installation of the filters and for 4 weeks after filters were installed (Sept 6 to Oct 10, 2004). The rectifier, in light dimmer switches, chops the sine wave and generates microsurges that travel along electrical wiring. For this reason, readings[2] of the dirty electricity were taken in her home with and without the dimmers on (Table 1). The dirty electricity in her home reached a peak at 470 GS units (see www.stetzerelectric.com for definition of GS units) with dimmer switches off and 1130 GS units with them on. Graham/Stetzer filters reduced values from an average of 300 to 40 GS units with dimmer switch off and from 440 to 70 GS units with dinner switch on. Values should be less than 50 and, for optimum effectiveness, less than 30 GS units (HSSP 2003). She also installed 4 filters in her office at work but was able to reduce the dirty electricity from 400 to only 100 GS units since microsurges were coming from neighboring offices. In situations like this, G/S filters need to be installed in neighboring offices as well. Ideally an entire building should be filtered to optimize power quality. During the period of the study she spent most of her time at home and approximately 6 hours at work each weekday.

Although this person considered herself healthy and ranked herself high on the wellness questionnaire, she did notice changes after the filters were installed. Her sleep improved immediately (this is a common response) and she began to have vivid dreams. If she woke up in the middle of the night she would return to sleep quickly. Although she did not

[2] Readings were taken with a Stetzerizer™ Microsurge Meter (Model GS-M300-A, www.stetzerizer.com).

consider herself anxious, she noticed that she was calmer and had more energy after the filters were installed. She had less head "pressure", stiffness, and muscle pain (Figure 3). She also noticed that she no longer had cold extremities at night (see Case Study #4).

Table 1. Power quality in the home or workplace of each of the case studies.

Case	Details	Dirty Electricity (GS units) Without Filters Mean	Without Filters Range	With G/S Filters Mean	With G/S Filters Range
#1: Healthy	Home: Dimmer Switches off	300	190-470	40	30-50
	Home: Dimmer Switches on	440	190-1130	70	30-290
	Office	400		100	
#2: EHS[1]	Home	~900	300-1900	~20	13-30
#3: MS[2]	Home	170		30	
#4: Diabetes	Home	800	160 - > 2000	13	10-15
#5: School[3]	School	23	13-101	13	8-24

[1] EHS: electrical hypersensitivity
[2] MS: multiple sclerosis
[3] values for school are in mV (rms) for frequencies up to 20 kHz. Measurements were taken with a Fluke 79 III meter connected to a Graham Ubiquitous Filter, which removes the 60-Hz sine wave.

She wanted to participate in this study because her recently deceased husband, who was suffering from mercury poisoning, felt "discomfort" in certain rooms of the house. When we measured the dirty electricity in her home, the high values corresponded to rooms in which he felt unwell. She wanted to know if her wellbeing was affected by the poor power quality in her home. These results suggest that it was and raise the question, "Is she electrically hypersensitive?"

