

The Effects of Dry Needling on Hamstring Strains and Pain in Collegiate Athletes

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Abstract

Hamstring strain injuries are among the most prevalent injuries in the athletic population. The commonality of the injury and rate of re-injury suggest that current treatment methods are inadequate. Researchers have been studying dry needling in the past decades to investigate the potential clinical significance it may have on muscle pain. Results have shown significant reductions in myofascial pain with dry needling, but most studies have been on muscles other than the hamstring muscle group, and focused primarily on chronic pain. The ability of dry needling to inactivate trigger points in muscles by eliciting a local twitch response suggests potential effectiveness in treating acute grade 1 hamstring strains. The current research was done on collegiate athletes, where participants received a type of dry needling or sham needling as a placebo. Pain was measured using a visual analog scale (VAS) and mean scores were compared for significance.

Operational Definitions

- **Grade 1 Hamstring Strain-** Characterized by a tear of only a few muscle fibers with minor swelling and discomfort along with little to no loss of function or strength (Jarvinen et al., 2007)
- **Dry Needling-** treatment involving inserting a thin, solid needle into a muscle to stimulate the tissue
- **Myofascial Trigger Points-** A hyperirritable spot in the skeletal muscle that is associated with a hypersensitive palpable taut band (Cotchett et al., 2014)
- **Local Twitch Response-** Involuntary spinal cord reflexes of muscle fibers in a taut band after dry needling (Dommerholt & Fernandez-de-las-Penas, 2018)
- **Needle Manipulation-** Manually manipulation of the needle after insertion into the muscle tissue
 - **Pistoning technique:** Up and down motion with needle
 - **Unidirectional rotation (UNI):** Rotating the needle in one direction
 - **Sham needling:** needle with dull end that does not penetrate skin

Introduction & Review of Literature

- Hamstring strains are one of the most frequent injuries in contact & non-contact sports (Foreman et al., 2006)
- Average number of days missed in season is 8-25 days depending on severity of injury (Heiderscheit et al., 2010)
- Cotchett et al. (2014) studied dry needling effects on plantar heel pain using pistoning technique. Results showed significant reduction in first-step pain scores (VAS) in favor of dry needling and overall lower pain levels in comparison to sham needling group
- Several studies have shown that the pistoning method is effective in finding TrPs and generating a successful LTR (Arias-Buría et al., 2015)
- A study performed by Langevin et al. (2001) indicated that UNI manipulation stimulated a greater LTR than no manipulation

Purpose & Hypothesis

- The purpose of this study was to determine the effects of dry needling on pain in acute grade 1 hamstring strains.
- The hypothesis for this research study was that the dry needling treatment groups would experience in a larger decrease in pain levels according to the VAS scores than the control group.

Methods

Participants

- Doctors in cities throughout North Carolina referred athletes who met the criteria
- Informed consent agreement
- 45 males and 45 females (N=90)

Inclusion Criteria

- Experienced a grade 1 hamstring strain within the last 2 weeks as determined by MRI
- No prior exposure to dry needling or tearing of the hamstring above grade 1 in the last 6 weeks
- Division 1 athlete

Intervention

- Randomly assigned to either pistoning (group A), unidirectional rotation (group B), or placebo sham needling (group C)
- Goal was to elicit LTR in dry needling groups
- Treatment sessions were performed 3 times a week for 2 weeks, then once again for a follow up at 6 weeks using a VAS to measure pain

Research Design

- Randomized, placebo controlled, double blind study
- Licensed clinicians with at least 2 years experience assigned to each group
- Quantitative: descriptive statistics used in data analysis

Data Analysis

- Paired sample t-tests performed on Excel ($p < .05$)
- Mean VAS scores were compared to identify any potential relationships between groups

