



International Journal of Medical and Exercise Science

(Multidisciplinary, Peer Reviewed and Indexed Journal)

ORIGINAL ARTICLE

A COMPARATIVE STUDY ON THE EFFECT OF MYOFASCIAL RELEASE VERSUS DEEP TRANSVERSE FRICTION ON MYOFASCIAL TRIGGER POINTS OF UPPER BACK

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Abstract

Background and Objectives: The prevalence of Myofascial pain disorder has been increasing dramatically in recent years. Myofascial pain is generated by Myofascial trigger points in muscle tissue. There are various studies conducted on the efficacy of manual techniques to reduce pain due to Myofascial trigger points. Objectives of the study is to find out the effect of Myofascial Release and Deep Transverse Friction and compare the effectiveness of Myofascial Release versus Deep Transverse Friction on patients with Myofascial trigger points of upper back. **Methods:** Total number of 30 subjects participated in this study. The study duration was 2 weeks, which was divided into 6 sittings alternately. Data were collected from subjects by using Visual Analog Scale before and after application of the technique. Statistical analysis has done using Wilcoxon Signed rank test and Mann Whitney U test. **Results:** There was significant reduction in the level of pain on different days in both the groups. Pain level of subjects treated with Deep Transverse Friction was markedly reduced significantly with ($P < 0.01$) immediately after the treatment in each sitting. **Conclusion:** The study concluded that in comparison to Myofascial Release, the Deep Transverse Friction is more effective in reducing pain.

Keywords: Deep Transverse Friction, Myofascial Release, Myofascial Trigger Points, Visual Analog Scale.

Received on 30th Oct 2015, Revised 13th November 2015, Accepted 24th Nov 2015

INTRODUCTION

Pain does not have a purpose, it warns us that there is something wrong and provokes a withdrawal response to avoid further injury. The International association for the study of pain defines pain as "An unpleasant sensory and emotional experience associated with actual or potential damage or described in terms of such damage". This is a general reaction pattern with three distinct, sequential and natural behaviors, the immediate phase, acute phase and chronic phase.^{1,2,3}

Skeletal muscle is the largest single organ of the human body and accounts for 40% or more of body weight. Clinical interest in pain of muscular origin has ebbed and flowed through the years as new names and new concepts of its cause have come and gone. In 1843, Froiep used the term "Muskelschwiele" or muscle callouses, to identify occasionally tender spots in muscle that felt like a tendinous cord, or a wide band.^{4,5}

The incidence and location of trigger points in Myofascial syndrome is commonly identified in upper trapezius and quadratus lumborum (Travell & Simons 1983b), directly over the center point of the muscle fiber and the incidence of primary Myofascial syndrome is noted as 85% in 283 consecutive chronic pain patient and 55% in 164 chronic head and neck pain patient (Fishbain et al., 1986).

Most common trigger point sites are belly or muscle close to motor point and close to attachment of muscle and these sites can be identified by surface EMG and ultrasound. Weeks and Travells identified Needle EMG in 1957, as another specific diagnostic modality for Myofascial trigger points.^{6,7}

There are many recent researches published about different approaches and modalities and practiced to relieve the problem associated with Myofascial trigger points. Common approaches and modalities used to relief the pain are, Trigger Point Pressure Relief, Deep strong massage, Friction massage, Myofascial release, Ice massage, spray and stretch Modalities – Therapeutic ultrasound, High voltage galvanic stimulation,

Iontophoresis, Transcutaneous electrical nerve stimulator and Low Level Laser Therapy.³

The technique of Myofascial release is applied to decrease the fascial restriction and restore motion, ease the physical functioning. Here gentle force is applied in a specified direction for a specified length of time in the restricted portion of the fascia for positive permanent structural changes.⁴

Need of the study:

Myofascial trigger points are major cause of sustained pain and dysfunction that lead to chronic pain conditions. These are hyperirritable spots, which usually appear in the taut band of the skeletal muscle or in the muscle fascia that are painful on palpation and give rise to a characteristic referred pain, tenderness and autonomic phenomenon.^{8,9}

Previous studies suggested that increased tension of the affected muscle and the resulting pain and dysfunction are both relieved by restoring the full stretch length of muscle. This study aims to evaluate the benefits of two manual therapies; deep transverse friction and Myofascial release technique and it will be beneficial if comparison will be made between effectiveness of two so as to analyze which technique can be advocated for the pain relief in Myofascial trigger points of upper back in future.^{10,11}

Objectives:

