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Effectiveness of Low Level Laser Therapy with Nano Current Bio-Stimulation on Pain, Range Of Motion and Function in Patients with Adhesive Capsulitis

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ABSTRACT

Adhesive Capsulitis Is A Common Condition Involving Scapulohumeral Pain And Loss Of Motion, It Is Chronic Inflammation And Fibrosis Of The Joint Capsule. The Painful Nature of the Adhesive capsulitis and lack of effective therapy for improving pain range of motion and function demonstrate the demand for a new effective therapeutic intervention so the present study was aimed to determine the effectiveness of low-level laser therapy (LLLT) with nano current bio-stimulation in patients with adhesive capsulitis. Methods: 20 patients with adhesive capsulitis were divided into 2 groups and treated for 3 weeks and pre and post study, the visual analogue scale, the range of motion and function data were taken. In this study group received low-level laser therapy with therapeutic exercises and group B received therapeutic exercises

Result: patients received low-level laser therapy showed a significant improvement in pain, range of motion and function in patients with adhesive capsulitis after 3 weeks.

Conclusion: low-level laser therapy along with therapeutic exercises significantly improve pain range of motion and function in patients with adhesive capsulitis than therapeutic exercises alone.

Keyword: Low-Level Laser Therapy, Adhesive Capsulitis, Range Of Motion, Capsular Stretching, Therapeutic Exercises.

INTRODUCTION

American academy of orthopedic surgeons (AAOS) ranks shoulder pain as third most common musculoskeletal disorder behind the knee and spinal disorder. AAOS defines frozen shoulder (adhesive capsulitis) is a condition of uncertain etiology characterized by significant restriction of both active and passive motion that occurs in the absence of another known intrinsic shoulder disorder[1]. With respect to the physical therapy, a variety of interventions are used such as ultrasound, shortwave diathermy, the range of motion exercises and mobilization techniques. Currently, no therapeutic intervention is universally accepted as most effective for improving pain, the range of motion and function in patients with adhesive capsulitis. Low-level laser therapy (LLLT) with nano current bio stimulation has been recommended as a noninvasive, non-thermal modality to treat various musculoskeletal conditions [2]. Therefore the current study aimed to determine the efficacies of LLLT with nano current bio stimulation with the concomitant exercise program in patients with adhesive capsulitis.

AIMS AND OBJECTIVE

To compare and determine the effects of LLLT with nano current bio-stimulation and therapeutic exercises on pain, the range of motion and function in patients with adhesive capsulitis.

RESEARCH HYPOTHESIS

Null hypothesis

There is no difference in effects between LLLT with nano current bio stimulation and therapeutic exercises on pain, the range of motion and function in patients with adhesive capsulitis.

EXPERIMENTAL HYPOTHESIS

There is the difference in effects between LLLT with nano current bio stimulation and therapeutic exercises on pain, the range of motion and function in patients with adhesive capsulitis.

METHODOLOGY

Study design: Experimental study

Sample size: the pilot study was performed and depending on it sample size was calculated as 18. Here, 10 subjects in each group were taken

Inclusion criteria: [3]

Subjects diagnosed with primary idiopathic adhesive capsulitis

Age group≥ 35 years

Duration of complaints ≥ 3 months

≥50% loss of ROM of the shoulder joint relative to non-affected side

Exclusion criteria: [3]

Painful stiff shoulder after severe trauma, fracture or dislocation

Neuromuscular disorder involving the shoulder joint

Neoplastic disorder

Skin allergies

MATERIALS USED IN THE STUDY

ELasercalamative, Consent form, Data collection sheet, Pencil, ruler, Paper, Plinth, SPADI (shoulder pain and disability index), Universal goniometer, Theraband, Coupling medium gel, Cotton, Towel.

