INTRODUCTION: Engaging in physical activity and exercise can result in muscle damage and soreness. When muscles lengthen under tension during eccentric contraction, which can happen during daily physical activities, it can cause exercise-induced muscle damage (EIMD). When you repeat those movements at a high intensity, intracellular muscle damage can occur leading to a 24 to 48-hour delay in the onset of muscle soreness (DOMS) (Choi, 2014). There have been products invented to enhance the recovery of DOMS created by EIMD. Light therapy (LT), in this case, is a non-invasive clinical technique commonly used to treat muscular injuries. The purpose of this study is to examine the effectiveness of LT on EIMD compared to a placebo group (PL) during an eight-day trial. METHODS: Participants were divided into two groups (LT & PL) not knowing which group they were in (single-blind experiment) and were tested on their range of motion (ROM) on their hip flexion and abduction, their perception of muscle soreness (GLMS scale), vertical jump, and agility (TT) test. To induce muscle damage, participants ran 40 15-meter sprints with a 5-meter deceleration zone, thereafter, commenced the LT treatment on the fourth day on LT. It was applied to the quadriceps, hamstring, and calf muscles on both legs. We hypothesised LT following EIMD would neither influence perceptions of muscle soreness, flexibility, vertical jumping ability, nor agility, compared to a placebo treatment group. DISCUSSION/CONCLUSION: A significant difference (p < .05) was found between the two groups in the measurement of calf soreness. The LT group reported lower calf soreness level throughout the week. No other significant differences were found between groups. This data lends itself to the theory that light therapy is more beneficial for treating soreness in Type I muscle fibers.

RESEARCH QUESTION
Will light therapy enhance recovery of muscle soreness and performance following exercise-induced muscle damage compared to a control condition?

HYPOTHESIS
Light therapy following exercise-induced muscle damage will neither influence perceptions of muscle soreness, flexibility, vertical jumping performance, nor agility, compared to a control condition.

METHODS

This study was an 8-day study starting on a Wednesday with baseline measurements. The following Monday to Friday, participants performed our muscle damage sprinting protocol which included 40-15 meter sprints with a 5-meter deceleration zone. Light therapy was then implemented starting from Monday to Friday.

RESULTS

Participants

Table 1

<table>
<thead>
<tr>
<th>Participants</th>
<th>LT</th>
<th>PL</th>
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</thead>
<tbody>
<tr>
<td>N=33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROM, Vertical Jump, T-Test</td>
<td></td>
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<td>N=16</td>
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</tbody>
</table>

Testing battery

Week 1: Familiarization: The data collection process began with a baseline test including perception of muscle soreness, range of motion (ROM), vertical jump, and agility T-Test. These data were collected all 8 days.

Week 2 Testing: On Monday, participants went through a repeated sprinting protocol in order to induce muscle damage (described below). Proceeding the protocol, participants began their light therapy treatment.

DISCUSSION/CONCLUSIONS

Calf soreness throughout the week appears to recover faster in the light therapy group than the placebo group. Calf soreness is considered mostly Type I muscle fibers which are more endurance-oriented. Light therapy may be beneficial for endurance athletes more so than strength and power athletes. Light therapy has been theorized to enhance mitochondrial biogenesis and electron transport chain activity, which may enhance muscle performance (Ferraresi, et al, 2015). Our results may lend support to that theory.

WHAT I LEARNED

From doing this study, I learned it is important to make sure that the way you take measurements throughout the study remains consistent. Many of the differences seen in the data are small margins of difference, so an inaccurate measurement could cause those findings to be inaccurate.

REFERENCES


ACKNOWLEDGEMENTS

We would like to thank all of our volunteer participants for donating their time to our research.