Therapist Education Impacts the Massage Effect on Postrace Muscle Recovery

ALBERT MORASKA
University of Colorado at Denver and Health Sciences Center, Denver, CO

ABSTRACT
MORASKA, A. Therapist Education Impacts the Massage Effect on Postrace Muscle Recovery. Med. Sci. Sports Exerc., Vol. 39, No. 1, pp. 34–37, 2007. Purpose: The intention of this study was to assess the effectiveness of massage on muscle recovery as a function of therapist education in participants who completed a 10-km running race. Methods: Race participants were offered a 12- to 15-min massage immediately postevent. Participants were randomly assigned to a student therapist with either 450, 700, or 950 h of didactic training in massage. Muscle soreness was recorded by questionnaire using a 0- to 10-point visual scale at time points immediately before and after massage, and 24 and 48 h postevent. Eight hundred ninety-five subjects were recruited, with 317 subjects returning questionnaires from all time points. Results: Race participants who received massage from student therapists with 950 h of didactic training reported significantly greater improvement in muscle soreness across time compared with those who received massage from therapists with 700 or 450 h of education in massage (P < 0.01). On study entry, there was no difference in muscle soreness (P = 0.99), with a group mean of 4.4 ± 0.4; at the 24-h measurement, soreness was 2.4 ± 0.6, 3.7 ± 0.5, and 3.6 ± 0.9 for the 950-, 700-, and 450-h groups, respectively (P < 0.01). Conclusion: Level of therapist training was shown to impact effectiveness of massage as a postrace recovery tool; greater reduction in muscle soreness was achieved by therapists with 950 h of training as opposed to those with 700 or 450 h. Key Words: PHYSICAL ACTIVITY, DELAYED ONSET MUSCLE SORENESS, ALTERNATIVE MEDICINE, FITNESS, EDUCATION

M uscle soreness often accompanies a bout of intense or prolonged physical activity. The resulting disruption in cellular integrity, accumulation of cellular metabolites, or damage to connective tissues have been proposed to result in fatigue or soreness that reduce muscle performance (2,12,18). Although rest is an effective recuperative path, many athletes as well as lay populations seek alternative methods to facilitate recovery and reduce muscle pain. Massage therapy has been used for many years to promote health restoration and is frequently used by athletes in their preparation and recovery from physical activity (1).

Irrespective of a scientific recognition for an effect, physiotherapists spend a large portion of their treatment time providing massage to athletes during major (national and international) athletic events (5). However, the contrast between current scientific understanding of sports massage and its practice is notable, and scientific evidence to corroborate or refute an effect of massage on muscle recovery remains needed.

Massage administered after activities intended to induce delayed onset muscle soreness (DOMS) has been reported to enhance (4,20) or provide no benefit (8,10,11) to recovery of muscle force. However, soreness perception after DOMS induction has more consistently been reported to be improved with massage (8,20,22,23). Two recent review articles on sports massage conclude that the scientific evidence to support the use of massage for muscle recovery is limited, but both articles highlight that study limitations, including small subject pools, may detrimentally influence the interpretation of results (14,24).

The published studies on sports massage involve induction of muscle soreness in a laboratory environment. No studies have specifically investigated the effects of massage on muscle recovery after a scheduled (nonlaboratory) athletic event. The intention of this study was to assess the effectiveness of massage on muscle recovery as a function of therapist experience in participants who completed a 10-km running race. Race participants were offered a complimentary sports massage immediately after the event. Muscle soreness was recorded by questionnaire immediately before and after massage and each day for the following 48 h. The hypothesis was that massage would facilitate recovery of muscle soreness in a graded manner dependent on therapist experience.

METHODS

Subjects. The subject population was obtained from finishers of a popular 10-km running race in which over 42,000 participants completed the event. A complimentary postrace massage was available to all race participants in a gymnasium near the finish line. Subjects were recruited immediately after race completion, were blinded as to the...
educational training of the therapist, and were randomly assigned to a therapist. The institutional review board at the Boulder College of Massage Therapy approved the procedures for this study.