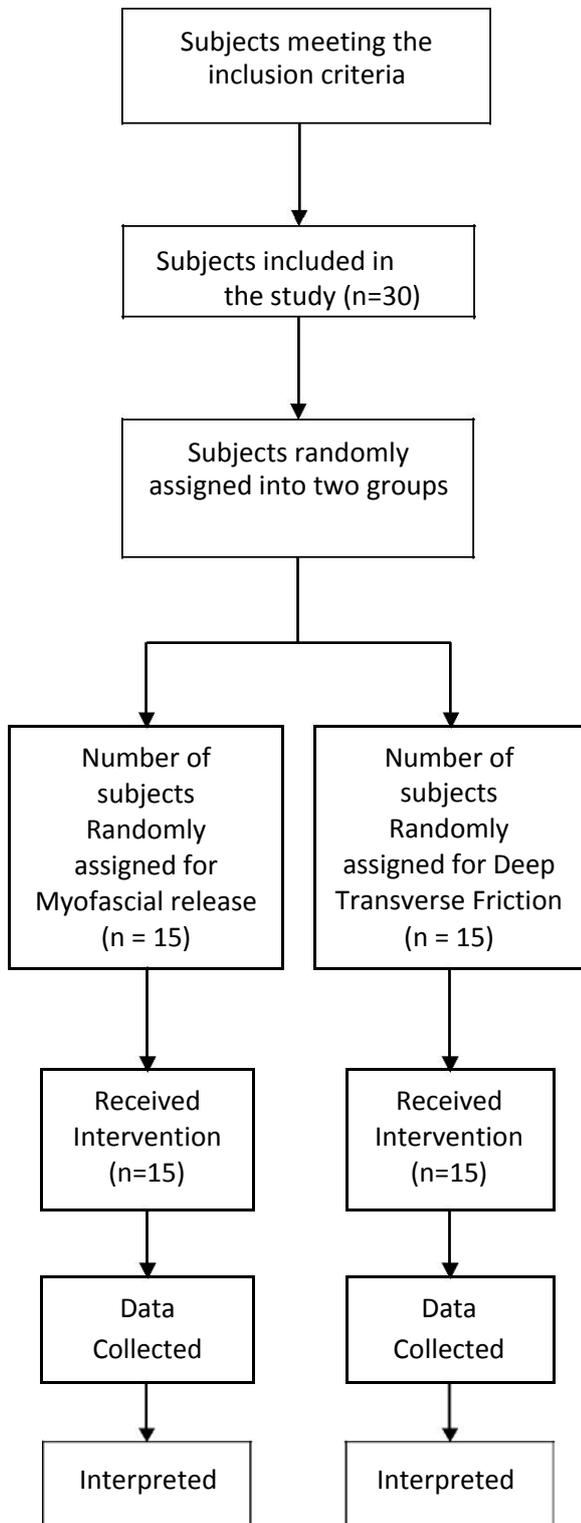
Objectives of the study were to assess the effect of Myofascial release on reduction of pain in Myofascial trigger points of upper back, find the effect of Deep Transverse Friction on reduction of pain in Myofascial trigger points of upper back and also to compare the effectiveness of Myofascial release versus Deep Transverse Friction in reducing pain in patients with Myofascial trigger points of upper back.

METHODOLOGY

Research Approach: Comparative approach is chosen for conducting the present study because one study was implemented in 1941 and another study was in 1996. Since most of the researches in the field of physical

medicine demand utmost level of accuracy, a true comparative study design is thought to be the suitable one. Hence, a pretest and post test for both group designs were chosen for conducting the present study.^{12,13}

Flow chart of the Study



Population:

The entire subjects for this study, who were suffering from pain at myofascial trigger points, selected from Florence Rehabilitation Center, Bangalore.

Setting of the Study:

The study was conducted in the department of physiotherapy, Florence Rehabilitation Center, Bangalore, India, with the written informed consent from the subjects selected for the study.

Sample and Sampling Techniques:

Subjects who were coming to the physiotherapy department with musculoskeletal pain were assessed by using evaluation form to screen for myofascial trigger points. Those subjects confirmed with myofascial trigger points and satisfying inclusion criteria were included in the study and randomly divided into two groups.

Here, 30 subjects were selected for the study. 15 subjects were allocated to group A in which they received myofascial release technique and 15 subjects to group B in which they received deep transverse friction. The total sample in the study included both the gender. Simple random sampling was selected so that each and every unit in the population had an equal probability of being selected in the sample.^{14,15}

Inclusion Criteria:

Samples included for this study were both genders with age group between 20 - 40 years, acute and chronic myofascial trigger points, and palpable taut band in the muscle with palpable nodule.

