# Clinician-Administered Versus Self-Administered Suboccipital Release on Superficial Backline Function

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## ABSTRACT

The effectiveness of trigger point release in the suboccipital region to improve hamstring mobility has been established in the literature, but the research has not clarified whether self-administered soft tissue techniques produce the same improvements to mobility as when the clinician delivers the manual trigger point release. The purpose of the study was to assess whether the same increase in hamstring mobility within the superficial backline function that is achieved with a clinician-administered suboccipital trigger point release can also be obtained through a patient/self-administered method. The study employed a randomized, descriptive laboratory design in which 60 participants reported for a single data collection session and were randomly assigned to either a clinician-administered or self-administered treatment group. There was a statistically significant main effect for the intervention ($F(1,58) = 18.24$, $p < .001$, $eta = .239$) indicating that both the clinician-administered and the self-administered groups improved in their hamstring mobility from pretest to posttest; but there was not a statistically significant interaction of time and group ($F(1,58) = 18.24$, $p = .360$, $eta = .014$) indicating that the effectiveness of suboccipital trigger point release on hamstring mobility did not differ between groups. The significant finding in this study is that toe touch distance – indicating improved hamstring mobility – increased for all participants following a suboccipital trigger point release. The significant clinical implication from the study is that improvement in hamstring mobility was similar whether the suboccipital trigger point release was clinician-administered or self-administered. If a clinician properly instructs a patient on how to perform a trigger point release in the suboccipital region, the self-administered intervention can be just as effective at improving hamstring mobility as when the clinician performs the release. This finding allows clinicians to extend the scope of their treatment by empowering patients to effectively treat their own myofascial trigger points.

**Key Phrases**
Clinician-rated outcome, manual techniques, myofascial release

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**Full Citation**
Wilhite C, Paloncy KA, Rakowski K, Daniel T. Clinician-administered versus self-administered suboccipital release on superficial backline function *Clin Pract Athl Train.* 2019;2(2):12-19.
https://doi.org/10.31622/2019/0002.3.

**Submitted**: February 8, 2019 **Accepted**: April 23, 2019

## INTRODUCTION

Trigger points are hyperirritable, localized areas of tightness within a band of skeletal muscle that can cause referred pain.[1] Referred pain is experienced in 1 area of the body, although the cause of the pain originates in a different area of the body. Trigger points arise from the degradation of proper body alignment which is typically the result of poor posture.[2-4] In these cases, the body necessarily recruits other muscles to compensate for body misalignment in order to maintain static positions.[2-4] These misaligned static positions leave muscles contracted and the compensatory muscular contraction frequently leads to hypersensitivity in the form of trigger points.[2-4]

Individuals who spend hours a day seated at a desk, hunched over a computer, or curled around a mobile device routinely engage a forward head posture. A forward head posture requires that posterior neck muscles be engaged to maintain static tension in order to keep the head upright.[2-3] This compensatory action within the nervous system can manifest as active trigger points. Trigger points are thought to be formed when sarcomeres, which are considered the building blocks of muscles, become overactive.[2-5] When this overactivity occurs and these myofilaments stop sliding over one another naturally, the sarcomere continues to stay in a switched-on position. This state of contraction leads to muscle pain, hypertonia, and stiffness, which is called a trigger point.[3-5] Evidence is clear that the restriction to tissue caused by trigger points negatively affects the mobility of other parts of the body by causing extra tension along the connecting fascial tissue.[1-4]

Fascia comprises sheets of web-like tissue surrounding muscles and joints, connecting different sections of the body to one another, allowing the body to function as 1 unit.[5-10] As illustrated in **Figure 1**, the superficial back line is a fascial tract consisting of 4 pieces connecting large sections of the body to one another. Two pieces attach at the supraorbital ridge, go over the top of the head, down both sides of the spine, and attach again on the lower leg. The second 2 pieces travel from the distal section of the femur, down the posterior aspect of the lower leg, and attach at the metatarsal heads of each foot.[8] These structures consist of the epicranial fascia, cords of the erector spinae, the sacrotuberous ligament, the hamstrings, the triceps surae, and the plantar fascia. The primary function of the superficial backline is to create the extension and hyperextension needed for an individual to maintain an upright posture. Clinical theory describing myofascial chains such as the suboccipital back line originates from the assumption that the muscles of the human body do not function as independent units.[10] Instead, muscles are interconnected in identified chains and linked through fascial structures creating a system of structural continuity.[10] Following this philosophy, trigger points that disrupt this function by causing pain or negatively affecting the mobility of 1 area of the superficial back line – such as the suboccipital muscles – will affect mobility along this facial tissue of the superficial backline, affecting even the distal region of the hamstrings.[8]

