**Project title:** Massage and Post Exercise Muscle Lactate Removal

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**PROJECT OVERVIEW**

**How does this study contribute to the MT knowledge base:**  
Massage is commonly used to aid in muscle recovery from exercise and sport activities. One claim often cited in the massage literature is that massage facilitates the removal of lactic acid, which is built up after physical activity. This study aimed to investigate this claim and adds to a growing body of literature on sports massage and specifically the effectiveness of massage in removal of lactic acid. This study also makes a unique contribution to this area of research as it is the first to investigate the efficacy of massage to remove lactic acid from the exercised muscle.

**About the study:**  
Using an experimental study design, the researchers set out to test the hypothesis that that sport massage and/or active recovery can improve muscle blood flow and lactic acid removal from exercised muscle after intense exercise.

The experiment set up was such that each participant completed 2 minutes of strenuous exercise. The isolated muscle group was in the forearm and the
exercise was an isometric hand grip exercise. After the exercise was completed, subjects were placed into one of 3 groups: massage, active recovery (mild exercise), passive recovery (rest).

**Ethics:**
This study was approved by the Health Sciences Human Research Ethics Board at Queen’s University

**Study participants:**
Healthy male subjects, average age of 24. Health was based on the following criteria: a) non-smokers, and b) no history of cardiovascular disease).

12 participants were recruited into and completed the study. Participants performed the required tasks in three experimental conditions: active recovery (mild exercise), massage, and control (rest). Adequate time (15-20 minutes) was allowed between each condition to allow all variables to return to original baseline levels.

**Massage therapy intervention:**
One 10-minutes massage to the forearm. The massage consisted of effleurage (2.5 minutes), petrissage (5 minutes), and finished with effleurage (2.5 minutes).

**Data collected:**
The following data was collected immediately after the massage every 30 seconds for 10 minutes:

*Doppler and echo ultrasonography* – To measure blood flow (of the forearm brachial artery).

*StatProfile M Blood Gas Analyzer* – To measure lactate concentration (in the deep venous forearm blood).

**Study results:**
Based on their analysis, the researchers report the following findings:

**Blood flow:**
- Blood flow was significantly lower in the massage group compared to the rest group (p=0.024).
- Blood flow was lower in the massage group than in the active group, but this was not a statistically significant difference (p=0.217).
- In addition, the researchers detected that blood flow in the massage group was markedly reduced following compressions with rhythmic massage. This was also lower during the massage compression compared to the contraction phase in the active recovery group.
Lactic acid:
- Thirty seconds after performing a 2 minute hand grip exercise, lactic acid levels increased to a similar level across all 3 groups.
- Clearance of lactic acid (efflux) via blood flow (over the 10 min post massage period) was the lowest in the massage group, compared to the active group and the passive group).

Based on their findings, the researchers concluded that massage impairs lactic acid removal following exercise. This may be caused by the fact through the compressions applied during massage, it mechanically impedes blood flow.

Study limitations:
The author identifies several limitations that require consideration when interpreting the results of this study:
- The two massage strokes - petrissage and effleurage – do not represent all possible massage techniques that can be used. As such, the results cannot be generalized to other massage techniques
- The experiment made use of a forearm muscle. It is possible that given the size of the forearm muscle, the percentage of total muscle affected by each stroke was much larger than for other areas such as the upper leg or back.

PRACTICE IMPLICATIONS:

Based on the findings of this study, a 10 minute Swedish massage application (petrissage and effleurage techniques) does not appear to be useful in helping to speed up the removal of lactic acid build-up related to strenuous exercise. Furthermore, the researchers conclude that massage impairs lactic acid removal because the compressions applied during a massage mechanically impede the blood flow through which lactic acid would be cleared.

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