GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 1 (346) Январь 2024

ТБИЛИСИ - NEW YORK

ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press. Published since 1994. Distributed in NIS, EU and USA.

GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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Содержание:

GEORGIAN MEDICAL NEWS
No 1 (346) 2024

COMPARISON THE EFFICACY OF DRY NEEDLING AND ISCHEMIC COMPRESSION METHODS IN MIYOFASCIAL PAIN SYNDROME: A RANDOMIZED TRIAL

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Abstract.

Objectives: Myofascial pain syndrome (MPS) is the most common in the musculoskeletal disease. Dry needling techniques and ischemic compression are the most common applications. We aimed to compare the efficacy of dry needling and ischemic compression methods on pain, cervical range of motion (ROM), and disability in MPS.

Patients and methods: This is a randomized, controlled study. 98 patients with MPS were randomly assigned into three groups. Group1 received dry needling (n=33), group 2(n=33) received ischemic compression and group 3(n=32) received combined with dry needling and ischemic compression inventions. Additionally, all patients were given neck exercise programs including isotonic, isometric, and stretching. The severity of the pain was measured by visual analog scale (VAS). The pressure pain threshold (PPT) and cervical ROM were also recorded. Disability was assessed by the Neck Pain Disability Scale. All assessments were performed before the treatment and one month and three months after the treatment.

Results: There were statistically significant improvements in VAS, PPT, cervical ROM, and disability scores after one and three months in all groups compared to pre-treatment results ($p<0.05$). After three months of follow-up, statistically significant differences were observed in all parameters between the groups ($p<0.05$) except cervical ROM ($p>0.05$).

Conclusion: Myofascial pain syndrome in patients with ischemic compression and dry needling effective treatment methods are shown separately in our study to be more effective when used together.

Key words. Miyofascial pain syndrome, dry needling, ischemic compression, trigger point.

Introduction.

Myofascial pain syndrome (MPS) is a common musculoskeletal system disorder in all age groups and is a pathologic feature characterized by frequent occurrence of a trigger point (Tp) with symptoms such as pain, taut bands, muscle spasm, susceptibility, limitation of movement, weakness, and rarely autonomic dysfunction [1,2].

The treatment of myofascial pain syndrome contains relief of pain, proper posture of the joint related to the affected muscle, full range of motion and adequate muscle power. The main treatment modalities are patient education and control of predisposing factors, analgesics, medical therapies such as myorelaxan and antidepressant, hotpack, exercise, stretching and spraying, ischemic compression, therapeutic massage, biofeedback, transcutaneous electrical nerve stimulation (TENS), ultrasound, interpharyngeal flow, low energy laser, extracorporeal shock wave therapy (ESWT), trigger point injections, dry needling, and acupuncture treatments [4-8].

Dry needling (Dn) is one of the methods commonly used in the treatment of myofascial pain syndrome. The needle disrupts by mechanically that acting sensory or motor components of nerve endings of trigger point activity or contribute to abnormal functioning contractile elements. The trigger activates the healing process in that region by performing point damage. Previous studies have shown that dry needling is a highly effective method of inactivation of the myofascial Tp [9,10,11].

Ischemic compression (Ic) therapy is the long-term compression on accessible TN. Several studies have shown that it is effective in the treatment of myofascial pain syndrome [12]. Travel and Simons first described this technique and reported that the activation on Tp was delayed by applying pressure on painful Tp [13-15]. The patient or therapist is applying pressure to the most sensitive area for 30 to 90 minutes and continue to press for approximately 1-2 minutes when muscle tension is observed to decrease [13].

In our study, it was aimed to compare the efficacy of dry needling and ischemic compression treatment methods on pain, pressure pain threshold, cervical range of motion (ROM) and disability in MPS treatment.

Patients and methods.