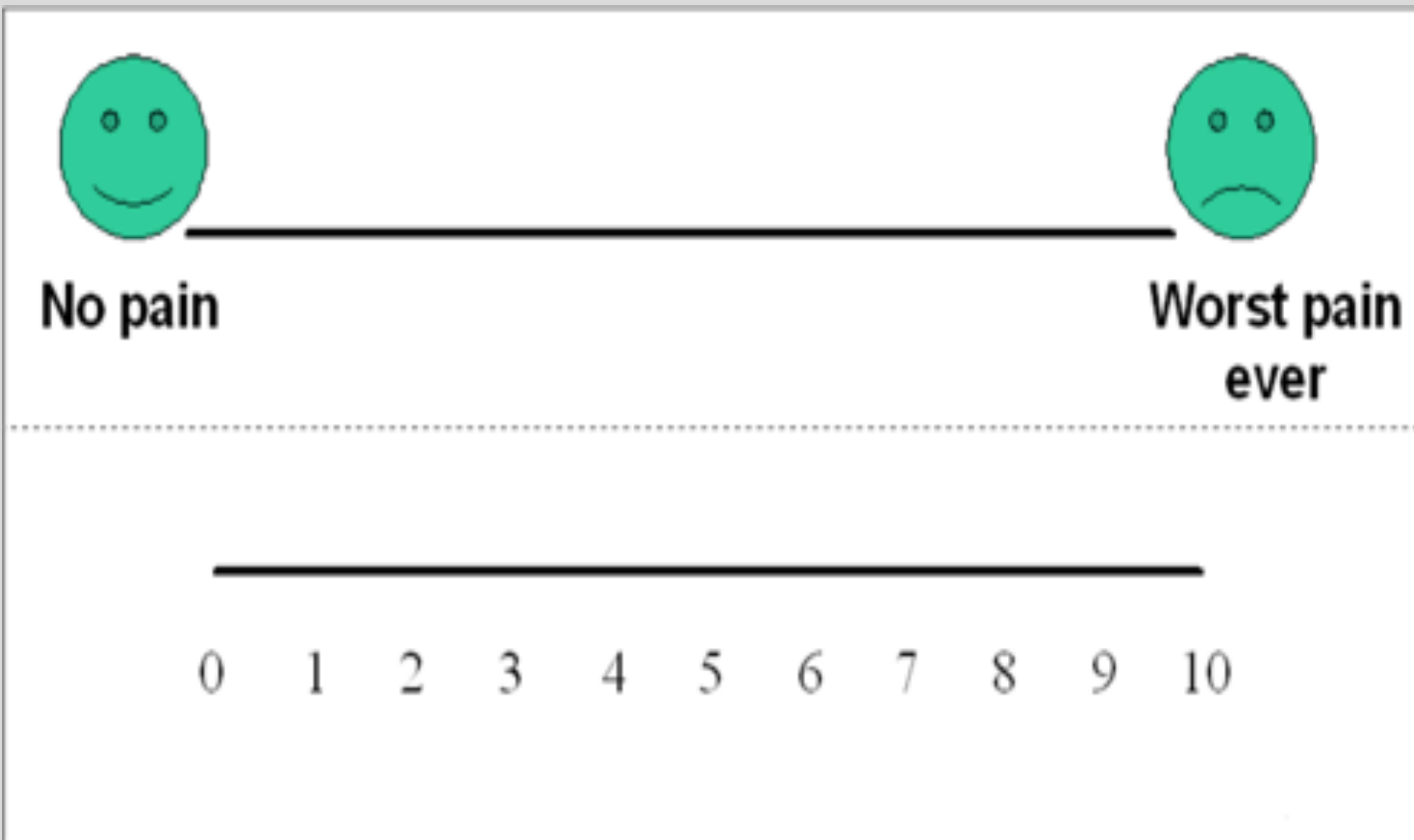


Figure 1. Visual Analgo Scale used during study.

Discussion

- Implications
 - There is no gold standard protocol to follow after a hamstring strain as current methods show variable results.
 - The results of this study could allow athletes to experience a faster recovery due to a significant reduction in pain.
- Limitations
 - Clinicians performing the dry needling could perform the needle manipulation differently
 - There was no specification of the location of the injury in the hamstring
- Future research
 - Attempt to determine the underlying mechanism that allows dry needling to be effective
 - Investigate the potential relationship between time the needle is manipulated and pain levels
 - Study the effects of adding electrotherapy to the needles while still in the muscle tissue

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