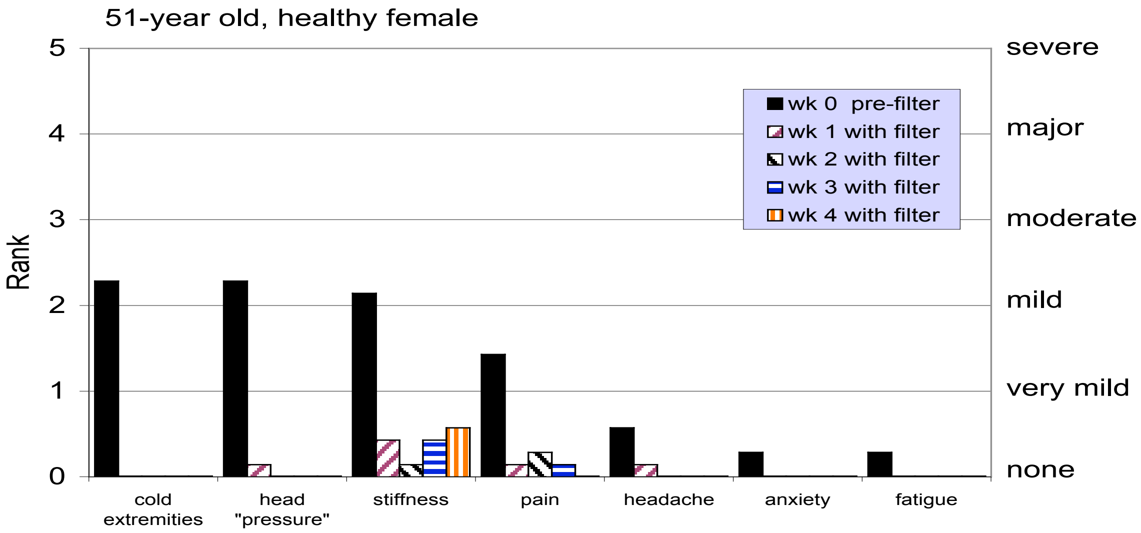


Figure 3. The response of a healthy 51-year old female to G/S filters, Sept/Oct 2004

Case #2: 42-year old male; EHS symptoms include disturbed sleep, headaches, painful teeth and gums, ringing in ears, fatigue and irritability; Barbados

A 42-year old male experienced ringing in his ears (tinnitus), painful teeth and gums, and headaches behind his eyes for which he took over-the-counter medication weekly. He slept poorly and was tired and irritable during the day. These symptoms are consistent with electrical hypersensitivity (Levallois 2002), although he did not use this term. His symptoms

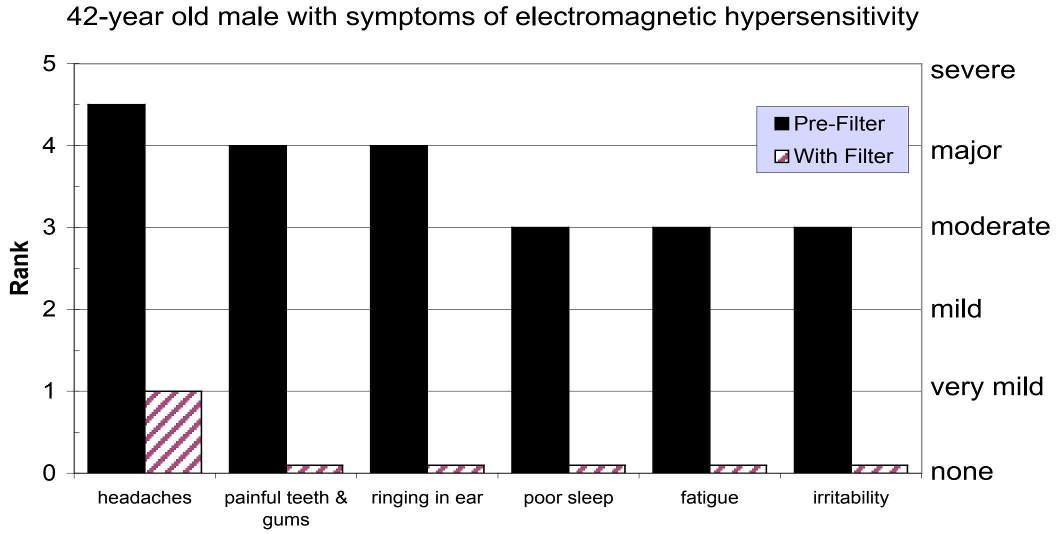


Figure 4. Response of a 42-year old male who was experiencing symptoms of electromagnetic hypersensitivity to G/S filters, May to September 2004.

began 4 years ago and in May 2004 he installed G/S filters in his home. Readings in his home dropped from an average of approximately 900 to 20 GS units (Table 1). His sleep improved immediately (similar to Case #1) and all his other symptoms have disappeared (Figure 4). Since the filters were installed (seven months ago) he can recall having only two headaches.