One hundred and twelve of patients apply to our clinics between April 2015 and December 2015 with complaints of neck or upper back pain and diagnosed MPS according to Travell and Simons diagnostic criteria (5 major and minimum 1 minor criteria are required for clinical diagnosis) were included for pre-evaluation [15]. Major criteria included pain, palpable taut bands, reflected of pain from trigger point, hypersensitivity on taut bands and decrease in range of motion. Minor criteria are pain with palpation of trigger point and/or occurrence of sensory change, local twitch response of taut bands with palpation and injection and decrease in pain with injection of trigger point or stretching of muscle. Fourteen patients were excluded from the study because they were not able to reach each of the evaluated patients. Demographic data such as age, gender, occupation, and educational status of 98 patients who were taken to work were recorded and complaints and duration of illness were recorded. The patients' inclusion criteria in the study were presence of at least one active trigger point located in the upper trapezius muscle, age between 21 and 78 years, symptom durations for 3 months. The place of the trigger point was found by the experienced physiatrist by palpation. All patients underwent detailed musculoskeletal examination and neurological examinations. Routine biochemical examinations, hemogram, erythrocyte sedimentation rate, CRP and cervical X-ray charts were requested from each patient. Patients with

fibromyalgia diagnosis, systemic disease, marked cervical disc herniation, cervical radiculopathy and myelopathy, myofascial trigger point injection within the last 6 months, physical therapy within the last 6 months, shoulder and neck surgery, pregnancy, inflammatory and rheumatic disease were excluded.

Patients in group 1 (n=33) received dry needling treatment. In this group, one active trigger point area in the trapezius of the patient was identified and marked with a pen and dry needle treatment method was applied to that region with single seantial disposable acupuncture needles. The applied acupuncture needles are sterilized with stainless steel and silicone coating in dimensions of 0.25 * 25 mm. Following the appropriate skin preparation, the trigger point was palpated, and the trigger point fixed with the lower finger pointing finger with the thumb of the hand where the upper needle was not held. From the center, the needle was inserted into the subcutaneous tissue rapidly, vertically, and the needle point and the trigger point in the muscle band were inserted into the muscle until it was found. When the muscle twitch response was seen, the needle was further advanced. The needle was moved back and forth three times in the trigger point so that the muscle contraction cycle could be broken. The dry needling method was performed by the physician and the evaluation of the patients was performed by the physician.

Patients in group 2 (n=33) received ischemic compression treatment. The pressure gradually increased when the pressure on the most active single trigger point of the patients in this group was applied for 30 seconds and the pain started to be relieved. Compression continued for about 60 seconds. Ischemic compression was applied for a total of 90 seconds [15]. This pressure intensity was gradually increased when pressure intensity was applied until the nail breathing was achieved at the first pressure in the application. Pain intensity was aimed at the visual pain scale (VAS) 7-8. The ischemic compression method was taught to patients and each patient was asked to perform ischemic compression for 4 weeks, twice a week. Each patient was allowed to undergo ischemic compression 8 times in total.

Patients in group 3 (n=32) received both dry needling and ischemic compression treatment. Patients in this group were first pruned once to the single active trigger point. On this trigger point, ischemic compression was applied at a constant pressure for 30 seconds, when the pain began to relieve, and then for 60 seconds more gradually increasing to a total of 90 seconds. The ischemic compression method was taught, and the patients were allowed to undergo ischemic compression for 4 weeks, twice a week for a total of 8 times.

All patients in all three groups; cervical exercises including cervical isotonic, isometric, posture and stretching exercises were applied as home programs.

All the patients studied were informed about the study and were told to use the data for scientific research purposes. This research was carried out in Ufuk University Faculty of Medicine, Department of Physical Medicine, and Rehabilitation with the approval of Ufuk University Senate Ethics Commission with an approval number. Patients were randomly divided into three groups. Randomization was done in closed envelope fashion. In the envelopes, the group numbers (1,2,3) and the treatment cards to be applied to the groups were written.

Clinical outcomes:

Patients were evaluated according to pain, pressure pain threshold, cervical joint range of motion (ROM) and disability. Assessments were done before the treatment, at the 1st and 3rd months of treatment.

Pain:

Pain was assessed by the visual analog scale (VAS, 0– 10 cm; 0 means no pain, 10 means severe pain). Patients were asked to indicate their pain between these lines and the numbering was measured with a point scale and the severity of pain was assessed over 10 cm. This VAS was used to evaluate the pain of patients during both rest and movement.