Exclusion Criteria

Samples with pain of traumatic or infective origin, rheumatoid arthritis, Ossification or calcification of soft tissue, nervous and vascular disorders were excluded from the study.

Method of Data Collection

Total 30 subjects with Myofascial trigger points were selected from Florence Rehabilitation Center, who was referred from nearby hospitals. Those patients satisfying inclusion criteria with age group between 20

years and 40 years were included for the study. They were randomly assigned into two groups: group A and group B with 15 subjects in each group.

The subjects in both the groups received allocated treatment for 6 days alternately. In both the groups, the data was collected using Visual analog scale, the pretreatment VAS score and post treatment VAS score was taken. VAS is a linear rating designed to capture a subject's judgment of his or her position on a continuum. A line is presented horizontally or vertically on paper, with the end points anchored with descriptive words representing the extremes of the parameter of interest.^{11, 12}

The patient is asked to bisect the line at a point represented self – assessed position on the scale. The patient's score is then obtained by measuring from the zero mark to the mark bisecting the scale. The patient is instructed to mark the line at the point that corresponds to the degree of pain or severity of symptoms that are experienced.

The pretreatment score was taken in all the 6 sittings of treatment before applying the treatment. Post treatment VAS score was taken in all the 6 sittings of the treatment after applying the treatment.^{16, 17}

Selection of tool:

Every individual throughout the life experiences pain at different sites with different intensity that can be rated with various scales. Here, in this study visual analog scale is used as a tool for quantifying pain. It is a 100mm scale used to quantify the level of pain. It is an internationally standardized as well as highly reliable tool for quantifying pain.

Use of VAS is an effective tool to obtain subjective intensity ratings of pain. The patient is asked about the intensity of pain and asked to mark on 100mm line where his or her symptom exists at that moment. The line is then measured and a quantified value is obtained.

Materials used for the study: Saline water, cotton, powder and towel.

Procedure:

In the study the subjects having Myofascial trigger points were selected and who satisfied the selection criteria were chosen for the study. A total of 30 subjects were included in this study.

Later an informed consent was taken from them and they were clearly explained about the procedure of the study. Here the 30 subjects were randomly allotted for Group A and Group B with 15 in each group. The subjects in Group A were treated with Myofascial release technique and Group B with Deep transverse Friction technique. Both the groups were assessed for pain by visual analog scale.

When the subjects in both the groups reported for the treatment, they were given time to get prepared for the treatment with the upper back exposed. The female patients were given more privacy and their attender was allowed with them throughout the treatment. The patients were in arm rest position and they were instructed to inform if any discomfort was felt during the treatment procedure.

The data was collected by using VAS as a measurement tool. A pretreatment visual analog scale score and post treatment VAS score was taken for this study. The pretreatment VAS score was taken before applying the treatment in all the 6 sittings and post treatment VAS score was taken after applying the treatment in all the 6 sittings.

Subjects in group A receiving Myofascial release technique were evaluated for areas of restriction. The treatment area was cleaned with water using cotton and the area was dried before applying the technique. Later, powder was applied on to the treatment area in order to reduce friction thereby, preventing blister formation. The treatment was applied by the therapist standing at the side of the patient. Then technique was applied with different levels for duration of 5 minutes in each sitting.



Fig 1. Myofascial release technique on the upper back

Here the technique was applied in four levels. Level one was performed by longitudinal movements without causing any tension to the tissues. The level two was performed by applying light resistance to the tensed muscle.

The level three was performed by compressing the treatment area, while the tissues were being compressed; they were taken passively through their fullest possible range of motion. In level four, the patient actively moved the tissue through the fullest possible range of motion, while offering resistance.

When the location of the fascial restriction was determined, gentle pressure was applied in the direction. This had the effect of pulling the elasto-collagenous fiber straight. When pressure was first applied to the elasto-collagenous complex the elastic component was engaged. This had a springy feel the elastic component was slowly stretched until the hand stopped at the firm barrier. This was the collagenous component, which cannot be forced, as it is too strong. Gentle sustained pressure released it that is supported by the Arndt-Schultz law.

The Arndt-Schultz law explains how the gentle sustain pressure of myofascial release can produce consistent change and improvement. The law states that a weak stimulus increases physiologic activity and very strong stimuli inhibit or abolish activity.

