

Case Report: Treating Atrial Fibrillation with the Neubie Direct Current Electrical Stimulation

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Introduction: A novel Neuro-Bio-Electric-Stimulation device (Neubie, Neufit, Austin, Texas, USA) using Direct Current (DC) has been used to treat various neurological conditions (ALS, MS, peripheral neuropathy, chronic pain) and functional limitations such as limited range of motion. One method, called the Master Reset Protocol, is thought to stimulate the vagus nerve system, impacting heart rate, digestion and other vital systems.

Purpose: We used the Master Reset Protocol on a subject experiencing paroxysmal Atrial Fibrillation (AFib) to assess whether this treatment might be effective in reversing a cardiac arrhythmia.

Subject and Methods: A single subject is reported in this Case Report. The subject is a 62-year-old healthy, athletic male, 6'2" tall, 165 lbs. with a good diet and is not obese nor has other exacerbating underlying conditions related to heart disease. The subject experiences arrhythmia approximately 1–2 times per month lasting generally 3 or more days per the subject. The Master Reset Method was initiated within 12 hours of arrhythmia onset, and arrhythmia before and after treatment was confirmed through subject observation and confirmed with pulse readings. A total of ten treatments were conducted over 7 months.

Results: Reversal of arrhythmia was confirmed during or within 24 hours of treatment with DC application for all 10 treatments (100%). Two of the more severe cases of AFib required two treatments on the same day with confirmed reversal of AFib.

Conclusion: Treatment with Direct Current suggests a good correlation with reversal of arrhythmia. Further studies are planned to determine if similar, regular, treatments can be effective in preventing arrhythmia.

Keywords: AFib, cardiac arrhythmia, vagus nerve, direct current, electrical stimulation

Introduction

Atrial fibrillation (AFib) is the most common cardiac arrhythmia and results in the upper chambers of the heart (the atria) beating irregularly instead of beating effectively to move blood into the ventricles. This can lead to clotting in the heart and increased risk of myocardial infarction or stroke. While estimates vary, it is agreed that the incidence and prevalence of AFib have increased over the last 20 years and will continue to increase over the next 30 years, becoming one of the largest epidemics and public health challenges.¹ AFib may be intermittent or paroxysmal (episodes lasting 24 hours to one week), persistent (episodes lasting longer than a week), longstanding persistent (lasting over 12 months), or even permanent (chronic AFib that cannot be restored).² There is a 2024 consensus statement on catheter and surgical ablation interventional treatments for AFib.³ About 25% of paroxysmal AFib cases become chronic.⁴ This study evaluated Neubie direct current (DC) applications to a subject diagnosed with paroxysmal AFib that would last for a three or more days per the subject's intake.

Several pathological mechanisms have been explored to explain the onset of AFib, including genetics of ion channels, tissue fibrosis, inflammation, oxidative stress, sedentary lifestyle, and dietary factors, though this remains to be determined.⁵ The heart is highly enriched in autonomic nerves of both the sympathetic and parasympathetic nervous systems that act in a complementary function to maintain a body's homeostasis that is reflected by heart rate variability

(HRV). Predictive studies have shown that changes in HRV can precede the onset of AFib.⁶ The sympathetic nervous system prepares the body for stress-related activities (fight-or-flight), while the parasympathetic system is associated with returning the body to normal day-to-day activities (rest-and-digest).

The autonomic nervous system controls atrial rhythms through ganglions located on the outside (extrinsic) and inside (intrinsic) of the heart and includes the vagus nervous system.⁷ The vagus nervous system is critical to controlling stress.⁷ Components that can trigger AFib include stress, anger, high fat meals, intake of alcohol, caffeine, smoking, and other stimulants. Current treatments include the use of medications such as beta blockers, calcium channel blockers, or cardiac glycosides, or cardiac ablation surgery techniques for the treatment of AFib, but for many the treatments do not persist or there is no response.^{3,8} Other studies using electrical stimulation for AFib have been reported, and other techniques, such as “Paced Breathing” have been reported to positively affect cardiac output and lower heart rate.^{9–11}

The Neubie neuromuscular direct current (DC) device and its protocols were developed by NeuFit (Austin, Texas, USA). The Neubie is FDA-cleared and is used by healthcare workers and by the public for home use for relaxation of muscle spasms, prevention or retardation of disuse atrophy, increasing local blood circulation, muscle re-education, maintaining or increasing range of motion, immediate post-surgical stimulation of calf muscles to prevent venous thrombosis, and acute and chronic pain. The Neubie delivers pulsed DC to the client to support rehabilitation and to advance physical fitness and impact training efficacy and recovery. One NeuFit procedure called the “Master Reset” protocol is thought to stimulate the parasympathetic nervous system via vagus nerve stimulation, bringing calm to an overexcited sympathetic nervous system.¹² Because heart rhythms and arrhythmia are controlled through a fine balance between the sympathetic and parasympathetic nervous system, the Master Reset protocol might be effective in resetting normal heart rhythm to subjects experiencing arrhythmia.⁶ This case report reviews the first use of the Neubie on a subject who regularly experiences paroxysmal AFib as diagnosed by a cardiologist. An initial treatment with the Neubie Master Reset on the subject was intended to treat exercise recovery symptoms. The subject noticed that the treatment also eliminated his arrhythmia. Observations from multiple additional treatments are reported here.