Tinnitus, one of his symptoms, is the medical term for the perception of sound in one or both ears or in the head when no external sound is present. It is often referred to as "ringing in the ears," although some people hear buzzing, hissing, roaring, clicking, chirping or whistling. Tinnitus can be intermittent or constant and its perceived volume can range from subtle to shattering according to the American Tinnitus Association (2004).

An estimated 1 out of every 5 people experiences some degree of tinnitus. Of the more than 50 million Americans who experience tinnitus, 12 million seek medical attention, and two million are so seriously debilitated that they cannot function on a "normal," day-to-day basis. There is no known cure for tinnitus and treatments range from biofeedback, to drugs, to cochlear implants. Family doctors may also refer patients, who have no obvious physical damage, to psychiatrists.

Several individuals with tinnitus who have tested the G/S filters have reported a significant reduction in the volume of the sound they hear. Some have noticed that when the buzzing is loud, the dirty electricity in their home is high. If some tinnitus sufferers are able to perceived dirty electricity as “noise” then the removal of the dirty electricity may help alleviate their symptoms. The mechanism for this hearing is not known.

The human auditory response to pulses of radio frequency energy, referred to as RF hearing, is well established for frequencies in the MHz range (2.4 –10,000 MHz) (Elder and Chou 2003). Evidence supports a heating effect, whereby audible sounds are produced by rapid thermal expansion of tissue resulting in a clicking, buzzing, or chirping sound. For this reason, the hearing phenomenon depends on the dimensions of the head and on the energy in a single pulse and not on average power density. In our study, exposure was to frequencies in the kHz range that are not associated with a heating phenomenon, so it is possible that some other mechanism is involved in producing the sounds heard.

Case #3: 43-year old female with multiple sclerosis; Ontario, Canada

Graham/Stetzer filters were installed in the home of a 43-year old woman, who has had MS for 8 years. She walked with a cane and did "wall-walking" in her home. "Wall-walking" refers to a person using the wall or furniture to help maintain balance. Readings in her home decreased from an average of 170 to 30 GS units after 13 filters were placed into receptacles in various rooms of her house (Table 1).

Figure 5 shows her response during a 6-week period with the G/S filters installed and a 1-week pre-filter period. Within 24 hours her sense of balance improved and she was able to walk a short distance carrying objects in both hands without assistance (no cane or wall-walking). Within 1 week joint stiffness, joint pain, and muscle weakness decreased significantly and she had less difficulty walking (Figure 5). Within 2 weeks she was able to walk without ankle support and was able to bend forward without losing her balance. She had less muscle weakness and was not as dizzy (Figure 5). Swelling in her hands and feet decreased and her extremities were not as cold (similar to Case #1). The quality of her sleep improved and her level of fatigue decreased (data not shown). This subject is very sensitive to changes in temperature and humidity. During weeks 3 to 6, this part of Ontario received record precipitation and all of her symptoms worsened but were not as severe as her pre-filter symptoms. This subject continues to improve, although her rate of improvement is not as rapid as it was during the first two weeks after the filters were installed.

Symptoms of multiple sclerosis vary between individuals depending on what part of the brain/nervous system is affected. Symptoms include cognitive dysfunction (including problems with memory, attention, and problem-solving); dizziness and vertigo; difficulty walking and/or balance or coordination problems; bladder and bowel dysfunction; depression; fatigue; numbness in extremities; pain; vision problems; hearing loss; speech and swallowing disorders (National Multiple Sclerosis Society, 2004).

