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Photomedicine and Laser Surgery

Effect of Phototherapy on Delayed Onset Muscle Soreness

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Peter Douris, P.T., Ed.D.

Department of Physical Therapy, School of Health Professions, Behavioral and Life Sciences, New York Institute of Technology, Old Westbury, New York.

Veronica Southard, P.T., D.H.Sc., G.C.S.

Department of Physical Therapy, School of Health Professions, Behavioral and Life Sciences, New York Institute of Technology, Old Westbury, New York.

Richard Ferrigi, P.T., D.P.T.

Department of Physical Therapy, School of Health Professions, Behavioral and Life Sciences, New York Institute of Technology, Old Westbury, New York.

Joshua Grauer, P.T., D.P.T.

Department of Physical Therapy, School of Health Professions, Behavioral and Life Sciences, New York Institute of Technology, Old Westbury, New York.

Dina Katz, P.T., D.P.T.

Department of Physical Therapy, School of Health Professions, Behavioral and Life Sciences, New York Institute of Technology, Old Westbury, New York.

Christine Nascimento, P.T., D.P.T.

Department of Physical Therapy, School of Health Professions, Behavioral and Life Sciences, New York Institute of Technology, Old Westbury, New York.

Peter Podbielski, P.T., D.P.T.



Department of Physical Therapy, School of Health Professions, Behavioral and Life Sciences, New York Institute of Technology, Old Westbury, New York.

Objective: The purpose of this study was to investigate the effects of phototherapy on delayed onset muscle soreness (DOMS) as measured using the Visual Analog Scale (VAS), McGill Pain Questionnaire, Resting Angle (RANG), and girth measurements. **Background Data:** Previous research has failed to prove the beneficial effects of phototherapy on DOMS. **Methods:** This was a randomized double-blind controlled study with 27 subjects (18–35 years) assigned to one of three groups. The experimental group received 8 J/cm² of phototherapy each day for five consecutive days using super luminous diodes with wavelengths of 880 and visible diodes of 660 nm at three standardized sites over the musculotendinous junction of

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the bicep. The sham group received identical treatment from a dummy cluster. The controls did not receive treatment. The study was completed over five consecutive days: on day one baseline measurements of RANG and upper arm girths were recorded prior to DOMS induction. On days 2–5, RANG, girth, and pain were assessed using VAS and the McGill Pain Questionnaire. *Results:* The experimental group exhibited a significant decrease in pain associated with DOMS compared to the control ($p = 0.01$) and sham groups ($p = 0.03$) based upon the VAS at the 48-h period. The McGill Pain Questionnaire showed a significant difference in pain scores at the 48-h period between the experimental and the sham groups ($p = 0.01$). There were no significant differences day to day and between the groups with respect to girth and RANG. *Conclusion:* The results of this study provide scientific evidence that phototherapy as used in this study provides a beneficial effect to patients who may experience DOMS after a novel exercise session.

Effect of Phototherapy on Delayed Onset Muscle Soreness

PETER DOURIS, P.T., Ed.D., VERONICA SOUTHARD, P.T., D.H.Sc., G.C.S.,
RICHARD FERRIGI, P.T., D.P.T., JOSHUA GRAUER, P.T., D.P.T., DINA KATZ, P.T., D.P.T.,
CHRISTINE NASCIMENTO, P.T., D.P.T., and PETER PODBIELSKI, P.T., D.P.T.

ABSTRACT

Objective: The purpose of this study was to investigate the effects of phototherapy on delayed onset muscle soreness (DOMS) as measured using the Visual Analog Scale (VAS), McGill Pain Questionnaire, Resting Angle (RANG), and girth measurements. **Background Data:** Previous research has failed to prove the beneficial effects of phototherapy on DOMS. **Methods:** This was a randomized double-blind controlled study with 27 subjects (18–35 years) assigned to one of three groups. The experimental group received 8 J/cm² of phototherapy each day for five consecutive days using super luminous diodes with wavelengths of 880 and visible diodes of 660 nm at three standardized sites over the musculotendinous junction of the bicep. The sham group received identical treatment from a dummy cluster. The controls did not receive treatment. The study was completed over five consecutive days: on day one baseline measurements of RANG and upper arm girths were recorded prior to DOMS induction. On days 2–5, RANG, girth, and pain were assessed using VAS and the McGill Pain Questionnaire. **Results:** The experimental group exhibited a significant decrease in pain associated with DOMS compared to the control ($p = 0.01$) and sham groups ($p = 0.03$) based upon the VAS at the 48-h period. The McGill Pain Questionnaire showed a significant difference in pain scores at the 48-h period between the experimental and the sham groups ($p = 0.01$). There were no significant differences day to day and between the groups with respect to girth and RANG. **Conclusion:** The results of this study provide scientific evidence that phototherapy as used in this study provides a beneficial effect to patients who may experience DOMS after a novel exercise session.

INTRODUCTION

DELAYED ONSET MUSCLE SORENESS (DOMS) is defined as a type I muscle strain that occurs following new exercise.¹ Generally, DOMS occurs after exercise has been completed and increases in intensity within the first 24 h after exercise, peaks at 24–48 hours, and then subsides within 5–7 days post-exercise. Individuals experiencing DOMS often report varied symptoms of pain, soreness, muscular stiffness, tenderness, strength loss, restricted movement and swelling.^{1–14} All individuals regardless of their fitness levels, who attempt to perform a new or unusual type of exercise are subject to DOMS. In physical therapy, DOMS may occur secondary to the unaccustomed exercises commonly performed during a therapeutic exercise session. This pain and discomfort may discourage a

patient from returning to physical therapy or disrupt their rehabilitation progress.¹⁴

There are a number of possible etiologies of DOMS. Researchers have illustrated a series of events that explain the DOMS phenomenon. Initially, high tensile forces damage muscle fibers and connective tissue that causes disruptions to the z-lines and the myotendinous junction. This in turn activates the inflammation process, and subsequently activates pain receptors.^{1,10} Within approximately 8 hours of the injury, there is a significant elevation in circulating neutrophils.^{3,11} Mast cells and histamine production are stimulated. Monocytes that convert into macrophages accumulate at the injury site and produce prostaglandins.¹ Elevated levels of prostaglandin activate type III and IV pain receptors within 24–48 h resulting in the sensation of DOMS.^{1,11}

Department of Physical Therapy, School of Health Professions, Behavioral and Life Sciences, New York Institute of Technology, Old Westbury, New York.

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