TO COMPARE THE EFFECT OF ULTRASOUND AND SHORT WAVE DIATHERMY IN MANAGEMENT OF PAINFUL SHOULDER ALONG WITH EXERCISES

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INTRODUCTION

Painful shoulder is an inflammatory disorder of the shoulder joint involving the capsule and soft tissues surrounding it. The problem of painful shoulder can start after an injury or strain or may sometimes develop more gradually without obvious trigger.

It is a condition that affect the ability to move the shoulder around. There is stiffness and pain in the shoulder joint, which reduces normal movement in the shoulder joint.

Recovery can be slow and symptoms usually last for a long time, although for some people it can be much faster than this.

It can occur equally in the right & left shoulders, and it makes no difference which is your dominant hand.

According to hauzeur jb periarthritis is the most common presentation of painful shoulder.

According to Condiotto et al in 2002 oct.

The time-course covered by the original definition of scapulo-humeral periarthritis suggested by Duplay through the more recent term of subacroy impingement syndrome coined by Need, follows the identification of the pathogenetic mechanisms leading to chronic subacromial impingement and degenerative tears of the rotator cuff. The Authors recall the functional-anatomic development evolution of the shoulder and the disequilibrium between the depressor and the elevator muscles which may promote the chronic friction against the acromion.

According to J.Maheshwari

Periarthritis shoulder is a disease of unknown aetiology where the gleno humeral joint becomes painfull and stiff because of loss of resilience of the joint capsule, possibly with adhesions between it’s fields. It produce pain and stiffness of the shoulder in early stages, the pain is worst at night and the stiffness is maximum in external rotation, then abduction and then internal rotation in the decreasing order of the shoulder.Later, the pain is present at all times and all the
movements of the shoulders are severely limited. Often, there can be is a history of preceding trauma. The disease is common in diabetes.

According to Apley:

- The term periarthritis shoulder should be reserved for a well-defined disorder characterized by progressive pain and stiffness of the shoulder which usually resolves spontaneously after about 18 months. The cause remains unknown.
- The histological features are reminiscent of Dupuytren’s disease, with active fibroblastic proliferation in the rotator interval, anterior capsule and coracohumeral ligament (Bunker and Anthjopny, 1995).
- The condition is particularly associated with diabetes, Dupuytren’s disease, hyperlipidaemia, hyperthyroidism, cardiac disease and hemiplegia. It occasionally appears after recovery from neurosurgery.
- It is mostly occur in aged 40-60yrs, may give a history of trauma. After trivial, followed any aching in the arm and shoulder. Pain gradually increases in diversity and often prevent sleeping on the affected side/after several months. It begins to subside, built it does so stiffness becomes an increasing problem, continuity for another 6-12 months after pain has disappeared. Gradually moment is regained, but it may not return to normal and some pain may persist.

Stages of Periarthritis shoulder

- Painful freezing stage
  this is the most painful stage motion is restricted this painful stage typically last for 1 to 4 months.
- Frozen month
  During this stage pain usually goes up and the stiffness worsens. This change last for 5 to 8 months
- Thawing stage
  This stage is gradual and steady improvement in range of motion over a lengthy period of time this stage last for 6 to 12 months.

The entire time frame of periarthritis shoulder may last as long as a year, while it is extremely rare from this problem to last longer than a year. It may last long as three years also according to some authors.

AIM AND PURPOSE OF THE STUDY

To compare the effects of ultrasound and short wave diathermy in management of painful shoulder along with exercise.

Painful shoulder patients are given both ultrasound and short wave diathermy. So I was curious about which one of them gives better results in patients painful shoulder.
To conduct a comparative evaluation of ultrasound and short wave diathermy in the management of painful shoulder along with exercises.

Aim is to find out whether ultrasound short wave diathermy is more effective and painful shoulder.

- Relieve pain
- To compare effectiveness
- To prevent further progression
- To limit complication associated with the complication
- To maintain range of motion.
- To relieve patients from depression by improving their ADL
- To make people aware that there are electro therapeutic modalities and physiotherapy techniques which can prevent them from being deformed and regain their lost moments.

SIGNIFICANCE OF THE STUDY

There is a rush of sedentary work in daily life which cause excessive stress for shoulder region due to overuse, injuries, bad poster and also result in neutral involvements.

Here electrotherapeutic modalities along with other techniques reduces pain.

HYPOTHESIS

Alternate hypothesis: Efficacy of ultrasound is better than short wave diathermy in the management of painful shoulder.

