Comparing the Effects of Tissue Flossing and Instrument Assisted Soft Tissue Mobilization on Ankle Dorsiflexion

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I. Introduction

Typically flossing is something done to help maintain teeth health, but what if I told you flossing can also improve joint health? A new technique, known as tissue flossing, makes many claims such as improved joint health, decreased muscle soreness, increased muscular gains, and increased ROM. Are these claims true? In this paper, we will discuss what tissue flossing is and compare it to instrument assisted soft tissue mobilization (IASTM) for increasing ankle dorsiflexion.

Tissue Flossing is a relatively new technique that involves the use of large, rubber bands wrapped around a specific joint or part of the body. Once applied, it is used for compression of the joint for the purpose of blood flow restriction, decreasing muscle soreness, increases joint mechanics, and ultimately, increasing joint range of motion. In this study, we will be testing this last claim.

Instrument assisted soft tissue mobilization, or IASTM, has now been around for a while. It involves using some type of instrument, in this case a metal HawkGrips tool, to massage the affected area. The purpose is to primarily irritate scar tissue, break up any adhesions in the muscle or tendon, align collagen fibers, and bring blood flow to the area. Previous research has shown that this positively influences tendon flexibility, so we have chosen to use this in our comparison group.

II. Review of Literature

There has been very little research done regarding tissue flossing. Of the research on tissue flossing much has shown it to be effective in increasing range of motion (ROM). However, the increase is not always significant. In a study by Stanek et al. the results showed an increase in ankle dorsiflexion after just one treatment. This is why we are wanting to test more than one treatment of tissue flossing and see if there is a difference. Also, a study by Plocker et al. showed that the flossing technique increased shoulder ROM, but the increase was not significant. There has been more research done about IASTM, and a couple of the studies we found have shown IASTM to be effective at increasing ankle ROM, specifically dorsiflexion. The research also states that having an increased ankle ROM can prevent more ankle injuries. In a systematic review by

Mason-Mackay et al. they were able to conclude that restricted dorsiflexion can predispose an athlete to injury. This is where our research fits in because we want to know if multiple treatments can have a greater effect and help to prevent injury.

For our study we are having a control group that will perform a calf stretch and exercise, because stretching has been shown to increase ankle ROM. A study by Jeon et al. concluded that improvements were seen in both the self-stretching using a strap and slant board stretching techniques, but greater improvements were seen in the self-stretching group using a strap. Our study is similar to other studies that have been done in that we are comparing tissue flossing to another intervention like IASTM. It differs in that we have a control that will complete a calf stretch and exercise. The two experimental groups will also complete the stretch and exercise after receiving the intervention. Another way this study differs is that we are planning on using general population not athletes for our study. Also, the study by Stanek et al. that we are basing our study on only did one treatment and we are doing a total of 8 treatments over four weeks. The current research has not been fully successful at showing a significant difference and that was our goal with this research. We want be able to conclude that tissue flossing is effective at increasing ankle ROM as well as, if not more effective than, IASTM.

III. Subjects

We had a total of 16 participants (Male:4, Female:12). All participants had no current or recent ankle injury during the time of the study. The groups were evenly distributed with the control having 5 people, IASTM having 6 people, and tissue flossing having 5 people. The non-dominant ankle classifications were 13 left ankles and 3 right ankles.

IV. Methods

Our study will be a multi group pre-test post-test design. This means that we will have two treatment groups and one control group. Our study will be conducted in the Athletic Training Facility at Cedarville University. Participants will be asked to participate for the study by sending out an email to all of the current students, faculty, and

staff at Cedarville University. We will specify that we are looking for individuals that are 18 or older and that do not currently have or have recently sustained an injury to their ankle. Once we obtain participants for our study, they will be given a copy of our written consent form (see Appendix) and asked to sign the consent form if they feel comfortable going through with the study. Once the consent form is signed, they will then be randomly allocated to one of the three groups for our study.

