

Comparison of PEMF Therapy of Various Duration in the Treatment of Subacromial Impingement Syndrome

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ABSTRACT

Introduction: - Subacromial impingement syndrome (SIS) is commonest among various joint pains. Study is done in order to compose the efficacy of PEMF treatment of various duration for patients with SIS.

Subject and Methods: - One hundred and eight patients who had been diagnosed with subacromial impingement syndrome by clinical examination. Patients were sequentially enrolled following informed consent were administered PEMF therapy for 15 minutes combined with exercise therapy. The second group received the same treatment except that each of the patients has received 30 minutes therapy the patients were evaluated before and after the treatment. Parameters examined were pain score, disability score and range of motion at shoulder joint.

Result: - Second group was significantly improved in pain score, disability score and range of motion.

Conclusion: - 30 minutes of PEMF therapy was shown to be more effective than 15 minutes of PEMF therapy.

KEYWORD: *Shoulder pain, subacromial impingement, PEMF*

INTRODUCTION

Subacromial Impingement Syndrome (SIS) refers to the inflammation and irritation of the rotator cuff tendons as they pass through the subacromial space, resulting in pain, weakness and reduced range of motion within the shoulder.

[1] The occurrence of SIS is associated with highly repetitive work, forceful exertion in work, awkward postures and high psychosocial job demand. [2]

Conservative and operative treatments are used to treat SIS. Some authors report the effectiveness of surgical and postsurgical interventions for SIS. [3] The goal of non surgical treatment is to decrease the subacromial inflammation, reduce the pain, and allow healing of the compromised rotator cuff and restore satisfactory function of shoulder [4]. Many treatment modalities including non-steroidal anti inflammatory drugs ((NSAID), physical therapy, activity modification and corticosteroid injections have been advocated to be benefit in SIS [5, 6].

Pulsed electromagnetic field (PEMF) has been suggested as a treatment method for musculoskeletal system disorders. [7] But literature is non-conclusive about the treatment of shoulder pain [8] Electromagnetic fields have shown to cause biological changes to the cell environment and restores its integrity and function. In addition to that, it increases membrane potentials of erythrocytes, increases oxygen content of tissue, vasodilatation of blood vessels and relieves pain without increasing local temperature. [9]

How to cite this paper: Anuja Pasari | Bismay Das | C. Monanty | Saurabh Singh | Sujoy Roy | T. B. Singh "Comparison of PEMF Therapy of Various Duration in the Treatment of Subacromial Impingement Syndrome" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-5 | Issue-1, December 2020, pp.1270-1273, URL: www.ijtsrd.com/papers/ijtsrd38177.pdf



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Aim of this study was to evaluate various durations of PEMF therapy in the conservative treatment of subacromial impingement syndrome.

Subject and methods -

One hundred eight patients were treated in the physiotherapy department of S.S. Hospital, Banaras Hindu University during the period of August 2018 to January 2020.

Selection criteria – Patients aged 25 to 60 years complaining of shoulder pain were examined for presence of subacromial impingement syndrome based on positive tests.

- **Neer impingement test:** - Therapist grasp patient's wrist and passively move the shoulder through forward flexion. Shoulder pain and a look of apprehension on patient's face indicate a positive sign.
- **Hawkins Kennedy Impingement Test:** - The test is positive when shoulder is flexed 90° and elbow is also flexed 90°, internal rotation will cause pain.
- **Copeland impingement test:** - Passive abduction in internal rotation (in scapular plane) is painful, pain eliminated with a passive abduction in external rotation.

Patients were grouped in as follows -

Group 1 – PEMF for duration of 15 minutes with exercise therapy

Group 2 – PEMF for duration of 30 minutes with exercise therapy

Exclusion criteria: - Primary scapulothoracic diagnosed instability or previous history of dislocation, adhesive capsulitis, any history of dislocation adhesive capsulitis, any history of shoulder surgery, avascular necrosis, glenoid development defects, degenerative signs effecting inter articular space and fractures.

All patients were subjected to detailed history, clinical examination including pain score, disability index and range of motions.

Pain intensity - was measured on visual analogue scale (VAS) of 10 points to evaluate intensity of pain where '0' represents no pain and '10' represents unbearable pain [10].

Shoulder disability: - was measured using shoulder disability index. It was measured in various activities involving shoulder. Score was calculated out of 10. In which worse higher end reflecting "So difficult required help" and lower score as "No difficulty"[11].

Shoulder movement: - It was measured with the help of goniometer. The axis of goniometer was placed at 2.5 cm inferior to the lateral aspect of acromion process for shoulder flexion-extension; at 1.3 cm inferior and lateral to the coracoid process for shoulder adduction-abduction and at the olecranon process of the ulna for shoulder rotation [12].