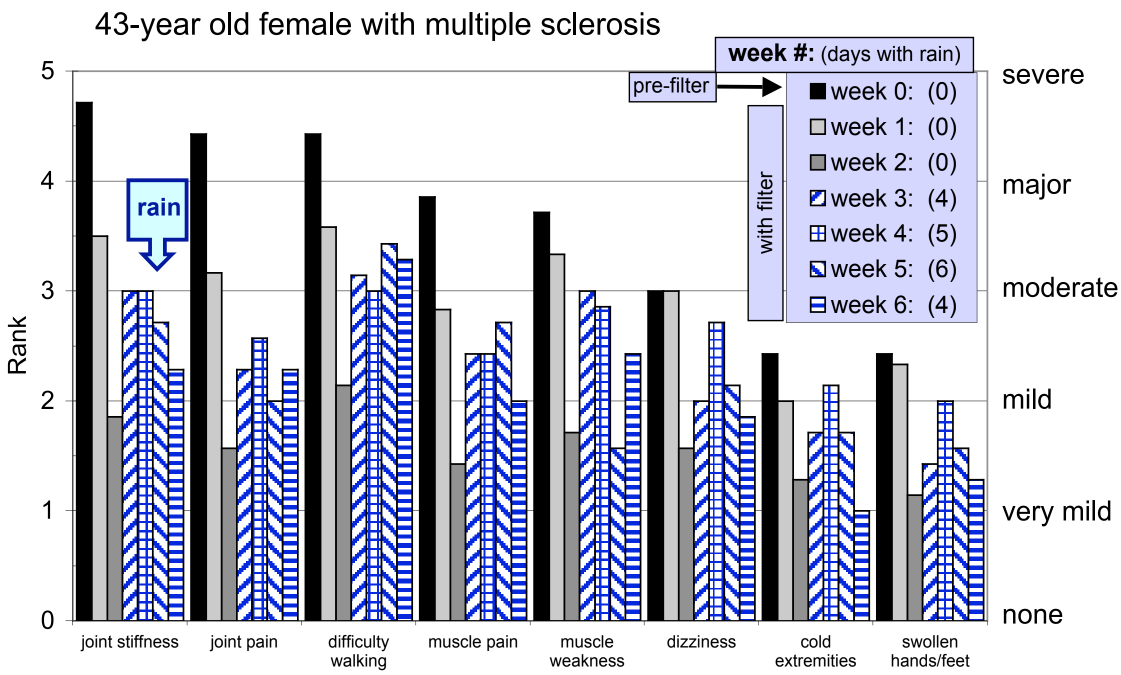


Figure 5. Response of a 43-year old female with multiple sclerosis to Graham Stetzer filters, June/July 2004.

Symptoms can change rapidly and unpredictably. Many people with MS are sensitive to hot or cold conditions and to wet/humid weather. An exacerbation (also known as an attack, a relapse, or a flare) is a sudden worsening of MS symptoms. Temporary improvements are also known to occur and for this reason, one case study showing an improvement may simply have coincided with a normal/temporary remission of this disease. So far, at least 5 people with MS have reported improvements following the installation of G/S filters. More studies are currently underway.

Case #4: 80-year old female with diabetes; Arizona, USA

Graham/Stetzer filters were installed in the home of an 80-year old female with diabetes on June 12, 2004. Her home had very high values for dirty electricity (800 GS units on average with values above 2000 in some rooms) and these dropped significantly to no greater than 15 GS units (Table 1). Because she was diabetic and taking insulin, she regularly monitored her blood sugar levels. Before the filters were installed this subject's fasting plasma glucose (FPG) levels taken at 7 am each morning before breakfast ranged from 152 to 209 with a average of 171 mg/dL (9.4 mmoles/L) (Figure 6). According to the America Diabetes Association a person with a fasting blood glucose level of 126 mg/dL or higher is considered to be diabetic. A fasting blood glucose level between 100 and 125 mg/dL signals pre-diabetes.

The day after filters were installed in her home, this subjects fasting plasma glucose was 87 mg/dL (well below the diabetic range) and she did not take her morning insulin (Figure 6). During the first week her FPG ranged from 87 to 168 and averaged 119 mg/dL (6.5 mmoles/L). Her average daily insulin intake (Humlin 70/30) decreased from 36 to 9 units within the first week. The filters had no effect on her plasma glucose measured at 5 pm. On days that this subject visited shopping malls and casinos, places that are likely to have poor power quality, her evening plasma glucose levels increased significantly (above 250 mg/dL or 14 mmoles/L) (see Havas and Stetzer 2004 for details and more examples).