Material and Methods

The treatment used in this study was the NeuFit “Master Reset” protocol.¹² The subject was lying down (supine) for the treatment and instructed on relaxation (diaphragmatic) breathing during the stimulation process. Positive electrodes (red) were placed on each side of the uppermost cervical vertebrae near the occiput. Corresponding negative electrodes (black) were placed on the balls of the feet so that a current with a frequency of 500 hz flowed from the occiput to the feet. The intensity of the current was subjective and was set to a level that could be felt by the subject but was not overstimulating, threatening, or startling as per the Neufit Master Reset protocol. In this case, the Neubie intensity levels ranged from level 10–20 mA at 500 hz. Maximum intensity for the Neubie is level 100, or 100 mA at 62.5 V. This is in marked contrast to the levels of DC used for external cardiac defibrillation in the presence of lethal ventricular arrhythmias.¹³ The Master Reset protocol uses the Neubie in “recovery mode” which applies to calming the nervous system or supporting recovery from activity. The device can also be used in “training mode” which is used to enhance training and for physical therapy applications.¹² Treatment times ranged from 15 to 20 minutes (Table 1).

Detection of AFib was initially diagnosed by a cardiologist using echocardiogram data. The subject indicated that he is very aware when his heart is beating arrhythmically. Arrhythmia is easily detected through pulse analysis and is associated with AFib but may also be present during Supraventricular Tachycardia (SVT) or during Premature Atrial Contractions (PACs). In this study, we used pulse readings to confirm pulse status (normal or arrhythmic). The subject also indicated before, during, and after each treatment whether he felt he was still in arrhythmia. The client contacted us to confirm when he converted to a rhythmic pulse if this did not occur during the actual treatment.

Subject Information

The subject is a 62-year-old healthy, athletic male, 6'2" tall, 165 lbs., with a good diet and is not obese nor has other exacerbating underlying conditions related to heart disease. The only notable recent clinical event was treatment for prostate cancer via localized radiation, and the subject is currently diagnosed as in remission. His AFib was diagnosed before the cancer treatments. Client pulse (resting ~ 60 bpm) and blood pressure were in the normal range. The pulse is

Table 1 Neubie Master Reset Treatment Summary

Treatment Number	Treatment Day	Neubie Treatment	Frequency	Intensity Level (mA)	Duration (min)
1	1	Master Reset	500 hz	10	15
2	23	Master Reset	500 hz	18	20
3	91	Master Reset	500 hz	13	15
4	97	Master Reset	500 hz	18	20
5	130	Master Reset	500 hz	20	20
6(a)	168 (a)	Master Reset	500 hz	14	20
6(b)	168 (b)	Master Reset	500 hz	15	20
7	197	Master Reset	500 hz	13	20
8(a)	198 (a)	Master Reset	500 hz	13	15
8(b)	198 (b)	Master Reset	500 hz	14	20

erratic during arrhythmic events, typically presenting as 2–4 normal beats followed by an arrhythmia and then repeating. When the arrhythmia is described by the client as more severe, there is often a reduction in the normal rhythm (1–2 beats) followed by an arrhythmia. The subject's arrhythmia is often but not always accompanied by an increase in heart rate.

The subject has a history of arrhythmia over the last year, presenting approximately 1–2 times per month. AFib is also present in the family history, with both parents and one sibling presenting with AFib. The subject stated that arrhythmia is typically initiated through diet (eating a meal high in fats), stimulants (alcohol and caffeine), or stress. Typical duration of arrhythmia is 3 or more days, depending on the severity. This is based on subject input since prospective data was not collected for this single Case Report. Severity is a qualitative term used by the subject and is related to how uncomfortable the arrhythmia makes him feel and whether it keeps him from being able to sleep. Severity also presents in pulse readings. Other than proper diet and stress prevention, the subject has not had any intervening therapy other than baby aspirin as prescribed by a cardiologist to reduce the risk of clotting. Light exercise often helps to transition the subject out of AFib. This subject volunteered for these treatments and was not compensated or charged. The subject signed a consent form for treatment and for publication, all data collection followed HIPAA guidelines and an Institutional Review Board (IRB) was not required for this single treatment case observation.¹⁴

Results

Table 1 summarizes treatments to date. This subject has received a total of ten treatments for seven different arrhythmic events. Treatments were initiated based on self-reporting of arrhythmia by the client, and all treatments were within 12 hours of initiation of arrhythmia. The treatments were done at various intervals over a 198-day period though not every AFib episode was treated during the 198 days due to scheduling conflicts. One event was treated twice on the same day and another was treated on one day, but arrhythmia returned and then was treated twice the following day. There were some variations in treatment duration (15 or 20 minutes) over the course of treatments for scheduling reasons.