Pressure Pain Threshold (PPT) Measurement:

It is determined using Algometer (Algometer Commander, JTECH Medical, Utah). Data was received over the trigger point with the algometer. The measurement was taken three times with 30-s pauses, and the mean average value was recorded in Newton (N).

Cervical range of motion:

Measurements of cervical ROM were made with an inclinometer (Baseline brand). The inclinometer computed cervical flexion, extension, bilateral lateral flexion, and rotation by placing the sagittal plane at the top of the patient's head while the patient was sitting.

Disability:

In this study, assessment of neck disability used to the Neck Pain and Disability Index (NPDI) [16-19]. The neck pain and disability index consist of 20 items and each item is scored with a visual analogue scale of 10 cm and numbered from 0 to 5. The articles were designed to assess the severity of pain and its effect on occupational, recreational, social, and daily life activities of the pain and its relation to emotional factors. The reliability of Turkish validity of neck pain and disability skull was performed by Aslan and colleagues [20]. In our study, all patients were treated with neck pain and disability test three times in total, before treatment, at the first month and at the third month of treatment. Each item was collected and scored with a total score.

Statistical analysis:

The SPSS 15.0 package program was used to assess the data obtained in the study and was accepted as a $p < 0.05$ level of significance. Independent groups used t test and Mann Whitney U tests for comparison of the variables in the continuous measures, and kikare and / or Fisher's exact chikare test was used to compare the distributions of categorical variables in terms of group factors. Also, the repeated measures ANOVA model was used to investigate the difference between groups of measurements at different time points. The difference between the groups was tested for time-dependent change and group x time interaction. Binary comparison results were also obtained in order to reveal the differences between groups and time points creating diversity. The results are expressed as mean ± standard deviation and percentages. Interaction graphs are also drawn to visually express groups' trends over time.

Results.

There was no difference between the groups in terms of age, gender, and duration of symptoms which the demographic

characteristics were compared (p> 0.05) (Table 1). Detailed examination of the entire musculoskeletal system, there were no findings except in cervical motion range of motion stiffness and trigger point accuracy. No pathological findings were found in the neurological examinations performed. Routine biochemical examinations, hemogram, erythrocyte sedimentation rate, and C-Reaktif Protein results were observed no pathology in all the patients studied. İn cervical X-ray radiographs were showed no pathology except cervical lordosis.

Pain:

There was statistically significant difference in resting and moving VAS, between the three groups before and after the treatment (p <0.05) (Table 2). Group III showed more improvement in resting and moving GAS assessment parameters than Group I and II (Table 3).

Pressure Pain Threshold:

There were statistically significant improvements in PPT after first and third months in all groups compared to pre-treatment results (p<0.05). At the end of the threapy, statistically significant differences were observed in all parameters between the groups (p<0.05) (Table 2). Group III showed more improvement in PPT values assessment parameters than Group I and II (Table 3).

Cervical Range of Motion:

Statistically significant improvement in cervical range of motion were observed at first and third months of treatment for each group (p< 0.05) (Table 2). When each of the three groups were compared with each other in terms of time points before treatment and during the third month of treatment, there was no statistically significant difference between groups in cervical flexion, extension, lateral flexion (right and left) and rotation (right and left) values (p> 0.05) (Table 3).

Disability:

There were statistically significant improvements in NPDI scores after first and third months in all groups compared to pre-treatment results (p<0.05) (Table 2). Group III showed more improvement in NPDI scores assessment parameters than Group I and II (Table 3).

Discussion.

MPS is a pathology that adversely affects the quality of life and functional status of patients. The basis of MPS treatment lies in the breakdown of the pain cycle and the removal of TNs. For this purpose, medical treatments, physical therapy modalities, exercise, interventional methods, injection methods, manual therapy methods are used [1,22-27].

