INTRODUCTION

Chronic pain is defined as any pain that persists beyond a three month period, and can linger even when the original source is gone. It can be a sustained sensory abnormality as a result of ongoing pathology such as chronic inflammation or it can be independent of the original source that initiated it. This study examines the effectiveness of transcutaneous electrical nerve stimulation (TENS) as a treatment for chronic pain in an N=1 ABAB style data collection.

TENS electrodes impart a low level impulse to the surface of the skin as well as the underlying nerves and muscles. The Gate Control theory describes the mechanism of action for pain control, stimulating a greater amount of large nerve fibers than small nerve fibers to inhibit nociception.

This study qualifies and quantifies pain levels of the subject at a baseline without treatment (A1), next with treatment (B1), third without treatment (A2), and lastly with treatment again (B2). Data collection had a two-month duration.

METHOD

Subject: 59 year old female with a 17 year history of chronic pain due to fibromyalgia, sarcoidosis, rheumatoid arthritis and a cervical fusion.

Apparatus: A custom garment with 8 paraspinal electrodes from cervical to sacral regions. Parameters of stimulation were: pulse width of 200µs, rate of 150 Hz, on time 10 sec, off time 10 sec.

Procedures: ABAB style data collection. Phase A1 was baseline condition. Phase B1 was the first TENS intervention condition observing therapeutic effect. Phase A2 observed the carry over effect of TENS. Phase B2 observed a second TENS intervention condition.

Data Analysis: The subject filled out weekly Oswestry pain questionnaires and a daily pain scale formulated specifically for this study to observe sleep disturbances and pain levels at four times per day.

RESULTS

Use of the custom garment with electrical stimulation dramatically reduced the subject’s pain levels (Figure 1) and increased her nightly hours of continuous sleep (Figure 2). Pain and reduced sleep returned immediately when the treatment was stopped in phase A2. The benefit of the device shown in B1, and the rapid return of pain in A2 prompted a shortening of phase A2 out of concern for the subject.

DISCUSSION & CONCLUSION

As per the Gate Control theory, the subject found a qualitative and quantitative reduction in pain with the use of TENS, which increased with use. The subject was able to return to desired sleep duration and quality, as well as chosen recreational activities. A decreased need for over the counter pain medication was also noted. It would be beneficial to the advancement of this technology for more research to be done, specifically studies including multiple subjects to be able to compare results across broader populations and/or pathologies.

REFERENCES

Rowlingson, J.C. International Symposium of Regional Anaesthesia, 120-126, 1996