All treatments resulted in a rhythmic pulse within 15 hours of treatment, many occurring during the 20-minute treatment. Two events required two treatments on the same day. Conversion times to a rhythmic pulse ranged from 3 minutes to 15 hours after initiation of treatment. Mean conversion time $\pm$ standard deviation was 4.13 ± 5.6 hours. Most were sustained for several weeks to months before recurrence. For the sixth AFib event, the subject described the arrhythmia as more intense than normal. The initial treatment (treatment 6(a)), did not clear the arrhythmia. As a follow up, the Master Reset was repeated four hours later (treatment 6(b)) after some light exercise (running), and the pulse returned to almost normal during the treatment and fully returned to a normal pulse within 15 hours of first treatment. For one treatment (treatment 7) the subject described the arrhythmia as very intense, with no sleep the night before. The treatment converted the arrhythmia with 20 minutes but it returned later the same day.

Table 2 Summary of Outcomes for Each Master Reset Treatment

Treatment Number	Treatment Day	Treatment
1	1	Subject out of AFib @ 13 minutes
2	23	Subject out of AFib @ 13 minutes
3	91	Subject out of AFib @ ~3 minutes
4	97	Subject improved, but still some slight arrhythmia. Out of AFib 12 hours later.
5	130	Subject improved, but still some slight arrhythmia. Out of AFib 1 hour after treatment.
6(a)	168 (a)	Subject improved, but not fully rhythmic. Fell asleep during treatment so that felt great for the subject after a sleepless night.
6(b)	168 (b)	Subject improved to almost normal with a slight skip in every 5th beat. Out of AFib the following morning. (eg 15 hours after first treatment).
7	197	Intense AFib according to subject. Out of AFib after session (eg ~20 minutes after initiation), but it returned several hours later.
8(a)	198 (a)	Feels better, still some arrhythmia and would like to repeat treatment.
8(b)	198 (b)	Repeated 4 hours later. Slept. Subject out of AFib after treatment. (eg out of arrhythmia after 4 hours, 20 minutes and two treatments)

This was treated twice the following day (8(a), 8(b)). After these two treatments (total time 4 hours 20 minutes), the subject was rhythmic and maintained a rhythmic pulse. Treatment results are summarized in [Table 2](#).

Discussion and Conclusion

The protocol for this study was intentionally kept simple, and treatment was limited to just one of the many NeuFit protocols. The Master Reset protocol was chosen because of its unique design purported to influence the vagus system. The subjective client response and pulse check were intentionally simple tests for these initial case treatments, but it needs to be noted again that arrhythmia may be attributed to AFib, SVT or PACs. Electrocardiograms or use of a Holter monitor would be the best method to truly acquire quantitative data regarding heart function and would be included in a larger follow-up protocol.

The heart is highly enriched in mitochondria and there is a close relationship between mitochondrial dysfunction and the occurrence of AFib, and further research in this area is needed.¹⁵ Mitochondrial and long-range cell–cell communication occurs via internal electric fields, and it is possible that the Neubie could be affecting such communication. Mitochondria, or the powerhouses of the cell that produce ATP energy for cells to do their work, are highly enriched in cardiac muscle and are known to play a role in cardiac disorders. Better understanding of the effects of the Neubie on mitochondria could better support cellular function, energy, and regeneration for those with AFib. A recent study by Neufit of the Neubie Master Reset on 600 patients showed that heart rate variability (HRV) increased/improved after a 20–30-minute session though the results could take up to two or three weeks in more compromised clients.¹⁶

In conclusion, this study suggests that direct current application with the Master Reset protocol may have an impact on arrhythmia. A follow-up protocol is being developed to investigate if the Neubie can be used as a preventative treatment for AFib. This would look at interval frequency and if regular calming of the autonomic nervous system could be preventive to conversion. This study would need to include more subjects, Holter Monitors and an Institutional Review Board for approval. Given that up to 25% of paroxysmal AFib clients can convert to chronic AFib, these results would be significant for potential prevention in some populations.³ There were no adverse events reported by the subject.

Subject Perspective

The first three treatments were amazing as I converted almost immediately during treatment. The Master Reset was calming and relaxing from the outset. The stimulation felt like a gentle buzz running through my body. Treatment number three seemed

to be the best power level as I was out of arrhythmia in just a few minutes. I usually stay in atrial fibrillation for 3 or more days. All-in-all, I feel the treatments helped me significantly in my goal of getting out of atrial fibrillation quickly.

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Disclosure

The authors report no conflicts of interest in this work.

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