In recent years, dry needling and ischemic compression treatments have been widely used in MPS treatment. For this reason, we aimed to compare the efficacy of dry needling and ischemic compression applications used in the treatment of MPS in pain, PPT, cervical range of motion and disability in our study. We evaluated our patients before treatment, 1 month after treatment and 3 months after treatment in total three times, for this purpose, 98 MPS patients were randomly assigned to three groups. Cervical isotonic, isometric, cervical stretching exercises and postural exercises were shown for all patients as home programs.

The literature on the location of ischemic compression which is non-invasive and easily applicable in MAS treatment is very limited. For example, in a review by Cagnie et al., fifteen studies evaluating dry needling and ischemic compression

Table 1. *Demographic Characteristics of Patient Groups (Mean ± standard deviation).*

		Group I (n:33)	**Group II (n:33)**	**Group III (n:32)**
Age (years)		47,75± 17,27 (23-78)	47,81± 14,54 (27-71)	47,31± 16,65 (21-78)
Gender	**Female**	18 (% 54,5)	21 (% 63,6)	18 (% 56,2)
	Male	15 (% 45,5)	12 (% 36,4)	14 (% 43,8)
Symptom duration (month)		18,63 ± 14,78 (3-48)	18,93± 13,91 (3-48)	15,81± 10,43 (3-44)

Table 2. *Comparison of clinical evaluation parameters between groups in the third month after treatment.*

	Group I (n:33) Mean± SD	**P (Group1-2)**	**Grup II (n:33) Mean± SD**	**P (Group 2-3)**	**Group III (n:32) Mean± SD**	**P (Group 1-3)**
VAS (at rest)	2.66 ± 1.16	**0,370**	2.87 ± 0.81	0,000	1.50 ± 0.84	0,000
VAS (at motion)	3.12 ± 0.92	**0,314**	3.33 ± 0.85	0,000	1.53 ± 0.76	0,000
PPT	8.54 ± 1.31	**0,600**	8.38 ± 1.33	0,001	9.43 ± 0.94	0,004
Flexion	43.33 ± 3.22	**0,621**	43.63 ± 2.26	**0,233**	44.37 ± 1.68	**0,094**
Extension	41.66 ± 6.33	**0,801**	41.96 ± 4.49	**0,281**	43.28 ± 3.26	**0,185**
Lateral Flexion (right)	43.03 ± 3.52	**0,387**	42.27 ± 4.69	0,019	44.37 ± 1.68	**0,129**
Lateral Flexion (left)	43.18 ± 3.71	**0,125**	41.81 ± 4.64	0,005	44.37 ± 1.68	**0,183**
Rotation (right)	57.12 ± 3.54	**0,866**	57.27 ± 4.16	**0,441**	57.96 ± 3.07	**0,349**
Rotation (left)	56.51 ± 4.23	**0,316**	57.42 ± 3.56	**0,157**	57.81 ± 3.09	**0,670**
NPDI	22.12 ± 4.21	**0,742**	21.81 ± 3.85	0,000	10.37 ± 3.27	0,000

(n= number of patients; SD= standard deviation; VAS= Visual Analog Scale; PPT= Pressure pain threshold; NPDI= Boyun Dizabilite Indexi)

Table 3. *Comparison of mean clinical assessment parameters intergroup pretreatment, first month after treatment, third month after treatment.*

