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Efficacy of handmaster plus to reduce pain and improve hand grip strength in the management of rheumatoid arthritis

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Abstract

Objectives: Efficacy of Handmaster plus to reduce pain and improve hand grip strength in the management of Rheumatoid arthritis.

Methods: The study used an experimental design and the study setting was at Physical Medicine and Rehabilitation Department, SV hospital Cherthala. 30 patients with Rheumatoid arthritis between the age group of 35- 55, were assigned in to two groups. The first group is treated with conventional methods. The second group were treated with Handmaster plus along with conventional treatment. The duration of the treatment was 2 weeks with 5 days a week. Outcomes was measured by VAS for pain and Sphygmomanometer for hand grip strength.

Results: Both groups showed significant improvement in reducing the pain and improving the hand grip strength after the rehabilitation program. The experimental group showed a statistically improvement in reducing the pain and improving the hand grip strength when compared to the control group. (P less than .01).

Conclusion: Rheumatoid arthritis patients who received Handmaster plus along the conventional physical therapy showed a statistically significant improvement in reducing the pain and improving the hand grip strength than control group. It can be a management of Rheumatoid arthritis patients for reducing the pain and improving the hand grip strength. A well designed trial is needed to study the effectiveness of Handmaster plus to reduce pain and improving the hand grip strength a large group and term effect.

Keywords: Rheumatoid arthritis, Handmaster plus

Introduction

Rheumatoid arthritis is a chronic progressive disorder with periods of exacerbation and remission. It is connective tissue disorder with involvement of musculoskeletal involvement. It is an autoimmune disease. RH factor is positive.

Musculoskeletal features of synovial tissue: involvement of synovial lining of tendon sheaths, bursa and ligaments give rises to pain, swelling, increased warmth and stiffness. There are two stages of Rheumatoid arthritis.

A) Acute Stage

Bb Chronic Stage

Joint changes progress through the following three stages.

Stage I

Inflammation of synovial membrane spreads to articular cartilage and soft tissues leads to limitation of joint movements with pain and muscle spasm.

Stage II

Granulation tissue formation occurs within the synovial membrane and spreads to the periarticular tissues. The cartilage starts disintegrating and joint is filled with granulation tissues. There occurs thickening of joint capsule, tendons and their sheaths impairing the joint movement permanently.

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Stage III

The granulation tissue gets organized into fibrous tissue with adhesion formation between the tendons, joint capsule and articular surface.

Stage IV

Contracture, joint ankyloses and deformity.

The onset of disease is common between the age group of 35 – 55 years and women are affected more than men in a ratio of 4:1. It involves multiple joints includes cervical spine, temporomandibular joint, shoulder joint, elbow joint, hands, wrists, hip, knee and ankle and foot. In wrists, it causes subluxation of distal end of ulna result in stiffness, deformity ulnar deviation at wrist.

In hands – palmar subluxation and ulnar deviation are deformity present. With involvement of metacarpophalangeal and proximal interphalangeal joint. A typical swan neck deformity and buttonhole deformity. Risk factors are climate, race, diet, psychosomatic disorders, trauma, endocrine dysfunction, hereditary disturbances, infections, disturbances in autoimmunity, environmental conditions. The purpose of study is to evaluate the effectiveness of handmasterplus and standard physiotherapy for reducing the pain and improving the hand grip in patients with rheumatoid arthritis.

Methodology

Research Approach: It is an experimental study approach

Research Design: Group design. The study design adopted is pre test, post test control group experimental

Sample: The sample consists of 30 patients with Rheumatoid Arthritis satisfying inclusion criteria and referred to physiotherapy department.

Sampling Technique: By using non-probability convenient sampling method the patients are assigned to experimental and control group of 15 each.

Group A: Receives conventional physiotherapy alone

Group B: Receives HandMasterPlus and conventional physiotherapy

Inclusion Criteria

Diagnosis of Rheumatoid Arthritis with duration of symptoms more than four months and less than one year.

Stage III of R.

Age group between 35 - 55 years

- Both male and female

Muscle power of Grade IV is taken.

Exclusion Criteria

- History of Rheumatoid Arthritis more than two year.
- Carpel tunnel syndrome
- Diabetes
- Neuropathy
- Wrist Fractures
- Tendon injuries
- Dequervaines Disease
- Tennis Elbow
- Mastectomy, lymphadenopathy
- Golfer's elbow
- Circulatory concerns

Treatment Protocol**Group A****Control Group**

The patients received conventional therapy 5 days a week.

One session per day each session taking 20 minutes conventional therapy. (20 minutes)

1. Therapeutic Ultrasound
Dosage-1MHZ
Intensity-0.7 w/cm
Duration-5 minutes
Pulsed Mode
2. Ice Massage
3. Minutes
4. Range of motion exercise
5. Stretching exercises
6. Splints - to correct deformity
7. Home advice

Group B: Experimental group

In addition to the conventional theory mentioned above this group received handmasterplus technique. The patients attended physiotherapy five days in a week for two weeks. The duration of each treatment session was 30 minutes including 20 minutes of conventional physical therapy.

Tools and Materials

1. Consent form
2. Data collection sheet
3. Assessment form
4. Sphygmomanometer
5. Pencil, scale

Outcome Measurements**Visual Analog Scale**

Pain is measured by using visual analogue scale. The patient is prompted with strip of paper marked with 10 cm line and is marked with "no pain 0" on one hand and "worst pain = 10" on the other end and asking to mark the line at the point corresponding to the point of intensity of pain of pain during 24 hrs.