Treatment -

Group 1 – PEMF for duration of 15 minutes -

Participants of this group received pulsed electromagnetic field therapy at 26 Hz frequency, 65 microsecond pulse duration and 200 w pulse power. It was placed in close contact with the area to be treated. Treatment was given for 15 minutes over a period of 3 consecutive weeks (6 days per

week). The device directs radio frequency waves to the area to be treated.

Group 2 – PEMF for duration of 30 minutes -

Participants of this group received therapy at same frequency, pulse duration and pulse power. But treatment was given for 30 minutes.

Exercise therapy: - In order to restore muscular deficits in strength, mobility and coordination of rotator cuff and shoulder girdle muscle, standard exercise protocol and manual therapy were given. At the beginning of the treatment, all the participants were given a brief explanation on anatomy and biomechanics of shoulder complex and a short description of the etiology and pathology of SIS.

The treatment in the first week aimed at reducing the pain intensity and to prevent further damage and consist of manual therapy techniques such as joint mobilization techniques and transverse friction massage and shoulder pendulum exercise.

The second and third week aimed restoring the functional level by increasing range of motion, muscle strength and flexibility and consists of range of motion exercises with rope and pulley, L-bar exercises, self capsular stretching exercises, joint mobilization techniques and transverse friction massage and shoulder pendulum exercises. Treatment was given for 40 minutes, over a period of 3 consecutive weeks (6 days per week).

Result: - There was no significant difference between the two groups with regards to age (p>0.05).28 patients were female and 26 patients were male in first group while in second group, 27 patients were male and 27 were female. Average age, time of onset and occupation are represented in the table 1.

Table-1 Demographic Features (N=108)

	Group 1 (n=54)	Group 2 (n=54)
(1) Sex		
Female	28	27
Male	27	27
(2) Average Age	35±9.21	34.7±8.22
(3) Time since the onset of pain (in months)	8.34±4.22	6.72±3.92
(4) Occupation		
Housewives	19	21
Government employees	7	6
Private workers	13	11
Retirees	15	16

Table-2 PRE AND POST TREATMENT CLINICAL SCORES IN TWO GROUPS (n =54 in each groups)

	Group 1	Group 2
Pain	7.33+ 1.15	3.7+ 1.74
Disability	7.07 +1.34	3.52+ 2.02
Range of motions		
(i) Flexion	120.74+ 26.34	155.74+ 22.4
(ii) Abduction	114.6+ 27.24	149.07+ 21.3
(iii) Internal Rotation	39.44 +15.9	51.63+ 11.93
(iii) External Rotation	54.3+ 10.9	67.6+ 12.8

Table 2 represents mean of pain, disability, range of motions (flexion, abduction, internal rotation, external rotation).

Table 3 represents comparative improvement in symptoms of both groups. P-value and t-value is also presented. It shows significant improvements in all parameters.

TABLE-3 COMPARETIVE IMPROVEMENT AS PERCENTAGE CHANGE IN SYMPTOMS SCORES IN BOTH GROUPS (n= 54 in each group)

	Group1 (n=54)	Group2(n=54)	p-value	t-value
Pain	16.67+7.74	39.78 + 22.5	<0.001	12.5
Disability	16.45+ 8.7	40.74+23.41	<0.001	12.8
Range of motions				
(i) Flexion	7.99+4.45	29.06 +26.94	<0.001	11.5
(ii) Abduction	10.54+ 7.77	32.83 +31.32	<0.001	12.5
(iii) Internal Rotation	34.13 +28.19	88.11+24.94	0.007	13.4
(iii)External Rotation	35.28+29.05	86.94 +29.65	0.003	14.9

The results presented with control therapy group verses increased dose add-on PEMF therapy are compared in table 2.

The results shows more dose response relationship in add-on PEMF therapy. The employed higher doses of PEMF add-on therapy yield higher improvements in the level of suffering compared to improvement in control group.

The pattern of superiority of PEMF add-on therapy over control group is maintained with higher doses as was seen with lower dose.

The observations indicate definite organic mechanisms of action of the employed add-on therapy for yielding improved relief in subacromial impingement syndrome. The higher doses employed are still not the maximal effective doses because other studies have reported even longer therapeutic exposures. However the increased duration of therapy in these patients is the optimal feasible duration for general O.P.D. clinic.

There was a significant improvement in all scales in both groups after treatment. But second group had significantly better values than the first group in all parameters after treatment.

Discussion:

Subacromial impingement syndrome is one of the most common causes of shoulder pain and general consensus on the method of treatment within the realm of physical therapy has not yet been reached [13]. Rest, cold compress, exercise, NSAIDs, ultrasound and PEMF are among the most common treatment protocol for SIS [13].