To palpate a taut band the muscle was stretched until the fiber of the taut muscle was in tension and the involved fibers remained slack. The stretch was on the verge of causing pain but did not evoke local discomfort or referred pain. A palpable band was felt like a taut cord of tense muscle fiber among the normally slackened fibers.

The taut band was palpated along the length to locate the spot of maximum tenderness and then firm pressure was maintained on that spot to elicit its referred pain pattern. Flat palpation was used as the muscle could be pressed against the underlying bone.

Subjects in Group B receiving deep transverse friction massage were evaluated for areas of restriction. The treatment area was cleaned with water using cotton, and the area was dried before applying the technique. Later, powder was applied on to the treatment area in order to reduce friction thereby, preventing blister formation. The treatment was applied by the therapist standing at the side of the patient.

The total duration of application of deep transverse friction massage was 3 minutes in each sitting. The treatment was given using deep transverse friction by one finger reinforced over the other, after the involved muscle was located by functional testing and palpation.



Fig 2. Transverse friction technique on the upper back

The therapist used a reinforced finger (i.e. middle finger over index finger) that is just large enough to friction completely across the

muscles. The skin was dry and cream was not used. It was extremely important that during friction, the skin of the therapist and the skin of the patient moved on as one to prevent bruising. The principal element of friction was to go across the tissue with as much pressure as the patient can tolerate. Friction began slightly until a level of anesthesia was reached.

Post friction exercise:

Active full range of motion exercise followed friction treatment if the patient could carry out the movement with minimal pain. After the treatment technique the patient was made to sit in a comfortable position and was instructed to do full range of motion exercises with minimal pain.

Statistical analysis:

Wilcoxon Signed rank test and Mann Whitney U test are used to analyse the data with pre and post treatment VAS score, which was obtained from the subjects in both the groups.

RESULTS

The analysis is the method of organizing the data in such a way that the researcher's questions can be answered. Interpretation is the process of making sure of the result and examining the implication of findings with a broader context.

This chapter deals with the analysis and interpretation of data collected from 30 subjects with Myofascial trigger points. The data collected were tabulated, analyzed and interpreted using inferential statistics. The results of the study were analyzed in intra and inter group.

Wilxon's signed rank test was used for intra group analysis and Mann Whitney U test for inter group analysis. The non-parametric method Wilxon's Signed rank test has been used to assess the significance of the difference between pre and post treatment

VAS scores in both the Groups. The Mann Whitney U test was used to assess the significance of the difference between two techniques Myofascial release and deep transverse friction.

The comparative analysis of data on level of pain was done for both the groups. Pre and post treatment VAS comparison between Day 1st and Day 6th was done for both the groups.

A comparative randomized study has been conducted. The sample consisted of 30 subjects, who were randomly divided in to two groups (Group A and Group B) with 15 subjects in each Group. Group A was treated with Myofascial release technique and the Group B was treated with deep transverse friction.

The aim of the study was to find the effectiveness and also to compare the effect of two different techniques administration in to the two randomly assigned subjects.

The statistical software namely MINITAB was used for the analysis of the data and Microsoft word and excel have been used to generate graphs, tables.

Intra group analysis

Intra group analysis shows significance of Post treatment VAS Score for both groups by Wilcoxon Signed Rank Test, (Table 1).

Study Groups	Mean Rank	Sum of Rank	P value	Critical value
Group A	8	0	0.0001* (P< 0.05)	30
Group B	8	0	0.000* (P< 0.05)	30

Table 1. Intra group analysis for Group A and B

Group A which was treated with myofascial release technique shows the mean rank as 8 and sum of rank as 0 with P value equal to 0.000, which is statistically significant ($P < 0.05$). This clearly depicts that the treatment technique was effective in reducing pain. The same table shows the mean rank of Group B which was treated with Deep transverse friction as 8 and sum of rank as 0 with P value equal to 0.000, which is statistically significant ($P < 0.05$). This clearly shows that treatment technique was effective in reducing pain.

Inter group analysis:

Inter group analysis, Comparison of Post Score of VAS for Both groups, by Mann Whitney U Test, (Table 2).