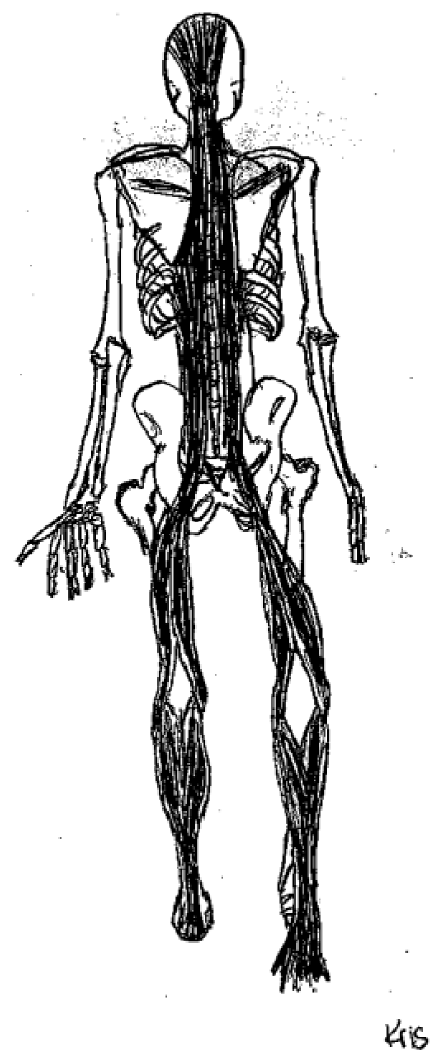


**Figure 1**: Illustration of Superficial Backline Fascia

Because sections of the body are connected by different fascial tracts, activation of a trigger point within a given muscle can affect the motion of other joints within the same fascial tract.[2-4] For example, a trigger point in the serratus anterior can cause referred pain in a patient's medial elbow on the ipsilateral side.[11] In the case of




ISSN Online 2577-8188

improperly stabilized forward head posture, tension can develop along the entire superficial backline as additional muscles are recruited to maintain an upright posture. However, trigger point release in the suboccipital region can reduce neural tension and act as a reset button for the nervous system, allowing patients to properly stabilize their head and neck.[4,8] This decrease in neural tension allows greater flexibility of movement and better function of the superficial backline.

Manual trigger point release is one of the many myofascial release methods used by clinicians to reduce pain and increase tissue extensibility in muscles with identified trigger points.[11-16] The particular manual trigger point release technique of interest to this study was in the suboccipital region.[4] Trigger point release in the suboccipital region restores head and neck motion by applying light pressure to any trigger point in the occipital muscles while the patient lies supine on a treatment table. In most cases, clinicians apply pressure manually using their fingertips to any area of tissue in the suboccipital region that feels tight or elicits pain.[11-14] Devices such as lacrosse balls or dowel rods can also be used to release trigger points, in place of the clinician's fingertips.[11-14] Studies have shown that, following a trigger point release treatment, overall function of the superficial back line (measured by hamstring flexibility) immediately increases.[2,4]

Although the trigger point release technique in the suboccipital region is typically administered by a clinician, the technique can be readily employed by patients themselves. However, research into the effectiveness of trigger point release in the suboccipital region has not clarified whether self-administered soft tissue techniques produce the same improvements to mobility as the clinician delivering the trigger point release. The purpose of the study was to assess whether the same increase in hamstring mobility within the superficial backline function that is achieved with a clinician-administered suboccipital-region trigger point release can also be obtained through a patient-administered method.

## PATIENTS

The study employed a randomized descriptive laboratory design in which participants reported for a single data collection session. Following institutional IRB approval, participants were recruited from a Division I university in the Midwest through verbal announcements. Participants included a convenience sample ($N$ = 60) of 18-24 year-olds who were randomly assigned to either a control group ($n$ = 30) or an experimental group ($n$ = 30). The sample comprised 31 males (51.7%) and 29 females (48.3%). All participants gave written consent and were subject to inclusion criteria of having no current pain or injuries to the neck or back; however, all participants were assessed for the presence of trigger points in their suboccipital muscles and all of them had trigger points, although none were painful enough to preclude their participation in this study. All of the original 60 participants (100%) were included in the study.