	Gruop I (n:33) Mean ± SD	**Gruop II (n:33) Mean ± SD**	**Gruop III (n: 32) Mean ± SD**	**P**
VAS (at rest)				
Pre treatment,	8.21 ± 1.24	8.12 ± 1.36	8.15 ± 1.32	
First month after treatment,	2.84 ± 0.83	3.18 ± 0.84	1.37 ± 1.00	
Third month after treatment	2.66 ± 1.16	2.87 ± 0.81	1.50 ± 0.84	0,000
VAS (at motion)				
Pre treatment,	8.00 ± 1.43	8.00 ± 1.36	8.00 ± 1.36	
First month after treatment,	3.24 ± 0.93	3.36 ± 0.96	1.40 ± 1.04	
Third month after treatment	3.12 ± 0.92	3.33 ± 0.85	1.53 ± 0.76	0,000
PPT				
Pre treatment,	5.76 ± 1.10	5.56 ± 0.99	5.67 ± 1.09	
First month after treatment,	8.41 ± 1.30	8.20 ± 1.30	9.33 ± 0.98	
Third month after treatment	8.54 ± 1.31	8.38 ± 1.33	9.43 ± 0.94	0,020
Flexion				
Pre treatment,	35,15 ± 11.07	38,18 ± 10.44	37,18 ± 9,49	
First month after treatment,	40,60 ± 6.70	41.36 ± 6.03	43.28 ± 3.00	
Third month after treatment	43.33 ± 3.22	43.63 ± 2.26	44.37 ± 1.68	**0,386**
Ekstension				
Pre treatment,	32,87 ± 15,15	33.03 ± 16,48	34.37 ± 13.06	
First month after treatment,	37.12 ± 10.60	38.48 ± 9.47	40.78 ± 6.96	
Third month after treatment	41.66 ± 6.33	41.96 ± 4.49	43.28 ± 3.26	**0,602**
Lateral Flexion (right)				
Pre treatment,	33,63 ± 13.36	34.09± 15.98	35.93 ± 12.97	
First month after treatment,	40.75 ± 5.46	40.90 ± 6.05	43.75 ± 2.54	
Third month after treatment	43.03 ± 3.52	42.27 ± 4.69	44.37 ± 1.68	**0,345**
Lateral Flexion (left)				
Pre treatment,	34.24 ± 12.25	34.09 ± 15.53	36.25 ± 12.18	
First month after treatment,	40.75 ± 5.60	40.75 ± 6.01	43.28 ± 2.72	
Third month after treatment	43.18 ± 3.71	41.81 ± 4.64	44.37 ± 1.68	**0,326**
Rotation (right)				
Pre treatment,	49.54 ± 9.54	52.12 ± 9.68	50.62 ± 10.14	
First month after treatment,	53.18 ± 8.27	56.36 ± 5.19	56.40 ± 3.85	
Third month after treatment	57.12 ± 3.54	57.27 ± 4.16	57.96 ± 3.07	**0,358**
Rotation (left)				
Pre treatment,	49.69 ± 11.10	51.51 ± 10.34	49.84 ± 11.32	
First month after treatment,	52.87 ± 8.57	55.90 ± 6.05	55.62 ± 4.16	
Third month after treatment	56.51 ± 4.23	57.42 ± 3.56	57.81 ± 3.09	**0,479**
NPDİ				
Pre treatment,	86.06 ± 5.64	85.63 ± 5.57	86.18 ± 5.45	
First month after treatment,	23.51 ± 4.35	24.30 ± 4.18	9.62 ± 2.84	
Third month after treatment	22.12 ± 4.21	21.81 ± 3.85	10.37 ± 3.27	0,000

applied to a patient suffering from neck pain associated with MAS were investigated. In ischemic compression studies, the duration of ischemic compression ranges from 30 seconds to 1 minute, the frequency of application ranges from 1seans to 12 sessions, and no common duration and frequency of application is available. In dry needling study's, dry needling application frequency ranges from 1 to 6 sessions. In addition, the results of the study indicate that short- and long-term definitive evidence is needed regarding the frequency of application for ischemic compression, duration, and frequency of application for dry needling duration and needle thickness [28,29]. In our study, we treated the patient with ischemic compression therapy for 8 seans for 90 seconds. Dry needling treatment was also applied as a single session into an active trigger point with 25 * 25 mm sterile acupuncture needles.

The number of studies showing the effectiveness of application, especially in comparison with dry needling and ischemic compression in literature, is very small. In our study, it was aimed to compare this treatment with ischemic compression with dry needling method which proved to be effective in pain relief and disability in MPS treatment. It has been shown here that ischemic compression therapy is as effective as dry needling therapy and co-use increases this effect even more.

In Kim et al.'s study, the efficacy of ischemic compression after myofascial trigger point injection was investigated. In this study, significant improvement was observed in the VAS scale in three groups. The trigger point injected with ischemic compression showed a more significant improvement in VAS than only the trigger point injection, but no difference was found between the application of ischemic compression for 30 seconds or 60 seconds [30].