The efficacy of different duration of PEMF therapy for the treatment of patients diagnosed with SIS was compared in this study. There was a significant decrease in VAS, disability index as well as all ranges of shoulder movement in Group that received treatment for 30 minutes than received for 15 minutes. The effectiveness of PEMF in the treatment of SIS has been shown in various studies [6, 13, and 14]. PEME is unique energy therapeutics. This boosts ATP formation. ATP driven cellular functions like proper transmembrane ion kinetics, Neuro-transmitter genetics and dynamics and repair processes of injured cells. In addition, there is Inhibitory effect of PEMF on inflammation. It also improves microcirculation, opening of capillaries and stimulating contractile element. This may explain removal of pain causing chemical disturbances from site of inflammation and

trauma but there are also studies indicating that it is not effective. [15, 16].

Different durations of various studies [17, 18] to our knowledge, there is no study in the literature that has directly compared treatment different durations. The result of this study indicate that PEMF therapy is beneficial if gives for more duration in the treatment of SIS.

Conclusion:

PEMF is significantly effective in yielding symptomatic and functional improvement over the more period of time. PEMF at more duration is hence recommended and preferred modality for treatment of SIS.

References:

- [1] Fongemic AE, Buss DD, Rolnick SJ (1998) Management of Shoulder impingement syndrome and rotator cuff tears. *Am fam phys* 57: 667-674.
- [2] Van Rijn RM, Huisstede BM, Koes BW, etal, Associations between worth-related factors and specific disorders of the shoulder – a systematic review of the literature. *Scand J works environ Health* 2010; 36: 189-201.
- [3] Gebramariam L, Hay EM, Hoes B W, etal. Effectiveness of surgical and postsurgical interventions for the subacromial impingement syndrome: a systematic review. *Arch Phys med Rehabil* 2011; 92: 1900-13.
- [4] Morrison DS, Frogameni AD, Woodworth P, Non-operative treatment of subacromial impingement syndrome *J Bone joint Surg AM* 1997; 79: 732-7.
- [5] Bigliani LU, Levine WN (1997) Subacromial impingement syndrome. *J Bone Jt surg Am* 79: 1854-68.
- [6] Akgun K, Birtane M, Akarirmak U (2004) is local subacromial cortico steroid injection beneficial in subacromial impingement syndrome *Clin Rheumatol* 23: 496-500.
- [7] Quittan M, Schuhfried O, Wiesinger GF, Fialka –Moser V (2000) Clinical effectiveness of magnetic field therapy a review of the literature. *Acta med Austriaca* 27: 61-68.
- [8] Leclairer, Bourgoquin J (1991) Electromagnetic treatment of shoulder periartthritis: a randomized controlled trial of the efficacy and tolerance of magneto therapy, *Arch Phys Med Rehabil* 72: 284-287.

- [9] Poul F, Roath S, Melville D (1978) Differential blood cell separation using a high gradient magnetic field. *Br J Haematol* 38: 273-280.
- [10] D. Gould et al. Visual Analogue scale (VAS). *Journal of Clinical Nursing* 2001; 10: 697-706.
- [11] Tveita, E., Ekebery, O., Juel, N. & Bautz-Holter, E. (2008).
- [12] Riddle DL, Rothstain JM, Lamb RL, Goniometric reliability in clinical setting shoulder measurements, *Phystrer*. 1987, 67(5): 668-73 (Pub med).
- [13] Van den Heijden GJ: Shoulder disorders; a state of the art review. *Baillieres Clin Rheumatol*, 1999, 13: 287-309 [PubMed] [Google Scholar]
- [14] Neviasser RJ, Neviassen TJ: Observations on impingement. *Clin Orthop Relat Res*, 1990, 254: 60-63 [PubMed] [Google Scholar]
- [15] Levendoğlu F, Yılmaz H, Uğurlu H: Comparison the effectiveness of physical therapy and corticosteroid injection for subacromial impingement syndrome. *J Rheumatol*, 2005, 20: 1-7 [Google Scholar]
- [16] Ebenbichler GR, Erdogmus CB, Resch KL: Ultrasound therapy for calcific tendinitis of the shoulder. *N Engl J Med*, 1999, 340: 1533-1538 [PubMed] [Google Scholar]
- [17] Johansson KM, Adolfsson LE, Foldevi MO: Effects of acupuncture versus ultrasound in patients with impingement syndrome: randomized clinical trial. *Phys Ther*, 2005, 85: 490-501 [PubMed] [Google Scholar]
- [18] Çelik D, Akyüz G, Yeldan D: Comparison of the effects of two different exercise programs on pain in subacromial impingement syndrome. *Acta Orthop Traumatol Turc*, 2009, 43: 504-509 [PubMed]