## INTERVENTION

On the day of the study, all participants reported to a classroom laboratory at the university and signed in on an attendance sheet. Those who signed in on an odd-numbered line were assigned to the clinician-administered (control) group, and those who signed in on an even-numbered line on the attendance sheet were assigned to the self-administered (experimental) group. Each participant (both control and experimental group) completed 3 baseline measurements using the slide ruler box and the researcher recorded the mean score as the pre-test score. A meta-analysis of the criterion-related validity of the slide ruler




ISSN Online 2577-8188

box sit-and-reach test presents evidence that this is an effective method for measuring hamstring extensibility (mobility), and that the clinician should use the average of 3 tests in their reported score.[15] Following baseline measurements, the researcher worked individually with each participant.

Participants in the clinician-administered group were asked to lie supine on a treatment table while the researcher performed a trigger point release technique in the suboccipital region on the participant for 2 minutes. The researcher was an athletic trainer with 2 years of practice, who had completed all coursework in a post-professional masters athletic training program that emphasized manual therapies and included training in myofascial release including trigger point release therapy. To perform the trigger point release technique in the suboccipital region, the researcher held their forearms in a supine position at the same level as the participant. Using the fingers of both hands, the researcher started in the thoracic spine area and gently massaged the soft tissue while moving fingers superiorly through the cervical spine stopping when the base of the occiput was reached. Once the occiput was reached, the researchers moved their fingers inferiorly about ½ - 1 inch (over the C1/C2 area) then while cradling the posterior cervical area, palpated with the fingers for areas of tightness which identified trigger points. The researcher confirmed these were trigger points by asking the participant if this pressure caused pain. While on the trigger point(s), the researcher then applied gentle pressure anteriorly for approximately 30 seconds to 1 minute per trigger point until they felt the tissue start to release and soften.[4,8,14]

The participants in the self-administered group were asked to lie supine on a treatment table. The researcher performed a trigger point release technique in the suboccipital region for 5 seconds using the same method of application as the control group. This was done so that the participant could identify the feeling they should replicate during the trigger point release. During this time, the participant was asked to take note in feeling what pressure over the trigger point felt like and how much pressure the clinician was applying. Each participant was then given a 1 inch diameter plastic dowel rod that they placed in the suboccipital region of their head. They were instructed to reproduce the same sensation as they had felt by the clinician for 2 minutes. Therefore, the actual trigger point release was performed utilizing the plastic dowel rod as a self-administered technique, and the initial hands-on portion done by the researcher was just maintained long enough to teach the participant how to replicate this sensation on their own.

Immediately following completion of the clinician-administered or self-administered trigger point release intervention in the suboccipital region, all participants were again measured on standing forward flexion. Participants were measured 3 times on their standing forward flexion distance score using the slide ruler box. The mean score was recorded as the post-test superficial backline function score. All participants were then thanked for their participation and dismissed.

## OUTCOMES MEASURES

The researchers in this study utilized toe touch distance as the single measurement of hamstring mobility. Standing forward flexion distance was measured using a slide ruler box and served as the baseline (pre-test) measurement of the participants' superficial backline function. To obtain this measurement participants were instructed to stand with their feet together and knees locked on top of a platform next to the slide ruler box. They were then instructed to bend forward from the hips, while keeping the distal extremity locked, and attempt to touch their toes and hold for a single breath cycle (eliminating




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bouncing movements) before returning to the start position. The participants' extended fingers moved the slide on the scale to a final position and the measurement was recorded in centimeters. The participants repeated this task 3 times; both pre-test and post-test following the intervention and the mean score was recorded as the final measurement of hamstring mobility. All measurements and subsequent intervention were conducted by a single trained evaluator to control for variability and bias. Kippers[18] found toe touch to be a valid and reliable test to measure active trunk and hamstring range of motion across all body types. Further, another study concluded that toe touch distance could be used as the sole measurement of hamstring mobility to accurately assess for an increase of mobility following clinician-administered trigger point release in the suboccipital region.[4]

## RESULTS

Before conducting hypothesis testing these data were examined for potential violations of the assumptions of the repeated-measures ANOVA. Data were assessed for outliers using boxplots; no outliers were found. A Shapiro-Wilk test showed that both the pretest ($p$ = .46) and the posttest data ($p$ = .10) were normally distributed. While conducting the mixed repeated measures ANOVA (pretest to posttest, control vs. experimental), Box's Test of Equality of Covariance Matrices was non-significant ($M$ = 5.72, $p$ = .138), indicating that the covariance matrices were equivalent, so all ANOVA interpretations were done using multivariate tests.

There was a statistically significant main effect for the intervention ($F(1,58) = 18.24$, $p < .001$, eta = .239) indicating that both the clinician-administered and the self-administered groups improved from pretest ($M$ = 4.74, $SD$ = 7.96) to posttest ($M$ = 6.79, $SD$ = 7.58). But there was not a statistically significant interaction of time and group ($F(1,58) = 18.24$, $p$ = .360, eta = .014) indicating that neither group outperformed the other. These findings show that the intervention was successful at increasing mobility an average of 2 centimeters regardless of whether the intervention was conducted by a clinician or by the patient. The magnitude of the mobility increase is displayed in **Figure 2**.