Study Groups	Mean Rank	Sum of Rank	U value	P value
Group A	8	R ₁ - 138.5	165.0	0.0015
Group B	8	R ₂ - 300		

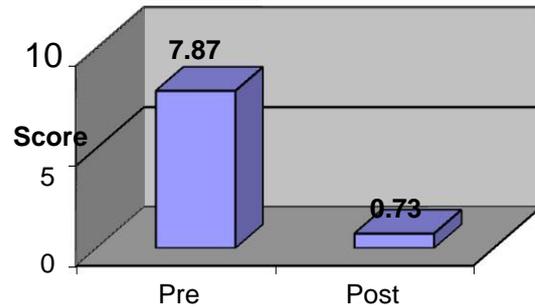
Table 2. Inter group analysis for group A and B

Group A shows the mean rank as 8, sum of rank R₁ as 138.50 and Group B shows the mean rank as 8, sum of rank R₂ as 300. The Mann Whitney U test value is 165.0 and P value is 0.0015, which is statistically significant ($P < 0.05$). This statistically analysis shows that Group B is more effective than Group A in reducing pain.

Treatment	Group A (MFR)		Group B (DTF)	
	Mean	S.D.	Mean	S.D.
Pre	7.87	± 1.16	8.533	± 0.516
Post	0.73	± 0.488	.133	± .3519
Average Diff.	7.14		8.40	
% of change	90.04%		98.42%	

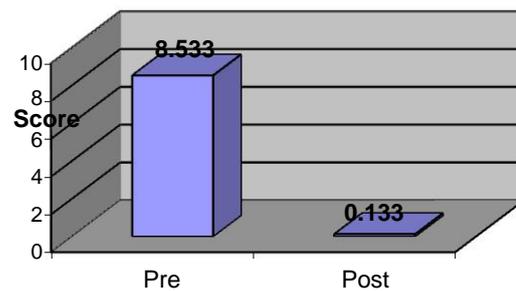
Table 3. Inter group analysis, mean difference and percentage of change in both the groups

Chart I A - Intra group analysis, Pre and Post Mean values of VAS score in Group A



Graph 1. Intra group analysis of VAS scores of pain for group A.

Chart I B - Intra group analysis, Pre and Post Mean values of VAS score in Group B



Graph 2. Intra group analysis of VAS scores of pain for group B.

The average difference of mean value is 7.26 and percentage change is 90.04%. The same table shows the Pretreatment mean value of Group B as 8.533 with SD ± 0.516 and Post treatment mean value 0.133 and SD ± 0.3519.

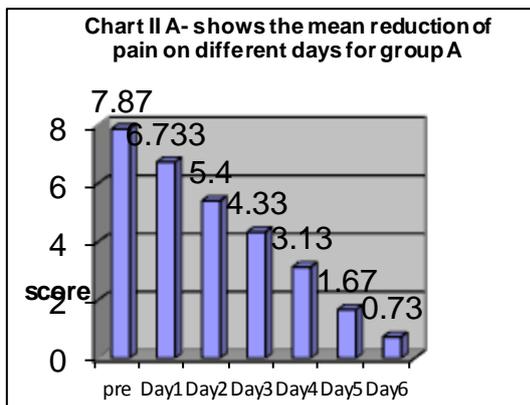
The average difference of mean value is 8.40 and percentage change is 98.42% (Table 3). The average means differences and percentage change clearly shows that Group B is more effective than Group A in reducing pain (Table 4 and 5).

Group	Pre	Day ₁	Day ₂	Day ₃	Day ₄	Day ₅	Day ₆
Group A	7.87	6.73	5.4	4.33	3.13	1.67	0.73

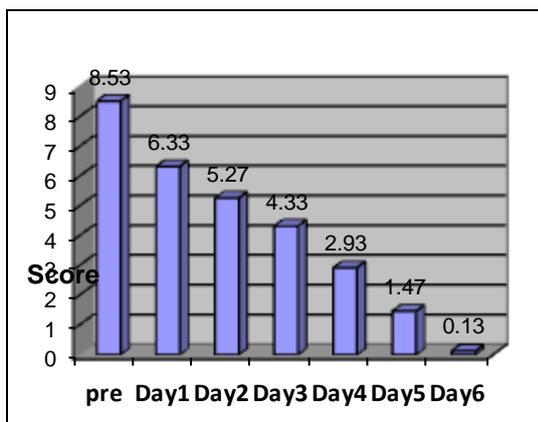
Table 4. Mean reduction of pain on different days in Group A

Group	Pre	Day ₁	Day ₂	Day ₃	Day ₄	Day ₅	Day ₆
Group A	8.53	6.33	5.27	4.33	2.93	1.47	0.13

Table5. Mean reduction of pain on different days in Group B



Graph3. Mean reduction of pain on different days for Group A.