PROCEDURE

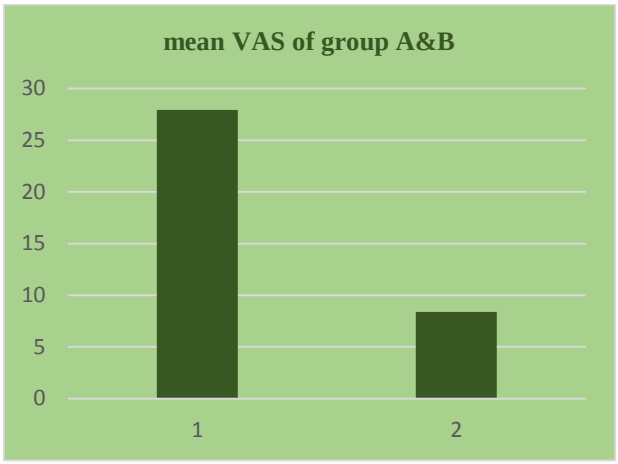
Patients with adhesive capsulitis fulfilling the inclusion and exclusion criteria were asked to sign written consent form and both male and female were taken. On the first visit, the complete musculoskeletal assessment was done. Visual analog scale (VAS), ROM and SPADI were explained in the local language and pre participation these measures were documented. Subjects were treated for 3 weeks, 6 days a week.

Group A: LLLT Dosage: frequency 670nm ±5nm, strength (Power) 0.50mW, duration 10 minutes [2]
capsular stretching and therapeutic exercises. [4]
Group B: capsular stretching and therapeutic exercises.
After 3 weeks following assessment was done and again VAS, SPADI, and ROM were documented.

RESULT

Data were analysed using statistical software SPSS20 and Microsoft excel and level of significance were kept at 5%Changes in outcome measures were analysed within the group as well as between the groups. To analyse the difference in VAS score after 3 weeks of intervention in 2 groups, paired‘t’ test was used. For groups A & B, p values were 0.0001 and 0.3660 respectively, showing a significant difference in VAS score in group A but not in group B.

The difference in improvement in VAS score between the 2 groups was analysed using unpaired‘t’ test, showing the significantly greater difference between the groups p value <0.002.



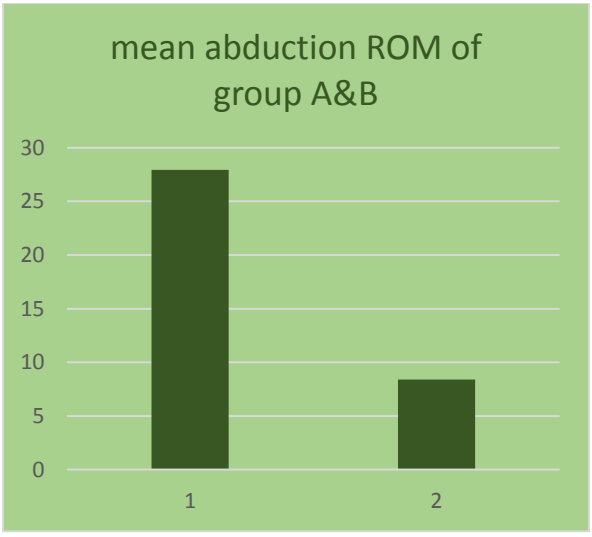
Graph1

To analyse the difference in external rotation ROM after 3 weeks of intervention within 2 groups, paired ‘t’ test was used for group A&B and p values were <0.0001 and 0.1108 respectively showing statistically significant difference in external rotation ROM in group A but not in group B.

To analyse the difference in external rotation ROM after 3 weeks of intervention between 2 groups, unpaired ‘t’ test was used for group A&B and p value was <0.003

To analyse the difference in abduction ROM after 3 weeks of intervention within 2 groups, paired ‘t’ test was used for group A&B and p values were <0.0001 and 0.0510 respectively showing statistically significant difference in abduction ROM in group A but not in group B.