Once participants are allocated to their respective groups, we will obtain baseline ankle range of motion measurements on the non-dominant ankle of each participant using a goniometer. They can then start going through the treatment plan for the group that they are a part of. The control group will be instructed to complete a calf stretching exercise on a 30^0 slant board for 3 sets of 30 seconds, they will also be instructed to complete a calf raising exercise for 3 sets of 10 reps. The IASTM group will be treated with an IASTM treatment to the non-dominant ankles' Achilles tendon. The treatment will be applied using HawkGrips IASTM tools for 5 minutes. The instrument will be held at a 30^0 angle to the participant's skin and stroked along the length of the Achilles tendon with as much pressure as the participant is able to tolerate. After this treatment is applied, they will then be instructed to go through the same exercises that the control group is going through. The tissue flossing group will be applied with a tissue flossing band on the non-dominant ankle in a similar style of a normal ankle tape. Once the band is applied, the participant will be instructed to go through 2 sets of 20 dorsiflexion, plantarflexion ankle pumps. The band will then be removed and the participant will be instructed to go through the same exercises as the control group is going through. Treatments will be done twice a week for a duration of 4 weeks. Goniometer range of motion measurements will be conducted before the first treatment is applied (baseline), after the second treatment of each week is completed, and after the final treatment is completed on the participant. All goniometer measures will be conducted in the same manner by one of the researchers for all participants.

V. Results

We used SPSS version 25 with a p value set at 0.05. We ran a mixed ANOVA in SPSS. A mixed ANOVA compares the mean differences between groups that have two "factors" -- a "within-subjects" factor and a "between-subjects" factor. In our study, the within-subjects factor was "time" (comparing five time points). The between subjects factor was "group", comparing the control group with the two intervention groups. To summarize, there was a significant effect of time. So for the participants as a whole, ROM significantly improved over time (p value = 0.023). However, there was no significant difference in ROM between groups over the different time periods.

VI. Discussion

A. Application

From these results, we can conclude, at the very least, that stretching protocol done at a minimum of two times a week, can increase ankle dorsiflexion. As discussed in our initial proposal, the purpose of increased ankle dorsiflexion includes, but it not limited to, improved jumping mechanics, reducing injury risk, and better rehabilitation after surgery. Without significance across groups, we are unable to determine if IASTM or tissue flossing would be beneficial for increasing flexibility. However, we can draw that it is not detrimental to ankle dorsiflexion.

B. Limitations

There were several limitations to our study. First, as predicted at the proposal of our study, was the number of participants. We would have liked to have had more, but we had several people drop out before even beginning. Though it would have helped increase the validity of our study, the lack of a larger number of participants made conducting the study easier and still gave us significant results.

A second limitation of our study was consistency across researchers. This includes the areas of IASTM, flossing, and goniometry. We have all been trained in these techniques, however, minor discrepancies could have caused minor numbers to be off. Tissue flossing application might have been too loose or too strong.

Goniometer measurements might be derived from an off-center goniometer axis. These are a part of research and are hard to get around, especially with erratic schedules and difficulty keeping consistent schedules. However, it should be noted that discussion of these techniques at the beginning aided us in reducing the risk of inter-researcher inconsistencies.

A final limitation of our study was how the final week was conducted. Due to time constraints with a school break, participants were rushed to complete their treatment times over the weekend and the first two days of the week. By completing the study on a weekly basis, this did not matter. However, changes in treatment times, days, and researchers who completed the various treatments could have caused a difference in measurements. The time difference between six weeks and four weeks is not being considered as a limitation because we were still able to achieve significance over time.

After completing this study, these limitations make sense and should be reduced in the future to give more validity and reliability to further research. Our recommendations include having larger groups, having the same researchers giving treatment and taking measurements throughout the entirety of the study, and having consistent times across the duration of the study.