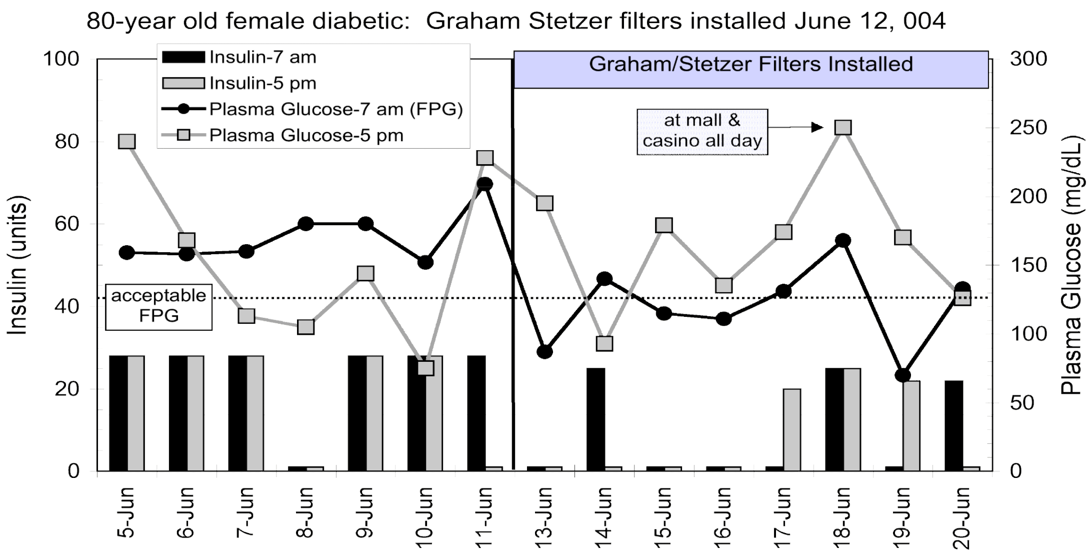


Figure 6. Response of an 80-year old female with diabetes to G/S fitlers installed in her home, June 2004.

In addition to Case #4, we have worked with individuals who have both type 1 and type 2 diabetes and those who are pre-diabetic and have found that blood sugar levels can change rapidly (within a matter of 20 minutes or so for some individuals) as they move from an environment that is electrically dirty to one that is electrically clean (and back again). The percentage of the diabetic population that responds to dirty electricity and to RFR needs to be determined.

Diabetes is on the increase. According to the World Health Organization (2004) in 1985 there were 30 million diabetics worldwide; by 1995 the number increased to 135 million and by 2000 to 177 million. The WHO estimates that by 2025 there will be 300 million diabetics globally. Four million deaths each year (9% of the global total) are attributed to diabetes. Lifestyle (lack of exercise) as well as genetics and environmental factors play a role.

Three types of diabetes have been diagnosed: *Type 1 diabetes* (also known as childhood onset diabetes) results from the body's failure to produce insulin. This is the common form for children and accounts for 5 to 10% of all diabetics. *Type 2 diabetes* (adult onset diabetes) results from insulin resistance (a condition in which the body fails to properly use insulin), combined with relative insulin deficiency and is usually diagnosed in adults. Type 2 diabetes accounts for 90 to 95% of diabetics. Gestational diabetes is a temporary condition that affects approximately 4% of pregnant woman and accounts for 135, 000 cases in the US each year. A forth classification is pre-diabetes, a condition that occurs when a person's blood glucose levels are higher than normal but not high enough for a diagnosis of type 2 diabetes. An estimated 41 million Americans are likely to be pre-diabetic, in addition to the 18 million (6% of the population) with diabetes of which only 13 million have been diagnosed with this disease (American Diabetic Association, 2004).