## DISCUSSION

This study supports existing research findings that hamstring mobility, as measured by toe touch distance, significantly increases following trigger point release in the suboccipital region.[2,4] In a randomized clinical trial, Aparicio[2] found the suboccipital trigger point release technique significantly improved hamstring function as measured by toe touch distance, straight leg raise, and popliteal angle. Further, studies showed that when a release was performed on a trigger point which was causing an area of restriction that was within a fascial tissue structure, such as the superficial back line, it had

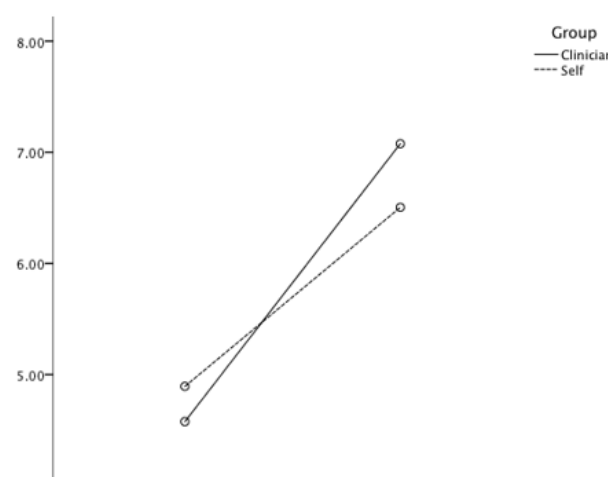


**Figure 2**: Increases in Superficial Backline Function Distances by Group (in)

a positive effect on other areas that connected to this line.[16-18]

This study demonstrates that a properly taught, self-administered suboccipital trigger point release is equally effective as a clinician-administered treatment. The finding that both clinician-administered and self-administered suboccipital trigger point release delivers immediate improvements in mobility has implications for treating back pain. In a similar study examining the effectiveness of reducing trigger point sensitivity in the neck and upper back, the investigators measured pain intensity following a prescribed home-based program of ischemic pressure and stretching.[19] The authors concluded that when monitored periodically by a clinician, home-based programs using self-administered therapy techniques are an effective method for reducing trigger point pain.[19]

While this study has shown that this manual technique can improve the overall function of the superficial back line, it should be noted that the reason why is still unclear. One possible reason for this outcome could be that the released tension relaxes the tissue in a way that allows more movement throughout the entire fascial line. The chain itself has too much tension, and this tension should be relieved to gain more motion.

The single-iteration methodology employed in this study demonstrates that immediate release is possible. However, this study does not show how long that relief will last, nor does it address the effects of multiple self-applications of the technique. Additional research should examine how long relief continues after a single application of the technique and should introduce a longitudinal component to study whether patients who trained to perform suboccipital trigger point release on themselves can use repeated applications of the technique to reduce back pain or other symptomology. Furthermore, this research opens the possibility of exploring other trigger point release techniques known to be effective when delivered by clinicians and exploring their amenability to self-administration by patients.

## CLINICAL APPLICATION

This study demonstrates that a properly taught self-administered suboccipital trigger point release was equally effective as a clinician-administered treatment. The current study adds to the existing findings in three ways. First, this study demonstrates that when trigger points in the suboccipital area are released, an increase in mobility observed immediately. Second, this study demonstrates that immediate increases in mobility can be attained when the trigger point release technique in the suboccipital region is employed by a properly trained patient in the absence of a clinician. Third, the amount of training needed to teach a patient to effectively perform the trigger point release technique in the suboccipital region requires less than a minute.

In a clinical environment dominated by managed care clinicians in a therapy setting are limited in treatment times and number of clinic visits with their patients; therefore, it is of great benefit when a clinician can identify manual therapy techniques, such as the suboccipital trigger point release, that can be taught to their patients and successfully administered outside of the clinical setting. This allows the clinician time within the scheduled therapy session to focus their intervention on other clinical goals.

The significant finding in this study is that, following a suboccipital trigger point release, toe touch distance increased for all participants. These findings indicate that if a clinician properly instructs a patient on how to perform a suboccipital trigger point release, the intervention is just as effective as when the clinician performs the suboccipital trigger point release. Future research should explore the long-term effects of




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suboccipital release on toe touch over time, as well as the reason behind these effects, as the current study only measured the immediate effects and not the direct cause of them.

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