Exploring the Use of Spinal Cord Stimulation: A Review of its Applications for Chronic Pain Management

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Introduction

- Chronic pain is a form of long-term pain that typically occurs after injury.
- As traditional treatments have shown effectiveness, health care professionals have utilized Spinal Cord Stimulation (SCS) as a treatment option
- SCS “interrupts” pain signals before they reach the brain by applying controlled electrical pulses to the spinal cord through a neuro modulation device
- Effectiveness of SCS may vary depending on the chronic pain condition itself

Objectives

- This research project aims to explore the utilization of SCS for chronic pain treatment within literature to contribute insights into the current state of SCS research

Methods

- A literature review was conducted using Web of Science
- “Spinal Cord Stimulation and Chronic Pain Conditions” was searched
- Publications were sorted by ““Citations: highest first”
- Top 100 most cited publications were extracted into an Excel and plain text file
- Those publications were further sorted by publisher frequencies and most common topics
- Bibliometrix was used to analyze of author, topic, and keyword trends
- Graphs were constructed using the tidyverse and ggplot2 packages on R Studio

Results

- 57 of the publications analyzed were articles while 43 were review papers
- Most frequent publisher is Taylor & Francis Ltd Wiley, followed by Lippincott Williams & Wilkins May Clinic Proceedings
- Majority of the results comprised articles discussing “Neuropathic pain (60 instances)
- 10 of the articles discussed “Transcranial Magnetic Stimulation” and 5 of the articles discussed “Complex Regional Pain Syndrome
- Keywords that were most frequently discussed in the articles include “neuropathic pain,” “spinal cord stimulation,” “chronic pain,” “double-blind,” and “electrical-stimulation”

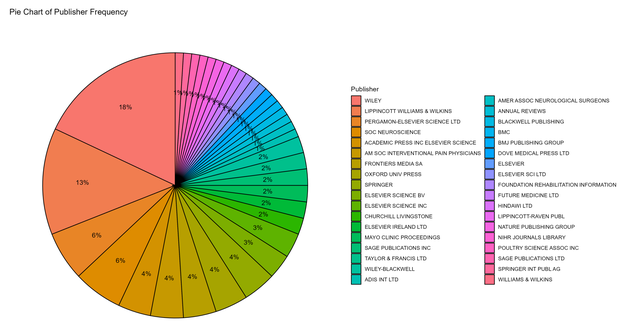

Figure 1

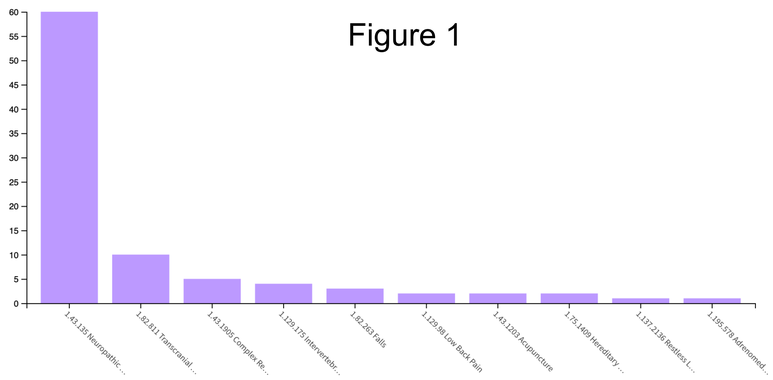

Figure 2

Discussion

- While significant SCS research has been conducted, further research on the efficacy and potential limitations is required to progress the field of neuroprosthetics
- Strengths of this project included:
  - Data filtration
  - Data analysis
- Weaknesses of this project included:
  - Limited scope
  - Data retrieval

Conclusion

- A thorough analysis of top 100 most cited publications on SCS and chronic pain revealed the following:
  - Trends in chronic pain conditions treated with SCS and publisher frequencies
  - Further development of SCS is required to reduce side effects

References

- Web of Science
- RStudio
- Biblioshiny