Based on our studies we would like to suggest that, in addition to *Type 1* and *Type 2* diabetes, there is a *Type 3* diabetes that may be attributed to poor power quality. This form of pollution may be contributing to the rapid growth of this disease and affecting the large number of people who are classified as “pre-diabetic” according to the American Diabetes Association and who have difficulty controlling their blood sugar with medication (brittle diabetics).

Case #5: Willow Wood School, Toronto, Canada

A study conducted at Willow Wood School in Toronto (January/March 2003) demonstrated that teachers and students responded to improved power quality. This was a single blind study that lasted 6 weeks (3 weeks with filters and 3 weeks without) (see Havas et al. 2004 for details). The Stetzerizer™ microsurge meter was not yet available when this study was done so the power quality was measured with a Fluke 79 III meter connected to a Graham Ubiquitous Filter (to remove 60-Hz frequencies) and values are expressed as mV (rms) rather than GS units (Table 1). The fluke meter measures frequencies up to 20 kHz while the G/S filter removes frequencies up to 100 kHz, hence the Fluke meter underestimates what was actually removed.

Fifty filters were installed in Willow Wood School and the dirty electricity (for frequencies up to 20 kHz) was reduced by 43% from 23 mV (range 13-101 mV) to 13 mV (range 8-24 mV) (Table 1). A school of this size requires 150 filters or more to reduce the microsurges produced by computers, photocopy machines, fluorescent lightly etc. Even though values were not as low as recommended, significant improvements were noted among teachers and in some classes.

While G/S filters were installed at Willow Wood School, teachers were less tired, less frustrated, less irritable (Figure 7). They had less pain and fewer headaches. They had a greater sense of satisfaction and accomplishment. If these improvements are a sign of electrical hypersensitivity, then 55% of the teachers at WW School may be electrically hypersensitive. This is a much larger percentage than the two percent for self-reported EHS as documented by Hillert et al. (2002). Our results are similar to those reported by Arnetz et al. (1997, as cited in Levallois 1999) for 133 employees of an insurance company who all worked in the same building. More than 50% of those who worked with computers reported that they had health symptoms induced by VDU-related work. The checklist of symptoms were typical of EHS and included musculoskeletal, respiratory, dermatological, gastrointestinal, neurological and memory problems.

If teaches in Willow Wood School were asked if they were electrically hypersensitive, very few would have answered in the affirmative. Indeed, after the study when we presented our results to the teachers, we learned that the concept of electrical hypersensitive was new to them.

Student behavior at Willow Wood School also improved while the filters were installed, especially in grades 1 to 6 as compared with middle school (grades 7-9) and high school (grades 10-12) (see Havas et al. 2004). Students were more active and were better able to focus on their lessons (Figure 8). There was less "inappropriate" classroom noise and class time was used more productively. Teaches spent less time dealing with disruptions or repeating instructions.