Null hypothesis: Effect of ultrasound and short wave diathermy is equally effective in management in painful shoulder.

OPERATIONAL DEFINITION

Painful shoulder:-

Painful shoulder is inflammatory disorder of shoulder joint involving the capsule and soft tissue surrounding it.

Ultrasound:-

It is a electrotherapeutic modality which produces ultrasonic waves through the quartz crystal.

Short wave diathermy:-

It is a deep heating modality which promote healing and reduces pain.
REVIEW OF LITERATURE

According to B.L haziman et al:

Retrospective study of painful shoulder assess the response the treatment of 130 patients. Therapy consisted of local corticosteroid injection, physiotherapy, or manipulation under anthetic little difference between treatments has been demonstrated although it seems that easy presentation lead to early recovery.

According to zancan A et all:

These aim of study was the instrumental evaluation of ultrasound therapy in in patient with periarthritis of the shoulder, with periarthritis of the shoulder, with regard to studies that show doubts about the real effectiveness of the anti-inflammatory action of ultrasound. Two groups of subject were studies, periarthritis versus normal patients. Clinical evaluation and instrumental measures performed before and after ultrasound therapy. The data was satisfactory analyzed and constant variations were found according to clinical evaluation of the patients. Therefore result of this study demonstrated a real influence of ultrasound therapy on periarthritis shoulder.

According to Nykanen m he studied on pulsed ultrasound treatment of painful shoulder. To study the effect of pulsed ultrasound in shoulder pains, 35 patients were treated with pulsed ultrasound in 37 patients with placebo ultrasound in a double-blind design. The therapy was given during inpatient rehabilitation, 10-12 treatment over 3-4 weeks. Treatment time was 10 times, frequency 1.0m Hz, on-off ratio 1:4 and intensity 1.0 w/cm2. Follow-ups were done after 4-12 months. No differences (p<0.05) in outcomes were found between the groups after the treatment period or at follow-ups. These results discourage the adding of pulsed ultrasound therapy with the variables used to the conservative treatment of the painful shoulder.

According to firmation. Kezban Yigiter and Mintaze Kerem In November 2004. The aim of there study was to investigate the effects of iontophoresis in patients with adhesive capsulitis. Forty-five patients participated in the study. Patients were divided equally into three groups. Group I was treated with calcium chloride (CaCl2) iontophoresis and short wave diathermy (SWD); and Group II patients with sodium chloride (NaCl) iontophoresis plus SWD; and Group III with SWD alone. All patients were allowed the same exercise program. Pain at rest and during movements of the shoulder were measured before and after the treatment. The results showed that all treatments decrease pain perception and increase shoulder passive range of motion(p<0.05). However, improvements in the treatments including iontophoresis were significantly better than with SWD alone(p<0.05). No significant difference was found between the treatments in which iontophoresis was included (p>0.05). In conclusion, iontophoresis plus SWD produced results that were better than with SWD alone in the treatment of adhesive capsulitis. According to Shield nora. Gormley John they studied on short wave diathermy trial in August 2002. There paper reviews the clinical trials investigating the efficacy of shortwave
diathermy (SWD) in the management of various conditions. SWD is a form of electromagnetic radiation used therapeutically in either a continuous or pulsed mode. Research has found that, although the popularity of this equipped in has declined recently, it is still widely available. Defecation of this modality is questionable. Few clinical trials have been conducted in the past 10-15 years. The quality of other available studies is varied, with many lacking objective outcome measures and appropriate design structure. A critical appraisal of the literature available on the use of SWD in the treatment of pain, soft-tissue injuries, rheumatology conditions, wound healing and a selection of other conditions is provided. It is concluded that SWD appears to be effective in the treatment of some conditions, but for other control trials are necessary…

According to Judith falconer therapeutic ultrasound in treatment of musculoskeletal condition in 22nd February 1990. this paper presents a quantitative synthesis of the literature addressing the effectiveness of ultrasound in selected musculoskeletal conditions. Pain and range of motion appear to improve following ultrasound treatment in acute per articular inflammatory conditions….., but not in chronic periarticular inflammatory conditions. Placebo response and experimenter expectancy bias cannot be ruled out as explanations for the positive results. The literature concerning the therapeutic efficacy of ultrasound for pain and immobility in musculoskeletal conditions is therefore inconclusive. Well- design clinical trials are needed to resolve this question.