Graph4. Mean reduction of pain on different days for Group B

DISCUSSION

Myofascial pain is generated by Myofascial trigger points in muscle tissue. Trigger points are thought to form in response to increased or altered muscle demands include prolonged muscle contraction, such as in workplace postural errors, proximal nerve compression and resultant muscle spasm and post-trauma (Simons et.al., 1998). Latent trigger points are thought to become activated in response to the same conditions that cause trigger point formation, that is, muscle overload, prolonged muscle contraction or nerve compression. The prevalence of Myofascial musculoskeletal pain disorder has been increasing dramatically in recent years. There are various studies conducted on the efficacy of physiotherapeutic modalities and manual techniques to relieve pain in Myofascial trigger points.

The present study suggested that Myofascial release and deep transverse friction reduce the pain level when tested before and after the treatment (P<0.01) significantly. Comparison of inter group i.e. Myofascial release (Group A) and Deep Transverse Friction (Group B) shows that there was a pain reduction in both the groups which is significant.

In the present study two comparisons were made of the pre and post treatment VAS values on the 1st and 6th day respectively. It was found that there was significant difference in the pain level of both the groups. Deep transverse friction showed immediate pain relief in each sitting which was significant.

In the intra group analysis, there was reduction of the pain level in both the groups. This was highly significant. Whereas the inter group analysis shows the Group B is more effective than Group A in reducing the pain level and which is significant, thus the alternate hypothesis can be retained.

These findings are supported by the previous studies like, Pat E. Belcher (2005) concluded in his study that the management of Myofascial pain syndrome through inactivation of active trigger points is best obtained by segmental Myofascial release and deep tissue massage of renegade muscle bundles, which quickly results in an analgesic effect over the treated area and is not at all a painful experience to the patient and Williams and Elkins claimed that massage is the single most effective treatment for Myofascial trigger points of the hand.

Barnes (1996) claimed that as a result of Myofascial release there is a change in the viscosity of the ground substance to a more fluid state and Myofascial release can restore proper alignment and Chuen Ru Hou et. al., conducted a study to investigate the immediate effect of physical therapeutic modalities of Myofascial pain in the upper trapezius and came to a conclusion that therapeutic combination of hot pack plus active ROM, stretch with spray as well as TENS, and hot pack plus active ROM and interferential current as well as Myofascial release technique are most effective for easing Myofascial trigger points pain and increasing cervical ROM.

Darcy Ann Umphred (2001) said that Myofascial release techniques are used to release the imbalance in the built and restriction within the fascia and to reintegrate the fascial mechanism, the therapist palpates the various tissue layers, beginning with the most superficial and working systematically

towards the deepest looking for movement restrictions and asymmetry and Gregory T. Lawton (2003) explained the use of invasive massage technique for the Myofascial trigger points. Hong et. al., (1993) conducted a clinical study and concluded that Deep Pressure Massage is more effective than the other modalities in reducing the tenderness of an active Myofascial trigger points immediately after therapy.^{18,19}

There are some studies, which say that there is beneficial effect of Myofascial release and Deep transverse friction with other physical therapeutic modalities on Myofascial trigger points

Cheun Ru Hou et, al., (2002) conducted a study to investigate the immediate effect of physical therapeutic modalities on Myofascial pain in upper trapezius and concluded that therapeutic combination of hot packs plus active ROM, stretch with spray as well as TENS, and hot pack plus active ROM and IFT current as well as Myofascial release technique, are most effective for easing effective for easing Myofascial trigger points pain and increasing cervical ROM.

Susan L. Michlovitz (1996) suggested that trigger points can be treated using a variety of techniques including stretch and spray, i.e. massage, deep pressure, ultrasound electrical stimulation and low power laser. The choice of treatment seems to be based upon empiricism and Gam AN. et. al., (1998) conducted a study to compare the effectiveness of various physical modalities in the treatment of Myofascial trigger points and concluded that the massage and exercise reduced the trigger point pain.²⁰

CONCLUSION

The principal conclusion of this study is that in comparison to Myofascial release the Deep Transverse Friction is more effective in reducing pain of Myofascial trigger points. In the treatment session there was reduction in the level of pain in both groups and the pain level of Group B was markedly reduce immediately after the treatment. So DTF can be considered as an effective manual technique for treatment for Myofascial Trigger Points.

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Citation:

Dr. Jibi Paul et al, A comparative study on the effect of myofascial release versus deep transverse friction on myofascial trigger points of upper back, IJMAES, 2015; 1 (2), 59-68.