


The Effects of MSM Supplementation on Knee Kinetics during Running, Muscle Strength, and Muscle Soreness following Eccentric Exercise-Induced Quadriceps Damage


Conference Paper · August 2025

CITATIONS


0




3 authors, including




Shirley Hall
University of Tennessee
28 Publications 48 Citations



100% research

- Some of the authors of this publication are also working on these related projects:
- 

The effects of anticipated and unanticipated stimuli on lower extremity biomechanics and muscle activation patterns during dynamic movement tasks [View project](#)
- 

Foot structure and lower extremity biomechanics [View project](#)

The Effects of MSM Supplementation on Knee Kinetics during Running, Muscle Strength, and Muscle Soreness following Eccentric Exercise-Induced Quadriceps Damage

Shelby A. Peel, Daniel A. Melcher, Brian K. Schilling, Richard J. Bloomer, Max R. Paquette

Contact: mrpquette@memphis.edu

University of Memphis, Health & Sport Sciences, Memphis, TN

Purpose

- Delayed onset muscle soreness is elevated following eccentric knee extensor damage (i.e. running downhill) [1].
- Muscle soreness alters sagittal plane joint kinematics and kinetics during running [1].
- Methsulfonylemethane (MSM) has anti-inflammatory [3] properties that may reduce the duration of muscle soreness after muscle damage.
- **The purpose of this study was to investigate the effects of MSM supplementation on knee joint kinetics during running and muscle soreness following eccentric knee extensor damage.**
- It was expected that MSM intervention would reduce the negative effects of muscle damage on knee joint kinetics during running.

Methods

Participants

- 40 healthy, resistance trained men (25.3±6.3y, 177.6±6.6cm, 26.7±2.5 kg·m⁻²).

Testing Procedures

- 5 consecutive testing days with one day including eccentric knee extensor muscle damage protocol.
- 3 trials of maximum voluntary isometric knee extensor force.
- 3 trials of over-ground running with rearfoot strike (3.35 m/s ± 5%).
- Visual analog scale for quadriceps muscle soreness (out of 10cm).
- 3D motion capture (240Hz, Qualisys AB), force plate (1200Hz, AMTI, Inc.), load cell (MLP-1K, Transducer Techniques).
- Visual3D software for analyses (C-Motion).

Dependent Variables

- Muscle soreness, knee stiffness, peak knee moment, peak knee power, loading rate, knee extensor maximal isometric force.

Analyses

- Repeated measures ANOVA (Group x Time) were used to compared means. Absolute change of variables relative to baseline was also compared between groups.