**Massage.** Student therapists with 450, 700, or 950 h (24, 40, and 31 students, respectively) of didactic training in massage therapy administered all massage sessions. Student education included 25, 45, and 75 h, respectively, of supervised clinical experience with the general public. Before the day of the event, all student therapists received an hour-long training session from a professional sports massage therapist regarding massage techniques and treatment of specific race participant concerns (e.g., muscle cramps). A 12- to 15-min postevent massage was administered to race participants within 15–60 min of event completion. Effleurage, consisting of deep flushing strokes applied to body regions of concern to the race participant, was the primary technique used. However, each therapist was allowed to use the strokes and techniques that they deemed appropriate for each subject and were not bound to a particular protocol. Most treatments were directed to the legs and low-back regions.

**Questionnaires.** Demographic information, race finish time, and perceived exertion during the event (0–10 scale) were recorded for each individual. Study participants rated their muscle soreness on a visual analog scale from 0 to 10 (10). A rating of 0 indicated absence of muscle soreness; 10 indicated extreme muscle soreness. Questionnaires were returned to a study volunteer at pre- and postmassage measurements or via prepaid postal mail for the 24- and 48-h time points. Only subjects who returned questionnaires from each time point were included in the analysis. A total of 895 subjects were recruited into the study; 317 or 35.4% of study participants competed and returned questionnaires at all four time points.

**Statistics.** Data are presented as the mean ± 95% confidence interval (CI). Analysis of variance (ANOVA) was used to assess group differences among the variables of age, finish time, and perceived exertion. Repeated-measures analysis of variance (RM-ANOVA) was used to compare groups across time for muscle soreness. Post hoc analysis was performed using an independent t-test with Bonferroni transformation. The a priori alpha level was set at 0.05. Statistical analysis was determined using StatView for windows (SAS Institute).

### RESULTS

There were no significant differences among treatment groups for the demographic variable age ($P = 0.90$) or the

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Age (yr) ± 95% CI</th>
<th>Finish Time (min) ± 95% CI</th>
<th>Perceived Exertion ± 95% CI</th>
<th>Male (M)</th>
<th>Female (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 h</td>
<td>39.1 ± 3.4</td>
<td>57.0 ± 4.8</td>
<td>8.2 ± 0.4</td>
<td>36</td>
<td>38</td>
</tr>
<tr>
<td>700 h</td>
<td>38.2 ± 2.3</td>
<td>55.1 ± 2.6</td>
<td>7.9 ± 0.3</td>
<td>73</td>
<td>89</td>
</tr>
<tr>
<td>950 h</td>
<td>38.3 ± 3.1</td>
<td>54.8 ± 3.2</td>
<td>7.6 ± 0.4</td>
<td>41</td>
<td>60</td>
</tr>
</tbody>
</table>

**FIGURE 1**—Race participants who received massages from student therapists with 950 h of didactic training reported significantly greater improvement in muscle soreness across time compared with those who received massage from therapists with 700 or 450 h of training ($P < 0.01$). A total of 95 student therapists participated in the study: 31 with 950 h, 40 with 700 h, and 24 with 450 h of training. * $P < 0.01$ versus 450- or 700-h groups at the corresponding measurement time.

race variables finish time ($P = 0.68$) and perceived exertion ($P = 0.12$) (Table 1).

All three massage groups reported similar scores for muscle soreness ($P = 0.99$) on study entry, with the entire group reporting a mean of 4.4 ± 0.4 (Fig. 1). Participants who received massage from student therapists with 950 h of training reported significantly greater improvement in muscle soreness over the course of the study compared with those who received massage from therapists with either 700 or 450 h of education in massage ($P < 0.01$). There was no effect of gender on muscle soreness across the study timeframe ($P = 0.26$).

At the 24-h time point, muscle soreness was significantly lower for participants receiving massage from student therapists with 950 h of education (2.4 ± 0.6) than for subjects receiving massage from therapists with either 700 or 450 h (3.7 ± 0.5 and 3.6 ± 0.9, respectively; $P < 0.01$). Post hoc analysis at the 48-h measurement point indicated a trend for lower muscle soreness in the 950-h group ($P = 0.06$).