To analyse the difference in abduction ROM after 3 weeks of intervention between 2 groups, unpaired ‘t’ test was used for group A&B and p value was <0.003

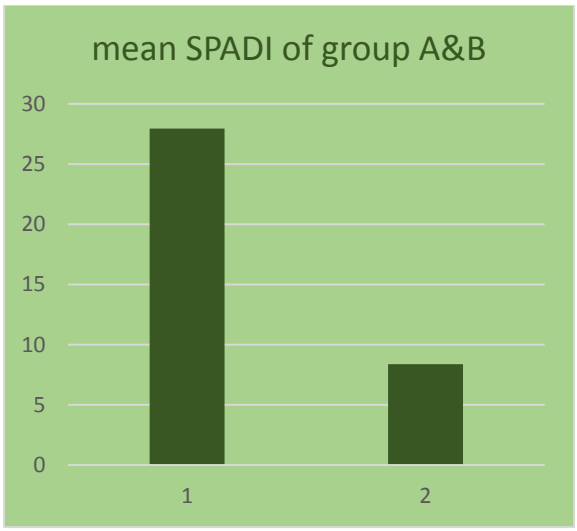


Graph2

To analyse the difference in internal rotation ROM after 3 weeks of intervention within 2 groups, paired ‘t’ test was used for group A&B and p values were <0.0002 and 0.1405 respectively showing statistically significant difference in abduction ROM in group A but not in group B.

To analyse the difference in internal rotation ROM after 3 weeks of intervention between 2 groups, unpaired ‘t’ test was used for group A&B and p value was <0.035

To analyse the difference in SPADI after 3 weeks of intervention within 2 groups, paired ‘t’ test was used for group A&B and p values were <0.0001 and 0.0766 respectively showing statistically significant difference in SPADI in group A but not in group B.



Graph3

DISCUSSION

The present study was done to see the individual effect and to compare the effectiveness of LLLT with nano current bio stimulation and therapeutic exercises on pain, ROM, and function in patients with Adhesive capsulitis. Group subjects were given LLLT with nano current bio stimulation and therapeutic exercises and group B were given therapeutic exercise. The result of the study showed positive findings with statistically significant improvement in VAS, ROM, and SPADI in group A after 3 weeks than group B.

Group A showed statistically significant improvement in VAS scores level which is in accordance with the study done by David Ip et[5] al which showed significant improvement in pain reduction with LLLT, stating that LLLT reduces pain related to inflammation by lowering in a dose dependent manner, levels of prostaglandins E2, prostaglandin endoperoxide synthase 2, interlukin1 beta, tumor necrosis factor alfa, cellular influx of neutrophil granulocytes, oxidative stress and tissue edema, Also group A showed statistically significant improvement in ROM which is in accordance with the study solimam et al[2] with the possible cause is as laser facilitates collagen production and tendon healing, collagen located in the ligament of the glenohumeral joint and as there was improvement in pain, the patients were able to use their extremity with less pain and wider range than the pre-treatment period. Group A showed statistically significant improvement in SPADI. Pain and disability are the subcomponents of SPADI, as the pain was found to be reduced, the pain component of SPADI was also found to be reduced and disability reduced due to improvement in ROM and hence the total score of SPADI found to be improved.

The current study showed that there was no improvement in VAS, ROM, and SPADI in group B which is consistent with the study by Blanchard v et al in 2010[6] compared the effectiveness of corticosteroid injections and physiotherapeutic interventions for adhesive capsulitis and concluded that corticosteroid injections have greater effects in the short time that therapeutic interventions. In present study proposed mechanism could be as no thermal or non-thermal modalities were given with the therapeutic exercises, the pain could not improve and the patient could not do exercises properly because of pain. Yet further study needs to be done for the same.

CONCLUSION

It can be concluded from the present study that LLLT with nano current bio stimulation therapeutic exercise was more effective than therapeutic exercise alone in the treatment of adhesive capsulitis.

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