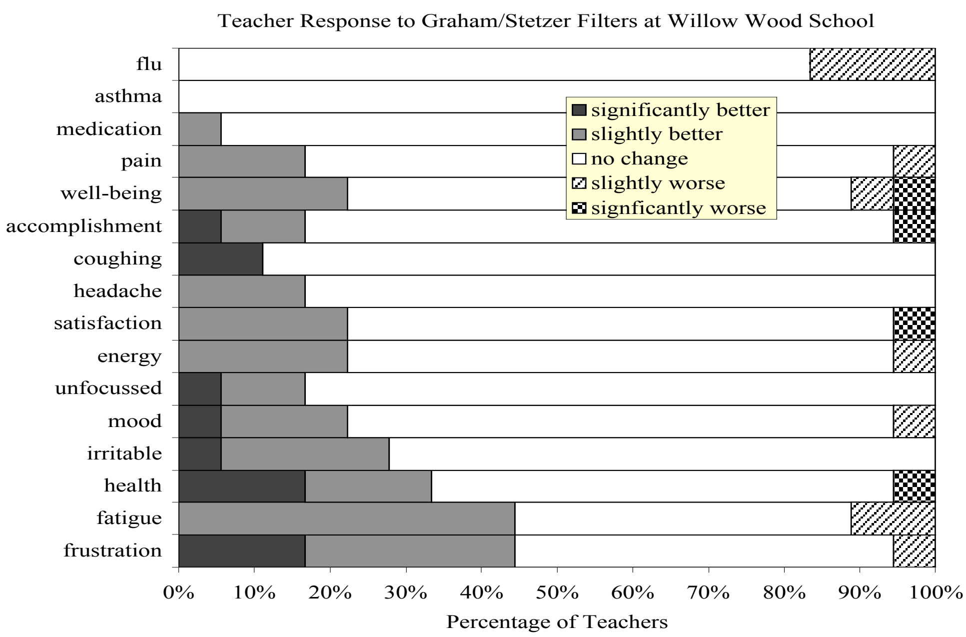


Figure 7. Teacher response to G/S Filters in Willow Wood School. Results are based on 18 teachers, 10 females and 8 males.

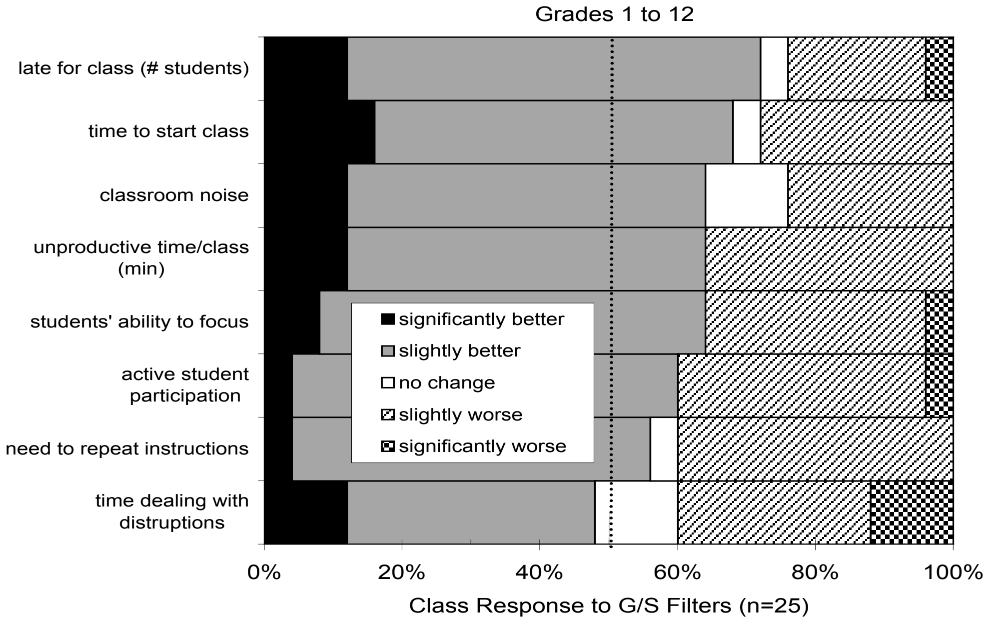


Figure 8. Student response to G/S Filters at Willow Wood School, January/March 2003. Results are based on 25 classes.

Our results suggest that dirty electricity may be interfering with teacher performance and student education. Other schools that have installed G/S filters have also reported improvements among their students and staff. At one school, Melrose-Mindoro in Wisconsin, the District Nurse (Char Sbraggia, R.N.) reported that after the G/S filters were installed teachers were less tired and students also seemed to have more energy. Several staff with allergies were taking less medication since they were experiencing fewer symptoms. But perhaps the most striking result was for students with asthma. Of the 37 students using inhalers, only three continue to use them and only for exercise-induced asthma before their physical education classes (www.electricalpollution.com). At Willow Wood School we had no reported cases of asthma among teachers and did not obtain health information about students.

