



Can Electromyostimulation (EMS) Reduce Muscle Inflammation and Fatigue?

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Background

Excess muscle fatigue, which is characterized by high lactate levels, triggers muscle tissue to make an inflammatory response.

Advantage: This inflammatory response involves the production of hormones which increase blood flow for muscle recovery.

Disadvantage: However, the inflammatory response accompanies symptoms like swelling, and pain, which cause discomfort during mobility.

Ideal medical treatment involves intervening and reducing the muscle fatigue and progression of inflammation. This is to maximize advantages and minimize, disadvantages which facilitates muscular recovery and promotes ease of mobility.

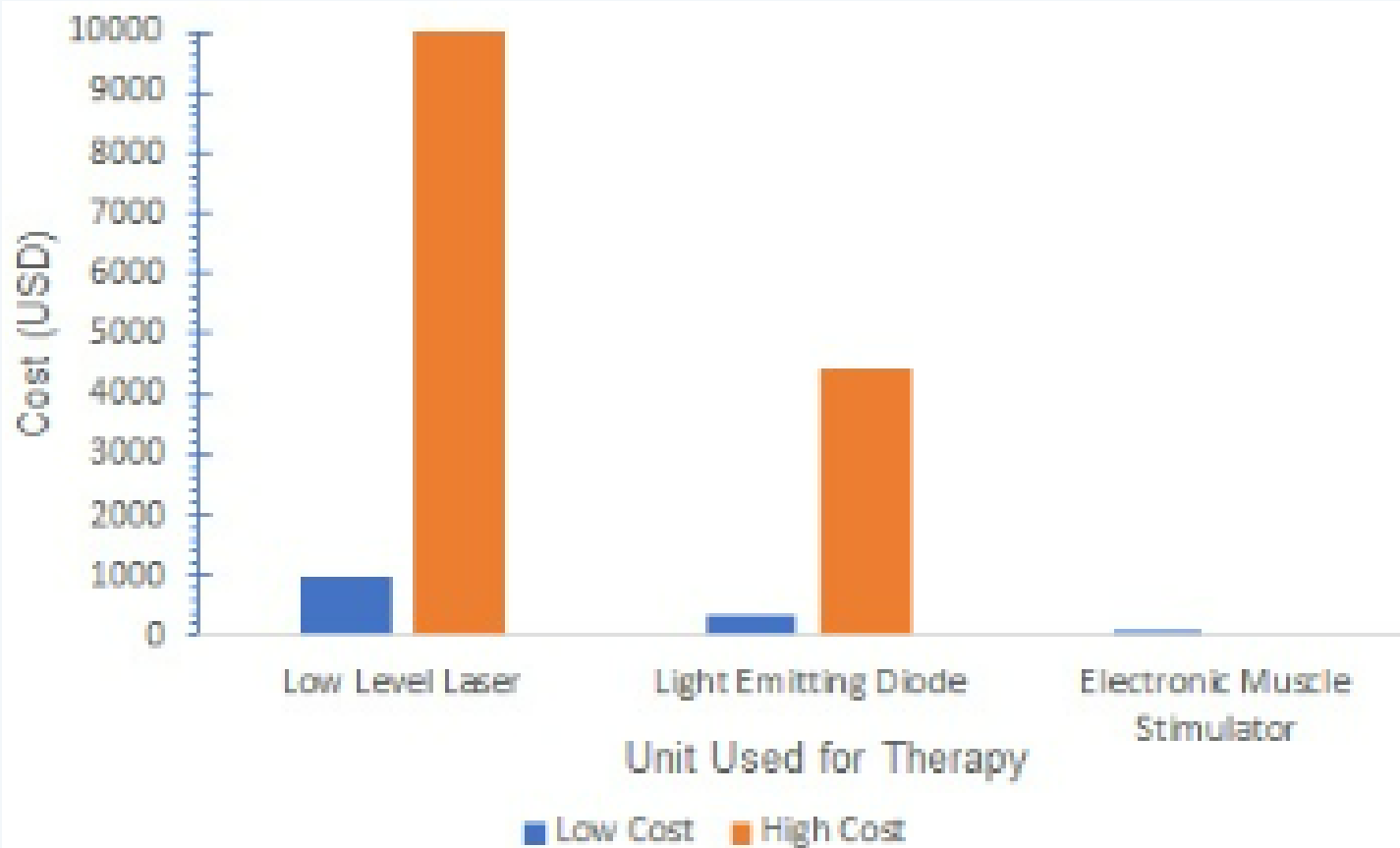
Problem Statement

Limitations: High Cost of Treatment

Current methods for reducing pre-existing muscle fatigue and the progression of muscle inflammation include *Low Level Laser Therapy*, and *Light-Emitting Diode Therapy*, are expensive, and therefore, not widely accessible to the public.

Existing Solutions

1. **Low Level Laser Therapy (LLLT):** Currently Used and More Expensive.
2. **Light Emitting Diode Therapy (LEDT):** Promising Solution Being Tested.