Immediately after the 12- to 15-min massage, a significant improvement in muscle soreness was found compared with premassage values ($P < 0.001$); no difference was detected among groups at this time point ($P = 0.78$). The average muscle soreness for all groups was 3.1 ± 0.4 immediately postmassage.

### DISCUSSION

This study presents self-reported recovery from muscle soreness for 317 people who received massage after a 10-km running race. A greater reduction in muscle soreness was detected across the study interval for those who received massages from student therapists with 950 h of didactic training in massage than for those who received massage from therapists with either 700 or 450 h. The effect was highlighted by reduced soreness at the 24-h time point, with a trend for an effect at the 48-h measurement in the 950-h group.

Inadequate therapist experience may contribute to the lack of effect from massage in some research studies (8).
To the authors’ knowledge, this is the first study that specifically addresses therapist experience in the context of muscle recovery. An experience threshold of 700–950 h of training in massage may be necessary to elicit an effect that can facilitate muscle recovery after a sporting event. However, many of the student therapists with 950 h, but not those with 700 or 450 h of training, had taken a 30-h sports massage course and had an additional 15 h of internship experience with athletic populations. Therefore, specific training in sports massage may also contribute to the observed difference presented in this study.

Previous investigations in sports massage relied on laboratory settings to induce muscle soreness (20,23). The findings presented here extend the capability of massage to benefit recovery from muscle soreness in the field. The ability of massage to facilitate muscle recovery subsequent to an activity in which people frequently participate supports its use in practice.

A physiological explanation for the effect of massage on muscle recovery after physical activity remains unidentified. For example, it is unlikely that massage enhances lactate clearance (6,13,19), and the impact of massage on muscle blood flow is debatable (9,21,23), although recent evidence using a laser blood flow meter and infrared spectroscopy suggests that blood flow is enhanced in small blood vessels with massage (15). Alternatively, the effect on lymphatic drainage as a means for flushing muscle tissue has not been thoroughly investigated (16). The subjective, questionnaire-based reporting of muscle soreness as presented in this study underscores a perceptual rather than a physiological alteration.

Mood, anxiety, depression, and other psychological variables are frequently reported to be improved in studies using massage (17). With specific regard to physical activity, Hemmings et al. (7) report that amateur boxers who received massage between performance tests indicated greater perceived recovery, even though recovery of muscle force was not detected. Likewise, Robertson et al. (19) give an account of field athletes receiving massage after a Wingate cycling test and reporting a lower fatigue index on a subsequent effort, although mean and maximal power output were also not responsive. Therefore, the potential for massage to affect muscle recovery after physical exertion through a psychological mechanism should be investigated as well as any physiological impact.

The significant reduction in muscle soreness immediately postmassage by all subject groups must be tempered by the lack of a nontreatment control group. Although this pain reduction was relatively short lasting, with muscle soreness comparatively elevated at the 24-h mark, it would be interesting to further investigate this lessening in muscle soreness because it might provide insight into the gate control theory of pain management (3).

One concern of studies using massage and subjective reporting is the potential for bias by the subject in which results are overstated because of a desire to “reward” the therapist. All subjects received massage in this study; therefore, any “pleasing” bias is balanced across the treatment groups. Additionally, any subject expectation for an effect from massage would be equally distributed. The subjects were also unaware of therapist experience in massage, making it unlikely that subject favoritism toward a more trained therapist would influence the findings.

As is typical with questionnaire-based studies, subjective reporting can be inexact, and physiological parameters cannot be measured. However, the inclusion of 317 race event participants who received massage provides insight that is not readily available from laboratory-based studies. This study further provides evidence that employment of massage therapists with adequate experience or specific training in sports massage is an important consideration for research investigators or athletes seeking a recovery advantage.

REFERENCES

11. Lightfoot, J., C. D. J. McDermott, and D. Goya. Immediate...