More and more children are being diagnosed with and medicated for attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD). ADD is the most commonly diagnosed behavioral disorder of childhood. Estimates of its prevalence range from 2% to 18% of school-aged children depending on type of diagnosed (University of Maryland Medicine 2002). In the US, the diagnosis of ADHD in children increased from 950 thousand children in 1990 to 2.4 million by 1996. Attention Deficit Disorder is a neurobiological condition characterized by developmentally inappropriate level of attention, concentration, activity, distractibility, and impulsivity (University of Maryland Medicine 2002).

Some of the symptoms associated with these disabilities (such as inability to focus, disruptive classroom behavior, need for repeated instructions, inability to actively participate in lessons) are the symptoms that were reduced after the G/S filters were installed, which raises questions about the relationship between ADD and power quality. Children are exposed to more dirty electricity because they are now spending more time then ever in front of computers (at home and at school) and television sets and have, for the first time, ready access to cell phones (radio frequency radiation). Both computers and television sets generate electromagnetic frequencies within the kHz and MHz range and these frequencies are not filtered at the set and thus travel along electrical wiring[3]. Studies testing the relationship between ADD/ADHD and dirty electricity (and radio frequency radiation) are urgently needed.

Conclusions

In this study we demonstrate that Graham/Stetzer filters can improve power quality by reducing the amplitude of harmonics and transients on electrical wiring in buildings; that dirty electricity flows along the ground and interacts with conducting objects (including people) in contact with the ground; and that when this form of energy is removed some symptoms that have been classified as electrical hypersensitivity can be alleviated. Furthermore, we demonstrate that symptoms for diseases not normally associated with electrical hypersensitivity, such as multiple sclerosis and diabetes, can also be reduced when power quality is improved.

Instead of just documenting the symptoms of electrical hypersensitivity we now have a method by which these symptoms can be alleviated. Graham/Stetzer filters and microsurge meters enable individuals to monitor and improve power quality buildings and they provide scientists with a tool for studying the effects of dirty electricity.

These results bring into question the definition of “electrical hypersensitivity”. Is a person electrically hypersensitive if his/her health improves when dirty electricity is removed? We suggest that individuals are electrically hypersensitive if their symptoms change when some component of the electromagnetic environment is either increased (provocation studies) or decreased (hygiene studies). What components of the electromagnetic spectrum are bioactive and at what intensities remains to be tested. Our results strongly suggest that transients are biologically active within the frequency range of 4 to 100 kHz and at intensities currently found in homes and schools.

We present five cases studies of disparate individuals, but we have data for six diabetics and are currently studying the response of 11 subjects with MS. To date we have had only one person with MS and one diabetic who have not improved after installation of G/S filters.

The results from the cases studies are so dramatic that they warrant further investigation. They suggest that: (1) poor power quality may be contributing to electrical hypersensitivity; (2) a much larger population than originally assumed may be electrically hypersensitive (50% vs. 2%); (3) children may be more sensitive than adults; (4) dirty electricity in schools may be interfering with education and (5) possibly contributing to disruptive behavior associated with attention deficit disorder (ADD); (6) dirty electricity may elevate plasma glucose levels among some diabetics and it may exacerbate the symptoms for the those suffering from (8) tinnitus and (9) multiple sclerosis. If these results are representative of what is happening in countries worldwide, then dirty electricity is adversely affecting the lives of millions of people.

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[3] The microsurges generated by a TV or computer in one room can be measured with the Stetzerizer™ microsurge meter at the electrical receptacle that is on the same circuit in another room.

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www.electricalpollution.com, provides other references dealing with power quality issues and provides information about the Graham/Stetzer filters and the Stetzerizer™ meter.

www.stetzerelectric.com provides definitions and more details of the meters and filters.