In our study, pain scores assessed by VAS showed a significant decrease after treatment with both treatment modalities, were not superior to each other, but this effect was observed to increase even more with the combined use of treatment methods. In addition, this effect continued three months after the end of treatment and the group in which the ischemic compression and dry needling methods were applied together was more effective at the end of the third month. This state of decrease in pain during treatment and continued treatment after treatment suggests the permanence of treatment. As the pain threshold on trigger points decreases in MAS patients, the measurement of trigger point pain threshold is targeted. By using pressure gauge measurements made using algometer devices, more reliable numerical and quantitative data can be obtained, and the effect of the treatment can be gained [31,32,33].

In another study by Wang et al., the effect of ischemic compression on mechanical hyperalgesia of the myofascial latent trigger point, assessed by algometers and decreased sensitivity to pressure pain threshold [34]. In our study, dry pressure and ischemic compression were observed more frequently in the group with pressure pain thresholds compared to the other dry needling and ischemic compression alone groups.

There is some evidence in the literature that musculoskeletal pain syndrome has a measurable decrease in the range of motion of the affected muscle [26]. As noted by Travel and Simons, trapezius is the most pronounced symptom pain at trigger points located in the upper fibers, and motion restriction is less frequent after pain. [27]. In a study in which Cagnie at all. evaluated the effect of ischemic compression on the neck and shoulder muscles, cervical mobility was assessed using an inclinometer and an increase in the range of motion of the cervical range of motion was determined by clinical evaluation before and after treatment [35].

In our study, significant improvement in cervical range of motion was observed in the three groups after the first and third months of treatment. There was no statistically significant difference in cervical range of motion between the three groups. This suggests that combined use of ischemic compression and dry needling treatment is not superior in terms of cervical range of motion, and that joint motion is not increased even further. However, monitoring of the efficacy of both ischemic compression and dry needling therapy at third months of treatment shows that the treatment persistence is also maintained in terms of cervical range of motion. In addition to the effect of treatment modalities on this continuity, it may also be the effect of home exercise programs that we give to patients.

Disability was assessed with “Neck Pain and Disability Index”. Sohns et all. conducted a study evaluating the effectiveness of manual compression therapy with a trigger point in the shoulder. They evaluated the disability effect of neck pain using NPDI, and significant improvement was observed in NPDI in the manual compression treatment group [36]. Kim and et all. examined the efficacy of ischemic compression applied after myofascial trigger point injection and found that the trigger point injected with ischemic compression showed a more significant improvement in NPDI than only the trigger point injection [37].

In our study, we administered NPDI before the treatment, during the first month of treatment and during the third month of treatment. We observed that the combination therapy group was superior to monotherapy groups in NPDI values. This suggests that ischemic compression with dry needling treatment is more effective in preventing patients with disability due to neck pain and limitation of movement. With combined treatment, the improvement in pain and joint range of motion is more likely to result in greater disability. In addition, the pain and disability scores of the patients showed improvement in the third month, and the persistence of the treatment is remarkable.

It is suggested that neck and posture exercises should be taught in the form of a sick home program so that this effect can last for a long time. In a review by Cheng et al., patients with nonspecific chronic neck pain have been shown to reduce pain when therapeutic exercises are applied for short-term pain relief, but this effect has not been shown to last very long. However, long-term exercise emphasizes the development of body building functions, preservation, and persistence of activity by making them habitual as home exercise by the patients [37].

Myofascial pain syndrome in patients with ischemic compression and dry needling effective treatment methods are shown separately in our study to be more effective when used together.

As a result, we think that it may be a good option the addition of ischemic compression therapy, which is less frequently encountered, to dry needle treatment, which is frequently used in MPS treatment, because of the positive effects on the pain, the PPT levels measured with the algometer, cervical the range of motion, and disability.

Acknowledgement: This study was presented as poster presentation in the 20th European Congress of Physical and Rehabilitation Medicine, 2016 Apr 23–28; Lisbon, Portugal; 2016. p 463: The comparison with ischemic compression and dry needling for myofascial pain syndrome.

Funding: None

Conflict of interest: None

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