Cosinor Analysis of Temperature Data in TBI and Sham Groups

Author One[1,†], **Author Two**[2] **and Author Three**[3,†]

[1]*Affiliation of author one*
[2]*Affiliation of author two*
[3]*Affiliation of author three*
[†]*These authors contributed equally to this work*

This manuscript was compiled on April 28, 2024

Abstract

This study presents a Cosinor analysis of temperature data collected from TBI and Sham groups. The analysis focused on measuring the Mesor, Amplitude, and Acrophase parameters before and after TBI, revealing significant differences between the groups.

Keywords: *Cosinor analysis, TBI, Sham, temperature, circadian rhythm*

Corresponding author: Provide the corresponding author information here. *E-mail address:* example@organization.com.
DOI: https://www.doi.org/exampledoi/XXXXXXXXXX
Received: March 20, 2024 **Revised:** April 16, 2024 **Accepted:** April 20, 2024 **Published:** May 21, 2024

1. Introduction

This paper investigates the circadian rhythm of temperature in animal models subjected to traumatic brain injury (TBI) compared to a control group (Sham). The analysis was performed using Cosinor analysis to assess the rhythmicity of the temperature data.

2. Methods

Temperature data were collected at 15-minute intervals from 10 animals (5 TBI and 5 Sham). The Cosinor analysis was applied to evaluate the circadian rhythm, focusing on key parameters: Mesor, Amplitude, and Acrophase.

3. Results

The results of the Cosinor analysis are presented in the following subsections.

3.1. Cosinor Analysis Results

Table 1. Cosinor analysis results for TBI and Sham groups.

Group	Animal	Mesor (°C)	Amplitude (°C)	Acrophase (hours)
Sham	4	36.15	0.78	-0.12
Sham	5	36.21	0.64	0.06
TBI	2	36.27	0.61	0.11
TBI	3	36.18	0.90	-0.05

3.2. Figures

The following figures show the results of the Cosinor analysis.

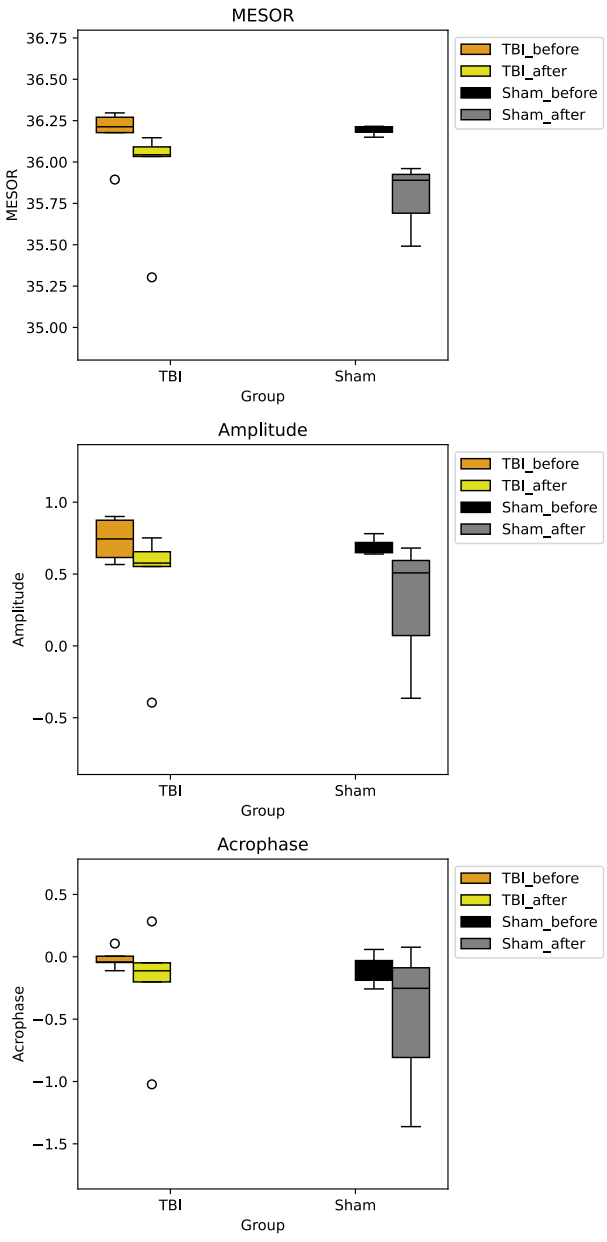

Figure 1. Comparison of Cosinor analysis between TBI and Sham groups. The plot shows Mesor, Amplitude, and Acrophase values.

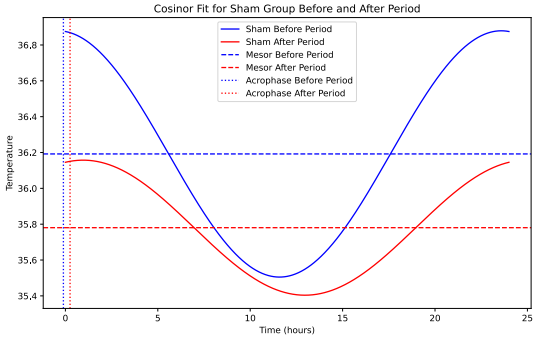

Figure 2. Cosinor plot for the Sham group showing the temperature rhythm before and after the TBI period.

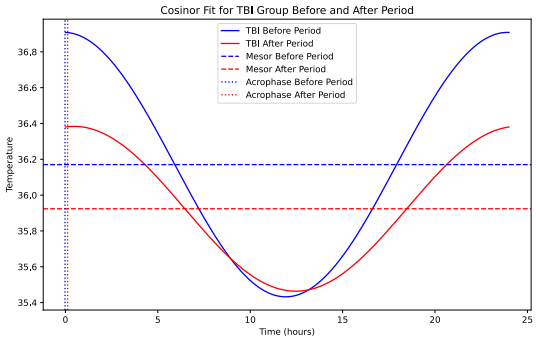

Figure 3. Cosinor plot for the TBI group showing the temperature rhythm before and after the TBI period.

4. Discussion

The analysis reveals that the TBI group exhibits a higher Mesor and Amplitude compared to the Sham group, indicating a stronger circadian rhythm post-injury.

5. Conclusion

Cosinor analysis provides valuable insights into the circadian rhythm changes in TBI models, showing significant differences from the Sham group.