

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



Sudeepta Matha, Nathan Jimenez, Sukhman Grewal, Keanu Villagonzalo, Riddhi Datta, Ritika Vakharia, Saumit Guduguntla, Hemali Bommanaboina, Abiela Sarrieddine, Sohan Arukonda  
Think Neuro and UC Berkeley



## 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”

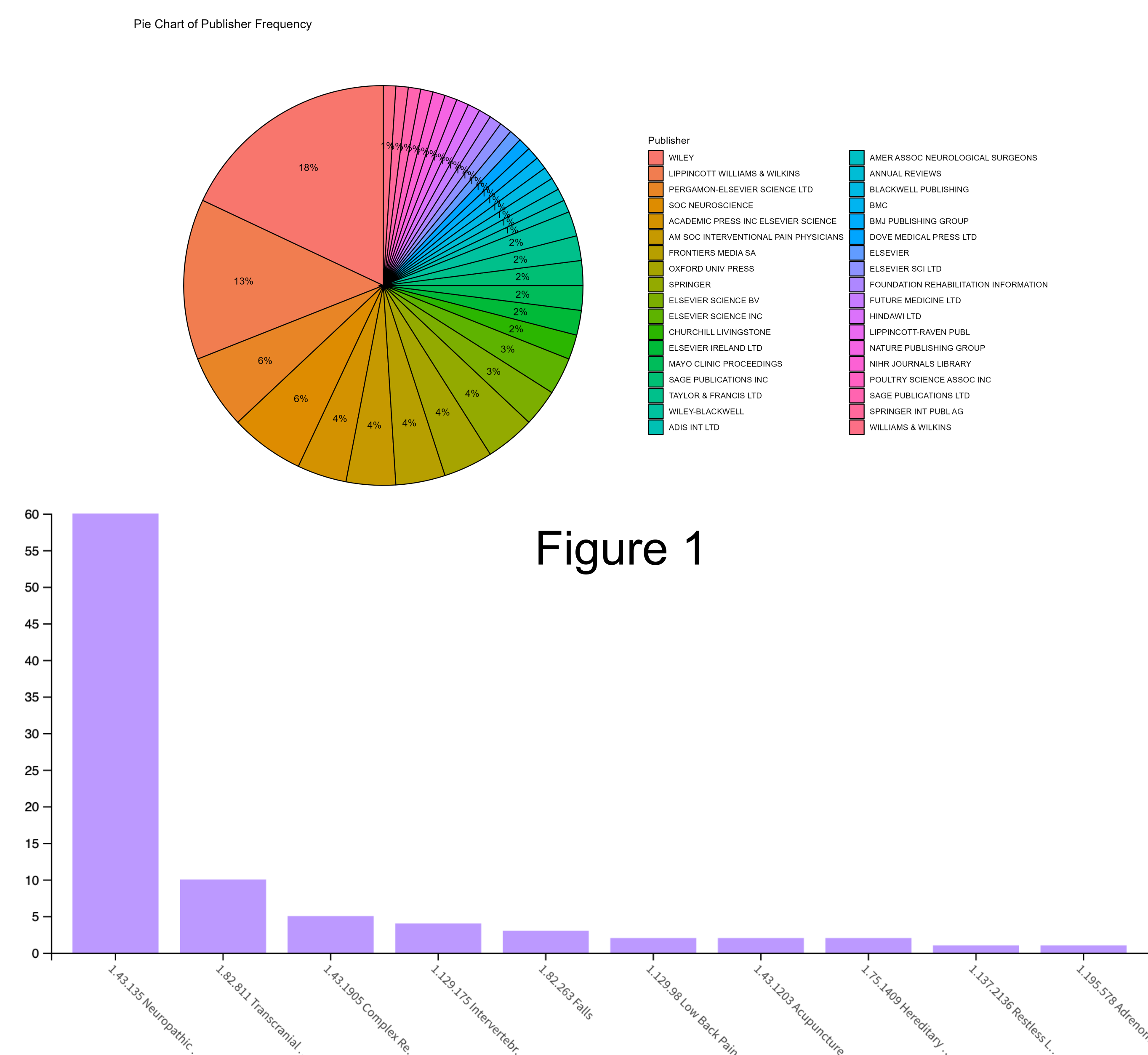


Figure 1

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 through 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