The Immediate Effects of Graston Technique© on Hamstring Flexibility Compared to a Control

Boyer S, Novack J, Madsen LP, Kingma JJ, Schrader JW, Docherty CL: Indiana University, Bloomington, IN

Context: Poor hamstring flexibility increases the risk of sustaining a muscle strain during physical activity. By identifying interventions that are effective at improving hamstring flexibility, clinicians can look to reduce injury rates among physically active patient populations. **Objective:** To determine if a single modified treatment of Graston Technique© protocol is effective in increasing hamstring flexibility immediately after treatment. **Design:** Randomized controlled trial **Setting:** Human Performance Laboratory **Patients or Other Participants:** Thirty-two subjects who met the inclusion criteria were randomly assigned to one of two intervention groups: 1) Graston Technique© (n = 16; Age = 20.7 ± 2.5 yr, Height = 176.0 ± 2.8 cm, Weight = 73.5 ± 3.5 kg), or 2) control (n = 16 Age = 21.2 ± 3.9 yr, Height = 176.7 ± 2.8 cm, Weight = 81.8 ± 3.8 kg). Subjects were included if they had decreased hamstring ROM measured with a passive knee extension (PKE) test of less than 60 degrees, had no lower extremity injury within the past year, and had not participated in an intensive leg workout 48 hours prior to testing. **Interventions:** All subjects participated in one, single-blind data collection session. Only the subject's dominant leg was included in the study. PKE measurements were used to capture hamstring range of motion using a digital inclinometer (Lafayette Inst. Co., Lafayette, IN) at two separate times: 1) after a 5-minute warm-up (Pre), and 2) immediately post intervention (Post). A visual analog scale was also used Pre and Post intervention to determine subject's perceived flexibility. The GT intervention consisted of 4 different techniques. Scanning strokes were done first and then smaller instruments were used to address soft tissue adhesions. Two techniques were performed while subjects were prone, and two while subjects were supine. Control subjects sat in a resting position with their hips and knees at 90 degrees and their feet flat on the floor. Interventions for both groups lasted 12 minutes. Two repeated measures analysis of variance (ANOVA) were completed, one for each dependent variable (hamstring flexibility and perceived hamstring flexibility). **Main Outcome Measures:** Hamstring flexibility (degrees) and visual analog scale (centimeters). **Results:** A significant time by group interaction was identified for range of motion ($F_{1,30} = 85.1$, $p < .01$), and perceived flexibility ($F_{1,30} = 21.04$, $p < .01$). The mean difference in PKE was 9.5° for the GT group (GT: Pre = 52.5 ± 1.8°, GT: Post = 62.0 ± 2.1°), while the control group had no significant change (Control-Pre = 52.3 ± 1.8°, Control-Post = 50.5 ± 2.1°). Additionally, the GT group perceived a greater increase in hamstring flexibility (mean difference VAS = 2.1 cm) compared to the control group (mean difference VAS = .5 cm). **Conclusions:** Our results indicate that GT is an effective intervention for increasing hamstring flexibility when measured immediately after treatment application. Additionally, subjects report subjective improvements in flexibility following GT application. These results may prove beneficial for reducing sport related muscle injuries.

Compressive Versus Decompressive Soft Tissue Therapy on Acute Hamstring Flexibility and Pain in Male Athletes With Perceived Hamstring Tightness

Barger KM, Warren AJ, Volberding JL, O'Brien MS, DeFreitas JM: The Steadman Clinic, Vail, CO; Oklahoma State University Center for Health Sciences, Tulsa, OK; Oklahoma State University, Tulsa, OK

Context: The Graston Technique® (GT) and Myofascial Decompression (MFD) are commonly used in treating hamstring injury, but limited research exists to determine immediate effectiveness and beneficial outcomes of these treatments. **Objective:** Compare the acute effects of GT and MFD on hamstring flexibility, strength, and patient-reported outcome measures of perceived function and pain. **Design:** Pretest-posttest randomized group study. **Setting:** Controlled laboratory setting. **Patients or Other Participants:** Twenty Division I collegiate male athletes (21.35 + 1.76 years, 82.85 + 8.36 kg, 175.89 + 5.93 cm) with complaints of perceived hamstring tightness and pain voluntarily participated. Participants were randomly assigned to one of two interventions (GT or MFD) of ten participants each. **Interventions:** The GT group received sweeping strokes of 30 per minute distal to proximal, and 30 strokes per minute proximal to distal repeated for 4 minutes using the GT-1 instrument. MFD participants received three minutes of static treatment using six plastic-valve cups along the length of the hamstrings, followed by 1 minute of single cup gliding. **Main Outcome Measures:** Dependent variables were assessed before and after intervention. Flexibility (ROM) was assessed via digital protractor in supine straight-leg-raise position. Peak force (PF), average force (AvgF), torque (TQ), and overall strength (STR)