According to the kurtais gursel y et al. best studded ultrasound in management of soft tissue disorder of shoulder there purpose is that: There is it still a lack of evidence about the beneficial effects of ultrasound (US) intervention for the management of soft tissue problems. Thus, this study was design to assess the effectiveness of US over a placebo intervention when added to other physical therapy interventions and exercise in the management of shoulder disorders.

SUBJECTS AND METHODS: 40 patients who were diagnosed by ultrasonography or magnetic resonance imaging to have a periarticular soft tissue disorder of the shoulder for randomly assigned to other group that receives true US (n=20; main time since onset of pain=8.7 months, SD= 8.8, range=1-36) or a group that received sham US (n=20; main time since onset of pain=8.1 months, SD=10.8, range=1-42). Besides true or sham US (10 minutes), superficial heat (10 minutes), electrical stimulation (15 minutes)b, and an exercise program (15-30 minutes) were administered to both groups five days each week for 3 weeks. RESULTS: subject shown within group improvement in pain, range of motion, Shoulder disability questionnaire scores, and Health Assessment questionnaire scores with the intervention, but the differences did not reach significance when compared between the groups. CONCLUSION: The results suggest that true US, compared with sham US, brings no for the benefits when applied in addition to other physical therapy interventions in the management of soft tissue disorders of the shoulder. According to Ginn kA et al… they studied on the randomised, controlled clinical trial of a treatment for shoulder pain. The aim of this study was evaluate the efficacy of a physical therapy approach to the treatment of shoulder pain. Sixty-six volunteers which shoulder pain believed to be of local mechanical origin were randomly allocated to other treatment group or a
control group. METHODS: Subjects in the treatment group received 1 month of physical therapy aimed at restoring function of their shoulder muscles. Subjects in the control group received no treatment. Outcome measurements of pain intensity, range of motion (ROM), isometric muscle force, functional impairment, and self-perception of improvement were obtained by blinded assessment. RESULTS: Subjects in the treatment group showed improvement in pain-free abduction and flexion ROM, functional impairment, and self-perception of improvement. The control group deteriorated slightly over the experimental period in ROM and functional impairment measures. CONCLUSION AND DISCUSSION: These results suggest that the physical therapy approach used in this study is effective in improving shoulder function in subjects experiencing pain of mechanical origin. The results also provide little evidence of spontaneous recovery over 1 month period.

According to Rahman et al in June 2007 this study the therapeutic effect of ultrasound and painful shoulder. There are various modalities used to treat shoulder pain. Ultra-Sound therapy (UST) is a non-invasive modality of treatment. It is not costly. The aim of the present study was to see the application of UST on shoulder pain. This was a prospective study done at BSMMU, BIRDEM and Rangpur Medical College Hospital. All the cases with duration of illness more than 3 months, and diameter of stones more than 5 mm were included in this study. Out of 26 cases 10(38%) were male, 14(54%) were housewife, 8 (31%) were businessmen. UST per given to all cases for 10 minute with 121.5 W/ sq cm for 12 doses. After 12 doses of UST all the patients became free from pain and restriction of movements. Radiographs of 24 (92%) cases showed no calculi. Only two patients showed clinical improvement only but radiograph showed no change in calculi any symptoms return after 1 and 2 months respectively. According to Maricevic at el they studied on the conservative treatment of shoulder pain. The treatment of patients with such a disease is at first always conservative accept acute rupture of the tendon. Recurrences and those who do not respond to therapy require surgery. This is studying close 86 patients treated for the painful shoulder. They were followed up and subjected to statistical analysis to determine the success of treatment by conservative methods. Conservative methods were in 83 shoulders, what amounts to a rate of 93 percent. Our results corresponds to those reported in literature.

**RESEARCH DESIGN AND METHODOLOGY**

**NATURE OF THE STUDY**

It is a comparative study to check the effectiveness of ultrasound and shortwave diathermy for the treatment of painful shoulder.

**RESEARCH SETTING**

Researches carried out in the research laboratory of Gaur Brahman Institute of Physiotherapy and Rehabilitation with permission.
CONSENT AND ETHICAL APPROVAL

The institute gave approval for the study. Each subject was examined by the Institute’s Medical Officer and was certified that they are physically and medically fit for the study.

Consent was taken from all the subjects prior to the study.

SELECTION CRITERIA

INCLUSION CRITERIA:-

1) Age group 40-60 years.
2) Complaining of pain in the shoulder joint.
3) Restriction of ROM at the shoulder joint.

EXCLUSION CRITERIA:-

Any injury around the shoulder, stroke or neurological problem.