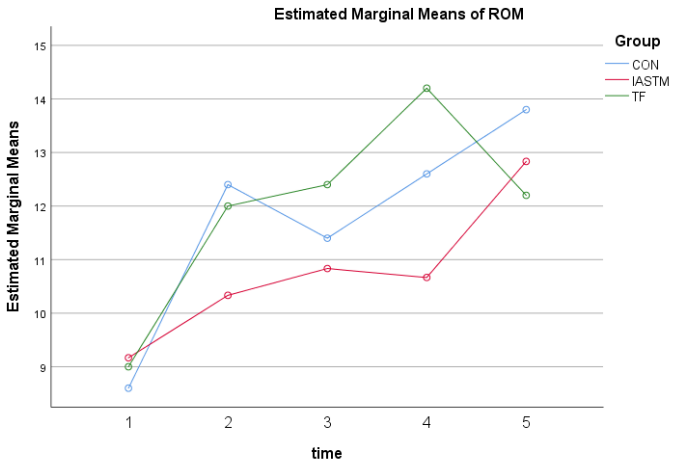

Figure 1

Increase in group means over the 4 weeks and 5 measurements

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Appendices:

Consent Form

Title: A study comparing Tissue Flossing and IASTM for ankle dorsiflexion in general population age 18-24 at Cedarville University

Opening Statement: I, _____, agree to participate in the following study, "A study comparing Tissue Flossing and IASTM for ankle dorsiflexion in general population aged 18-24" to be conducted by Sean Carlson, Garret Rife, and Zac Williams of the athletic training department under their advisor, Kurt Gruenberg. I agree that my participation is completely voluntary and that I am free to withdraw from the study at any time.

Study Details: The purpose of this study is to evaluate the claimed effects of a new technique called Tissue Flossing and compare those effects with Instrument Assisted Soft Tissue Mobilization, or IASTM. Tissue flossing is a relatively new technique that utilizes a large rubber band that is wrapped around the involved joint. Once applied, range of motion exercises are completed and the band is removed. The goal is to increase joint range of motion. IASTM involves using a specialized tool to scrape an effected muscle or tendon of the body. The goal is to reduce any adhesions or scar tissue in the muscle and bring blood flow to the area to encourage healing and increase range of motion.

Procedures: We will be conducting a multi-group pre-test post-test study where we will have three groups of participants. All groups will go through a stretching protocol that consists of calf stretching on a slant board for 3 sets of 30 seconds and calf raises for 3 sets of 10 reps. The first group will receive a treatment of a tissue flossing band being applied to the non-dominant ankle. While the participants have the band on their ankle, they will complete 20 dorsiflexion/plantarflexion ankle pumps. The second group will receive an IASTM treatment on the Achilles tendon of the non-dominant ankle for 5 minutes. The final group is a control group that will just go through the stretching protocol. At the beginning of the study we will take ankle range of motion. To take ankle range of motion, we will start with the patients ankle fully plantar flexed and then have them go to full dorsiflexion. We will also measure range of motion after the second treatment of each week to monitor the changes over time.

Duration of Study: The study will take place over the course of six weeks, with treatments taking place twice a week per week.

Risks: The risks that come from the study are minimal. Patients may experience some discomfort or slight pain to the tissue flossing or the IASTM. Some soreness may also occur due to completing new activities which the patient may not be used to. If any harm come to you, you have the option to drop out of the study or give the researchers a call with any questions or concerns.

Benefits: The main expected benefit from this study is increased dorsiflexion in the treated ankle.

Compensation: There will be no compensation after the completion of this study.

Confidentiality: Participant's names will be kept entirely confidential throughout the duration of the study and the publication of the study. Participants names and information will be kept on a secure device that only the researchers will have access to.

Questions: If you have any questions regarding the study are any of the techniques being used in this study, or if you experience any discomfort after receiving a treatment, feel free to call the researchers at the following numbers:

Garrett Rife: 717.658.7973

Sean Carlson: 812.361.9398

Zac Williams: 570.316.3686

Final Agreement: My signature below indicates that I have read through the entirety of this consent form and that I willingly agree to be a participant of this study. I have been given a copy of this form.

Patient Name:_____ Signature:_____

Researchers Name:_____ Signature:_____

Date: _____