Plot 1: Costs of Base Equipment for Different Muscle Therapy Systems. Electronic Muscle Stimulator Units are the Least Expensive.

Proposed Solution



Solea Medical Spa. (2021)

Electromyostimulation is a method of inducing involuntary muscle contraction by sending an external electric signal to the muscle, which is hugely advantageous for patients who feel discomfort.

Benefits

- *Increased Blood Flow:* Potential to Reduce Muscular Fatigue and Inflammation.
- *Low Cost:* Inexpensive Compared to Alternative Treatment Methods.

"Electromyostimulation (EMS) has Great Potential to be an Effective, Accessible, and Implementable Alternative Solution for Conventional Muscle Therapy."

Results

MUSCULAR FATIGUE

	Peak Frequency (Hz)	Maximal Voltage (mV)	Mean Voltage (mV)	Maximal Force (N)	Mean Force (N)
Subject 1.	51.577	110.008	72.312	145.76	126.14
Subject 2.	57.625	74.181	60.669	161.75	150.73

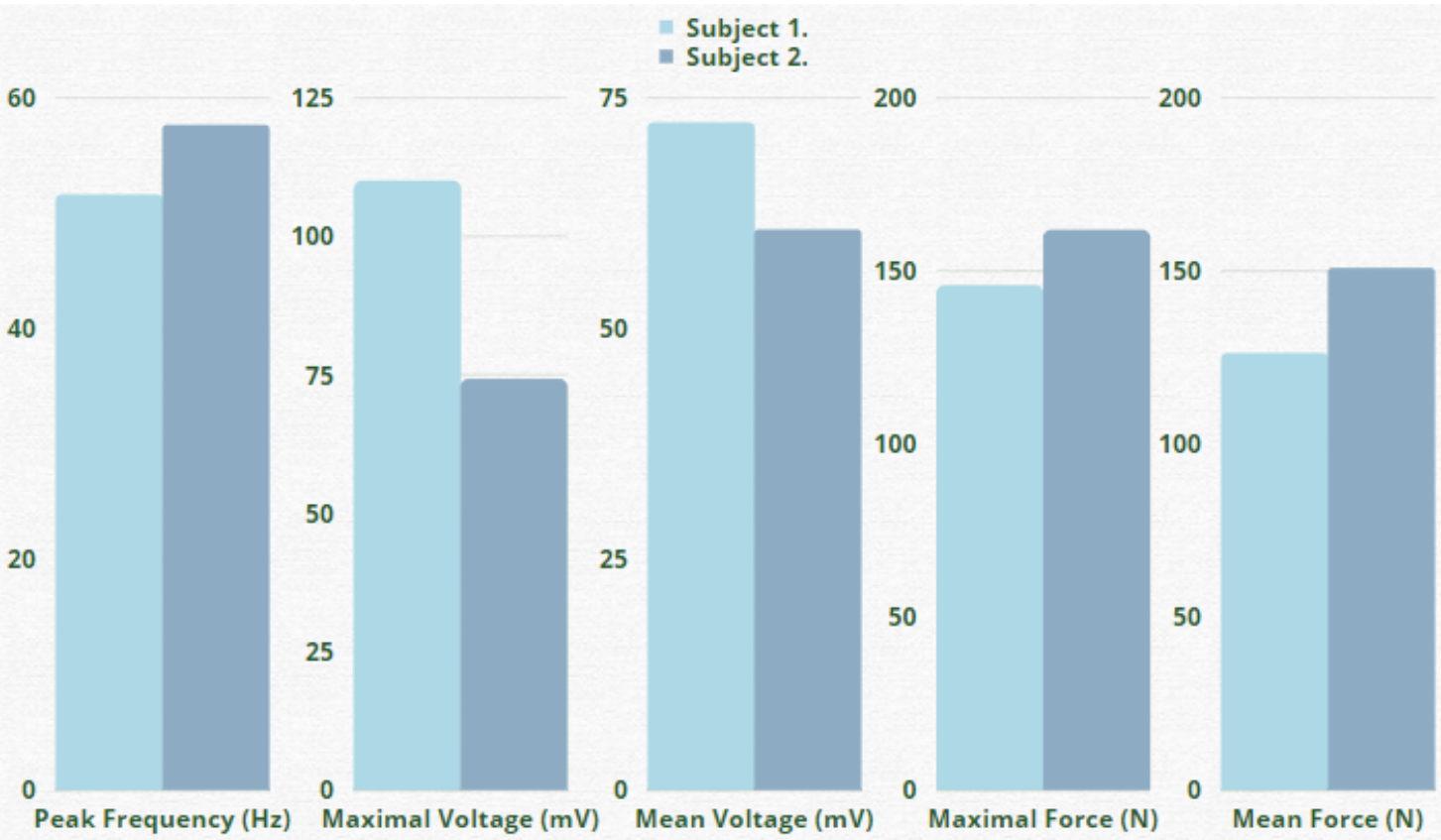
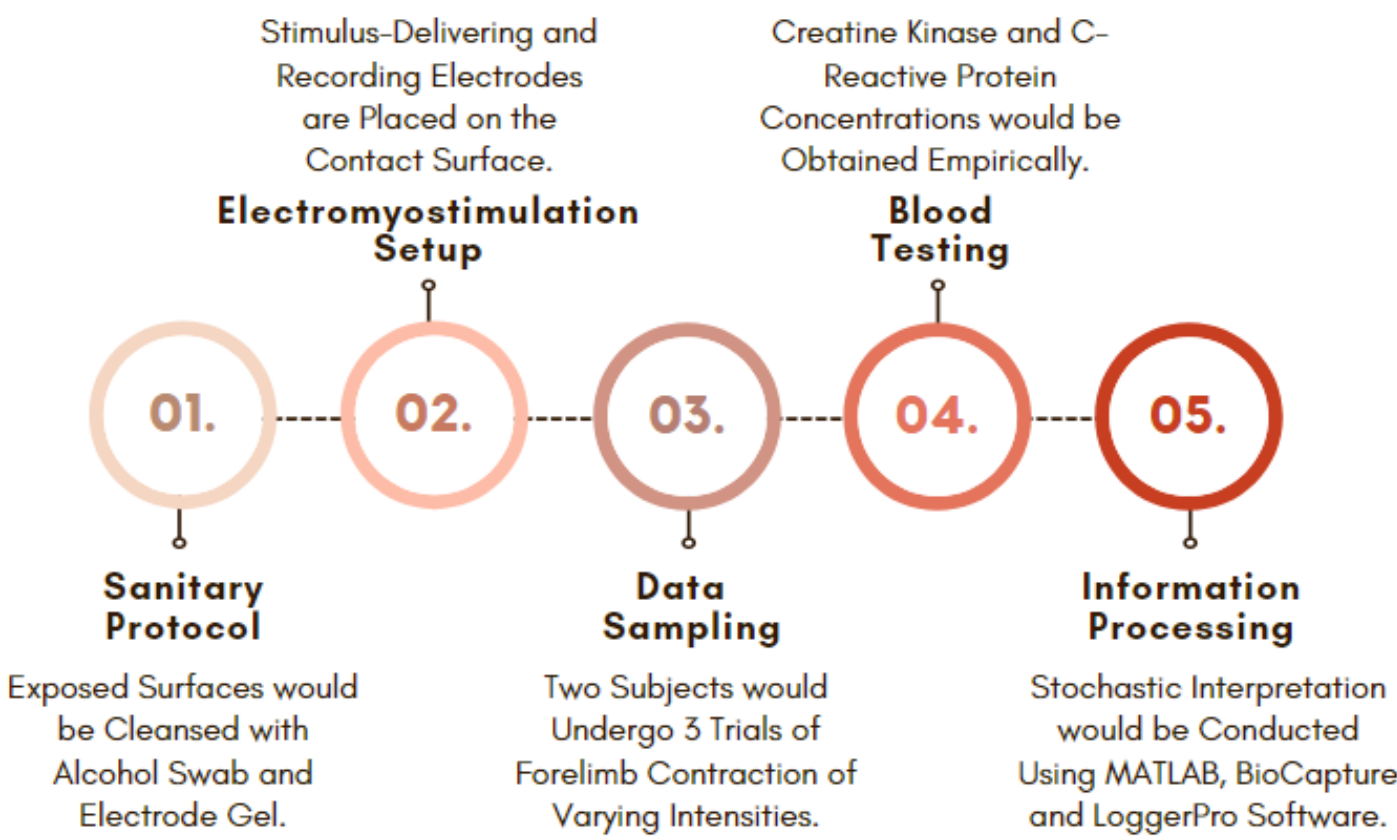
Table 1: Parameters for Muscle Fatigue for the Two Subjects.

MUSCULAR INFLAMMATION

Data sourced indicates a positive relation for muscle fatigue and electromyostimulation, Hence, we can hypothesize that a similar relationship can be obtained for inflammation.

Design Overview

EXPERIMENTAL METHODOLOGY



Plot 2: Graphs of Parameters for Muscle Fatigue for the Two Subjects..

Future Work

- Need to Test Effects of Long-Term Use.
- Determine Optimal Stimulation Duration.
- Create an Easily Implementable System for Public Use.

References

1. Dynamic Wellness. (2018).
2. Jin H.K., Hwang T.Y., Cho S.H. (2017).
3. Lasers in Surgery and Medicine. (2009). 41, 8, pp. 572-577.
4. Platinum LED Therapy Lights. (2021).

Discussion

Electromyostimulation can stimulate muscles. Circulation is promoted when muscles contract. This may reduce muscle inflammation and fatigue. This needs to be tested.

Once shown to work, duration of muscle stimulation and long-term effects need to be tested. Then a low cost EMS muscle therapy system can be made.

Acknowledgment

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