No cervical radiating pain pathology coming to the shoulder joint.

SAMPLE AND METHOD OF SELECTION

14 patients aged between 40-60 (non-diabetic patient) are selected and divided into two equal groups in a method of convenience sampling. The subject of this study were taken from Delhi Physiotherapy & slimming center in Ramesh Nagar, and Hindu Rao Hospital.

GROUP 1:

7 patient being given ultrasound and Physiotherapy exercises.

GROUP 2:

7 patient been given short wave diathermy and Physiotherapy exercises.

TIME DURATION:-

For ultrasound:

Intensity- 0.75w/ sq cm
Time duration- 7-12 minutes

Given along the anterior and superior portion of the joint capsule.

FOR SHORT WAVE DIATHERMY

Duration- 15 minutes

Placement of electrodes- Patient supine lying and anterior- posterior placement of bad in relation to the shoulder joint.
Patient told to feel mild heat during treatment session.

VARIABLES OF THE STUDY

Dependent variables:

- PAIN
- ROM

Independent variables:

- Ultrasound
- Short wave diathermy

MATERIAL AND INSTRUMENT USED

- Plinth
- Stool
- Ultrasound machine
- Short wave diathermy
- Aqua Sonic gel
- Goniometer

METHODOLOGY-

Electrotherapy modality treatment was given & exercises everyday for 3 weeks.

Intensity of short wave diathermy was based on each patient's tolerance. But all patients were advised that they should feel just comfortable warmth

Group 1-was given ultrasound at 0.5 w/sq cm for 7-12 minutes.

Group 2- was given SWD at comfortable warmth for 15 minutes.

Both group are given exercise once daily.

Treatment should given for total time duration of three weeks.

EXERCISE GIVEN ARE

- Codman, pendulum exercise
- Finger ladder exercise
- Shoulder wheel exercise
- Shoulder pulley exercise
- Wand exercise
- Shoulder glides were performed
- Active shoulder movements in all directions.
- Active assisted movements in all directions.
- Passive movements within bearable limits.

RELIABILITY AND VALIDITY

Instrumental validity

Goniometer- ROM of shoulder joint was measured by goniometer. It is the preferred instrument for measuring ROM.

Smith and Walker demonstrated intra-tester reliability ($r=90$) and inter-tester reliability ($r=70$).

VAS Scale- it is always reliable.

Tester's reliability

Procedure used for the measurement of the responses was conducted once and hence, this procedure was intra reliable.

Procedural reliability

Procedure used in the study is reliable and was used previously by many researchers.

DATA ANALYSIS

This chapter deals with the analysis, interpretation of data collected on the visual pain along scale and goniometer 14 subjects divided into two equal groups, was put into several suitable statistical analysis in order to verify the investigation of the study.

This characteristics of the data presides through tables. Pre and post scores of visual pain analog scale and goniometer was analyzed by using mean and standard deviation presented in the tables.
1. Mean $x = \frac{x}{n}$
2. Standard deviation. $S_d = \sqrt{\frac{(x-x)}{n-1}}$

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
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<tbody>
<tr>
<td>No.</td>
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<td>Vas</td>
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| Rom |
| Flex | 7 | 98.57 | 12.82 | 102.85 | 7.56 | 4.28 |
| Abduct | 7 | 75 | 13.23 | 85.71 | 4.49 | 10.71 |
| Latrot | 7 | 38 | 7.72 | 45.71 | 5.34 | 7.71 |

**Table 4.1**

<table>
<thead>
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<th>Pre test</th>
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<td>98.57</td>
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<tr>
<td>Abduct</td>
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<td>75</td>
<td>13.32</td>
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<td>Latrot</td>
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<td>7.72</td>
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**Table 4.2**

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<td>Flex</td>
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<td>102.85</td>
<td>7.56</td>
<td>112.86</td>
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<tr>
<td>Abduct</td>
<td>7</td>
<td>85.71</td>
<td>4.49</td>
<td>99.29</td>
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<tr>
<td>Lat rot</td>
<td>7</td>
<td>45.71</td>
<td>5.35</td>
<td>56.46</td>
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</table>

**Table 4.3**
### RESULTS AND DISCUSSION

#### Results

This study was done on 30 patients group into two secrets groups with 15 patients in each.

**Group 1**- patients are given ultrasound

**Group 2**- patients are given short wave diathermy

From the study done it is observed that ultrasound is more effective in painful shoulder.

OLX ultrasound is more effective on basis of goniometer scale and v a s scale.