was assessed by hand-held dynamometer in prone isometric knee flexion at 90°. Patient-reported outcomes of perceived function and pain and overall treatment effectiveness were assessed with the Perceived Functional Ability Questionnaire (PFAQ) and the Global Rating of Change Scale (GROC). Paired sample t-tests and a two-way ANOVA were used to compare mean differences in pre and post-test measurements of flexibility and strength and perceived function, and differences between interventions. **Results:** Aggregate data showed significant improvements regardless of treatment in ROM ($t = -5.41$, $p < 0.001$), PF ($t = -3.26$, $p = 0.004$), AvgF ($t = -3.47$, $p = 0.003$), TQ ($t = -3.24$, $p = 0.004$) and STR ($t = -3.34$, $p = 0.003$), and perceptions of flexibility ($t = -3.90$, $p = 0.001$), pain ($t = 2.76$, $p = 0.01$) and sport performance ($t = 3.18$, $p = 0.005$) as identified via the PFAQ. No differences in dependent variable comparisons were observed between groups. Perceived pain and flexibility improved following either treatment, however there was no significance found between groups. The GT group felt "quite a bit better" (5.4 + 1.17) compared to MFD reporting "moderately better" (4.3 + 1.42) on GROC scores after treatment, but no clinical meaningful change exists between groups. **Conclusions:** Both GT and MFD methods were effective in increasing hamstring flexibility and strength and improvements in perceptions of flexibility, pain and performance immediately following treatments. Subjects in both groups responded positively to treatment according to GROC measures. Considering there were no significant differences between interventions, it can be recommended that GT and MFD are useful treatment strategies for patients experiencing hamstring tightness or pain.

Instrument Assisted Soft Tissue Mobilization (IASTM) Graston Technique® Treatment of Dance Injuries

Honrado J: Harkness Center for Dance Injuries, New York, NY

Context: With a high injury rate among dancers, 65% of which are reported to be overuse syndromes, healthcare practitioners need to be equipped with the most current, evidence based technologies which will help performing artists return to functional activity using the least amount of time. **Objective:** Determine if Instrument Assisted Soft Tissue Mobilization (IASTM) Graston Technique® (GT) is a more effective treatment for chronic dance injuries than manual Soft Tissue Massage (STM) alone. **Data Sources:** A PubMed literature search without language restrictions was performed on the use of IASTM GT and STM treatments for dance related injuries between the years 1995-2016. The search strategy was IASTM GT and dance injury. **Study Selection:** Risk of bias was assessed with the Cochrane criteria. Studies which addressed conditions in which GT is indicated and correlates with common dance injuries were included: Achilles Tendinitis/osis; Cervicothoracic Sprain/Strain; Lumbosacral Sprain/Strain; Myofascial Pain Syndromes; Patellofemoral Disorders; Plantar Fasciitis/osis; Patients Demonstrating Central and/or Peripheral Sensitization; Post Surgeries such as Joint Replacements/RTC Repairs; Rotator Cuff Tendinitis/osis; Scar Tissue/Post-Surgical Scars; Shin Splints; and Women's Health. **Data Extraction:** One principle investigator analyzed the data found within this systematic review. Five clinical trials, two case series, three case studies, one pilot study, and two animal studies were included. All clinical and case studies contained improved outcome measures in subjective and objective clinical controls with use of GT on tendinopathies. One clinical trial showed a decrease in practitioner discomfort and fatigue with use of IASTM. One animal study showed altered microvascular morphology and the other accelerated knee ligament healing with use of GT. Hierarchy of evidence was taken into consideration when selecting studies for review. **Data Synthesis:** While all the studies showed favorable outcome measures with the use of GT on tendinopathies and a decrease in practitioner discomfort and fatigue with use of IASTM, the quality of evidence of the studies in this systematic review are low in hierarchy of evidence. There is insufficient research on the use of GT on dance specific injuries and returning those with dance specific injuries to functional activity in the least amount of time. Further research on the use of GT within the dancer patient population will help validate the use of GT for dance specific related injuries. **Conclusions:** The available research suggests that with the combination of a comprehensive fitness program, incorporating the use of GT in treating chronic overuse dance injuries is likely to aid dancers in returning back to functional activity faster, as well as provide long term results associated with the proper realignment of tissues. The evidence suggests clinicians benefit as well due to the decreased amount of strain placed on the joints of their hands. As such there is likely the potential of increasing the longevity and capacity of clinicians for manually treating their dancer patients by using GT.