Results

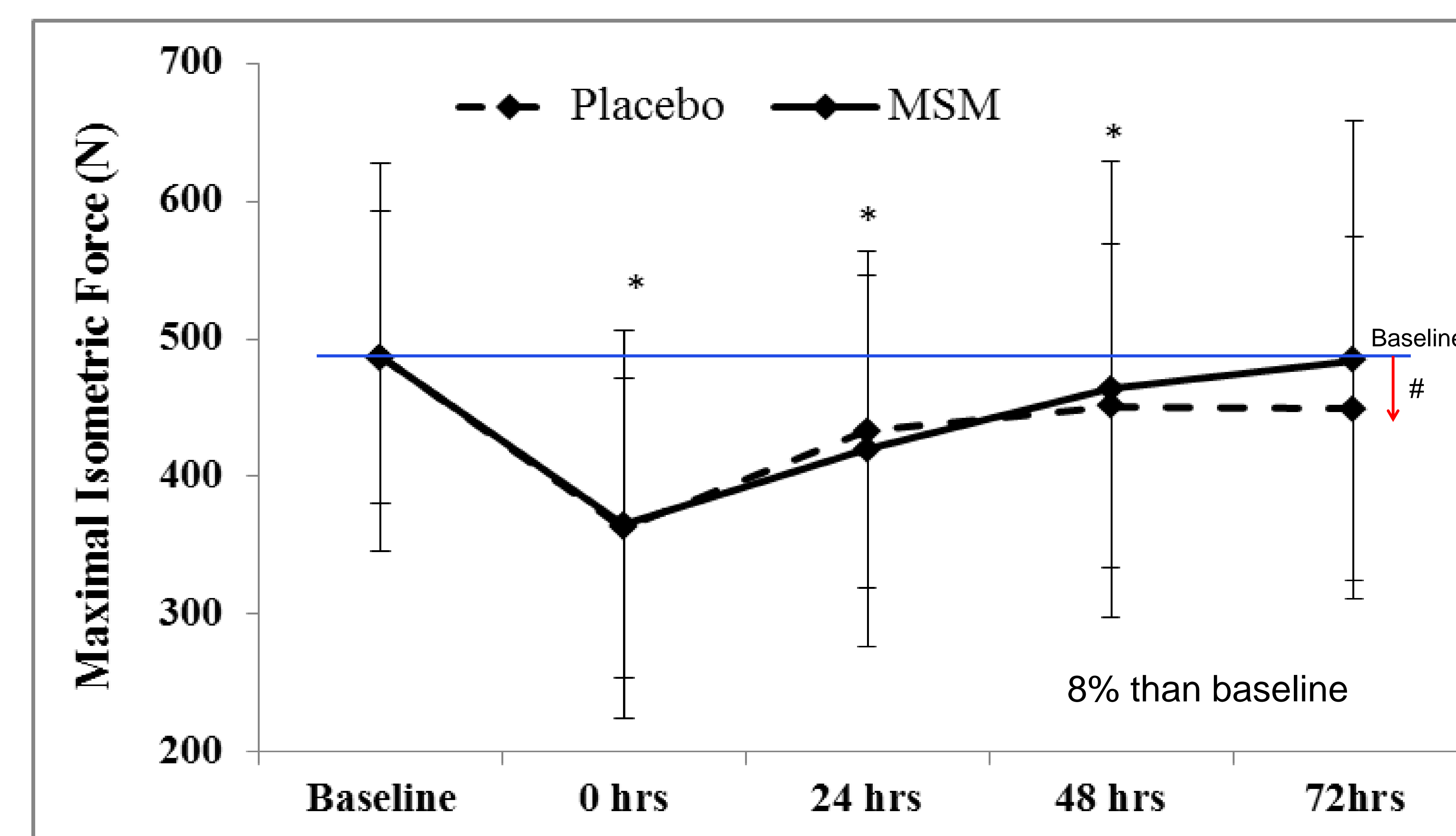


Figure 1. Knee extensor maximal isometric force at each testing time. *: main time effect compared to baseline. #: 8% lower than baseline in placebo group only.

Results

Table 1. Mean muscle soreness during passive knee flexion sagittal plane knee joint kinetics and peak instantaneous loading rate of the vertical GRF for each group at each testing time (mean ± SD)

		Baseline	0 Hrs Post	24 Hrs Post	48 Hrs Post	72 Hrs Post
Muscle Soreness (cm)	Placebo	0.4±0.2	3.4±0.6	6.2±0.4	6.2±0.4	4.4±0.4
	MSM	0.9±0.3	3.3±0.4*	5.1±0.3*	5.2±0.4*	3.4±0.5*
Knee Stiffness (Nm/kg/°) ^{a,b,c,d,e,f,g}	Placebo	-0.10±0.03	0.08±0.02	0.09±0.03	0.09±0.04	0.09±0.03
	MSM	-0.10±0.02	0.08±0.02	0.08±0.02	0.08±0.01	0.08±0.02
Peak Knee Moment (Nm/kg) ^{a,b,c,d,e,g}	Placebo	2.74±0.47	2.30±0.57	2.57±0.63	2.46±0.53	2.52±0.58
	MSM	2.86±0.57	2.43±0.56	2.57±0.55	2.53±0.54	2.56±0.54
Peak Knee Power (W/kg) ^{a,b,c,d,e,g}	Placebo	-14.5±3.2	-11.8±5.1	-13.1±4.3	-13.3±4.1	-13.6±4.0
	MSM	-16.0±5.3	-13.5±4.9	-14.2±4.4	-13.9±5.0	-14.4±4.2
Loading Rate (BW/s) ^{e,f,g}	Placebo	86.5±27.3	88.8±25.8	84.8±24.8	86.0±28.1	84.5±26.9
	MSM	78.7±20.4	80.8±19.0	73.7±17.8	74.3±23.2	73.9±16.8

Notes: **Time Effects:** ^a: 0h different than baseline, ^b: 24h different than baseline, ^c: 48h different than baseline, ^d: 72h different than baseline, ^e: 24h different than 0h, ^f: 48h different than 0h, ^g: 72h different than 0h; **Group effects:** *: different baseline absolute change between groups.

What Does It Mean??

- MIF returned to baseline values in the MSM group at 72 hours but remained 8% lower than baseline in the placebo group.
 - This finding suggest that MSM may speed up MIF return to baseline.
- Knee joint kinetics are not affected differently with or without MSM supplementation following muscle damage.
- The absolute change in muscle soreness during passive knee flexion was smaller in the MSM group.
- At least a portion of these findings suggest that individuals may be able to return to regular training more quickly with MSM supplementation following knee extensor damage.

References

1. Dutto DJ. *Med Sci Sp Ex*, **36**(4), 560-566, 2004.
2. Kim YH. et. al., *Biological and Pharmaceutical Bulletin*, **32**(4), 651-656, 2009.

Funding source: Bergstrom Nutrition