#### Discussion

This study has produced following findings

**Group 1** (ultrasound)-show more significant improvement in pain level between pre and post in interventions.

The percentage difference in pain between pre and post was 12.43%

There was also significant increase in range of motion in group1 between pre and post. The percentage difference in range of motion between pre and post was flexion 14.82%

Abduction 29.05%

Lat rotation 33.49%

**Group 2** (short wave diathermy) show no more significant improvement in pain level between pre and post intervention. The percentage difference in pain between pre and post for 7.01 percent.

There was also no more significant increase in range of motion in group 2 as compared to group 1 between pre and post. The percentage difference in range of motion between pre and post was flexion 8.1% abduction 13.67% lat rotation 19.04%.

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<th>Group 1</th>
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<tr>
<td>LAT ROT</td>
<td>7</td>
<td>57.14</td>
<td>6.36</td>
<td>56.46</td>
<td>3.78</td>
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Table 4.4
The main aim of this study was to compare the effect of ultrasound and short wave diathermy. Range of motion and patient with painful shoulder. All the patient in the ultrasound treatment group had significantly greater shoulder range of motion more pain relief and higher functional course then the patient in short wave diathermy group at the end of study.

The magnitude of the mean charges in the dependent variables affected by the ultrasound was more than SWD.

All the patient in ultrasound treatment group has significantly better than SWD at the end of 3 weeks of treatment.

Pain is a major contributor factor to the disability in the patient with painful shoulder. Hence it is understandable that ultrasound which affected greater pain reduces in this study also brought about greater range of motion. It appears therefore that ultrasonic can be appropriately substituted for SWD in the management of painful shoulder.

When ultrasound waves are applied to the soft tissue the energy that is absorbed was both thermal effect increasing the extensibility of the soft tissue and blood flow and decreasing tissue stiffness muscle spasm hand pain. High intensity ultrasound may cause local tissue damage if it is excessive, and this is the main potential side effect. The non thermal effects provide rotational for the use of ultrasound therapy in patient with painful shoulder. Practical recommendation for the dose and frequency of ultrasound treatment are varied and controversial. The dose can be where it while connecting the frequency intensity and cube of regiment and by changing the timing and duration of treatment. The lowest dose that achieve the required effect should be used.

For painful shoulder disorder police and continuous ultrasound at the frequency of 3 megahertz for 3 to 10 minutes daily or on alternate days for top 2 12. ultrasound in all the use of high frequency sound waves which penetrates deep into the tissue (4 to 10cm[1.6 to 4 inches]) and produce thermal mechanical chemical and biological effects. That may be used to treat limited range of motion caused by muscle shortening and fibrosis, skin or subcutaneous tissue scaring.

The result of my studies suggest that a short term program of ultrasound along with some physiotherapy exercise is well tolerated by patient with active disease. Here the pain proposes to break a adhesion and decreasing pain with its micro massage effect. Ultrasound in physiotherapy exercise for the more patient in the program statistically significant improvement of range of motion and reduce of pain after completion of exercise program. Several study have already show the benefit of ultrasound in well control painful shoulder. There are some evidence that the intermittent cycle of inter particular pressurized during exercise might increase the synovial blood floor does reducing inflammation and pain.

According to the study then by zancan et al also show dead ultrasound play an important role in treatment of painful shoulder.
Me.robbiec also suggest that the use the timing of its application and combination with other forms of therapy do not correspond in all respect of assumption made.

According to Nykanen m he studied on pulse ultrasound is better in treatment of painful shoulder.

LIMITATION OF THE STUDY.

- This study was done on small sample size of 15 patient group.
- The duration of treatment given to patient was less.

FUTURE SCOPE OF STUDY

Further study can include comparing the starter to other electrotherapeutic modalities and other forms of treatment and looking at the effects obtained.

Also symptomatic and subjects at risk such as those with the history of trauma to the shoulder region such as false or muscular pathological changes due to contusions or strains can be included.

- To compare the effectiveness of other electrotherapeutic modalities. Perfect look
- To compare thermotherapy versus cryotherapy.
- To study the combined effectiveness of stretching and splintage along with ultrasound and short wave diathermy.

CONCLUSION

The main conclusion from the studies that ultrasound along with physiotherapy exercise is better than short wave diathermy and exercise in the treatment of painful shoulder.

On the basis of result of this study.we suggest that patients with painful shoulder should be encouraged physiotherapy exercise along with ultrasound for improvement in ROM and reducing pain.
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