Sphygmomanometer for Hand Grip Strength

To measure the hand grip strength of the subjects. Sphygmomanometer was used with the cuff pre - inflated to 20 mm of Hg. The subject was asked to squeeze the cuff with the forearm in mid range position and held for 10 seconds. 3 repetitions are done and mean of value is recorded.

Data Collection Procedure

Prior consent was obtained from the hospital for the study. The patients referred by the Orthopedic Surgeon for taken for primary evaluation. If the patient fulfill the inclusion criteria. Consent was obtained from them prior to the study. Assessment was taken of all 30 patients using VAS and SPHYGMOMANOMETER for hand grip strength for the first day and the last day of the treatment.

Procedure for the Study

The patient was assigned using non probability convenience sampling into 2 groups. Group A and group B of 15 samples each. The order of testing was measurement of pain with vas and hand grip strength for sphygmomanometer. 30 patients were sampled from the population and were randomly

assigned into two groups of 15 each. Group a (control) and group b (experimental group). The treatment schedule consist of two weeks. pre test evaluation was done on the day one session prior to treatment and post test evaluation was done next day following the second week treatment tools selected for pretest post test measure ments of functional performance were vas for pain and sphygmomanometer for hand grip strength.

Procedure

Handmaster Plus

Hand master plus technique is a hand exercise in which it strengthens the hand grip and 18 muscles of the hand in one easy exercise. The hand master plus equalize balance between flexor and extensor muscles. It stimulates maximum blood flow for performance. Hand master plus hand exercise system is rated as "The most complete hand exercise"

Procedure

1. Squeeze the handmasterplus hand exercise ball for 1 second.
2. Open against the handmasterplus hand exercise cord for 1 second.
3. Repeat until comfortable fatigue

The patient is in sitting position with the forearm supported on a pillow with elbow flexed to 90° with forearm pronated and wrist extended. Three sets of ten repetitions is done and duration is 10 minutes and between rest is given.

Balance is the key to handmasterplus technique and strengthens the flexors, extensors, adductors and abductors of the hand. Hand master technique is carried out once in each session

Statistical Test Used

Statistical tests are used for analyzing the data that is Paired * test and unpaired' t test.

The study was designed as Pre test and Post test Experimental control group study design with experimental group treated with Handmaster plus along with conventional treatment. The aim of the study was to find out the efficacy of Handmaster plus to reduce pain and improve hand grip strength in the management of Rheumatoid arthritis. The outcome measures used were VAS and SPHYGMOMANOMETER for hand grip strength in Rheumatoid arthritis The main objectives of the study were;

- To find out the effectiveness of Conventoinal physiotherapy in the management of Rheumatoid arthritis.
 - To find out the effectiveness of Handmaster plus in the management of Rheumatoid arthritis.
 - To compare the effectiveness of Handmaster plus along with the conventional physiotherapy in the management of Rheumatoid arthritis.
 - To fulfill the objectives, the data was statistically analyzed using following tests
1. Paired "+ test' These test is used for testing the comparison of Pre and Post test score of both VAS and SPHYGMOMANOMETER in control group and experimental group.
 2. Unpaired t test These test is used for testing the comparison between the relief of pain and improvement

of hand grip strength between control group and experimental group.

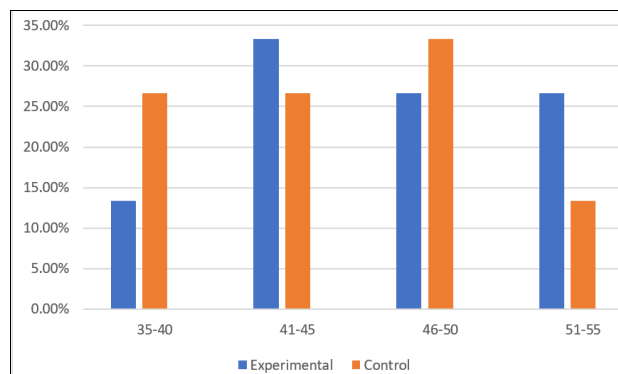


Fig 1: Comparison of ages of control and experimental group

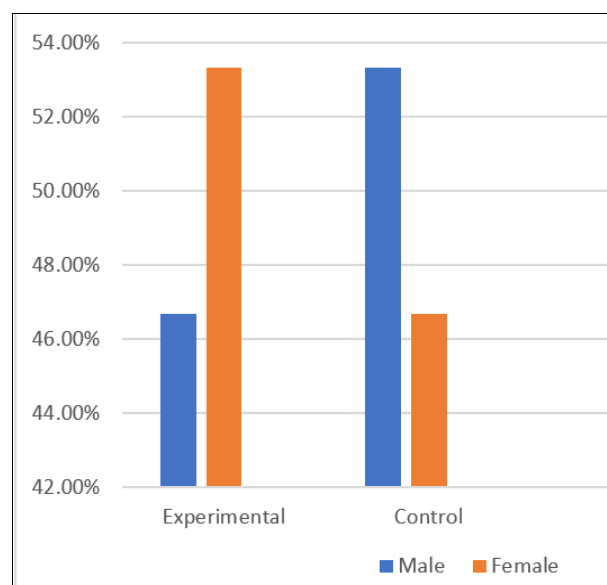


Fig 2: Comparison of gender of control and experimental group

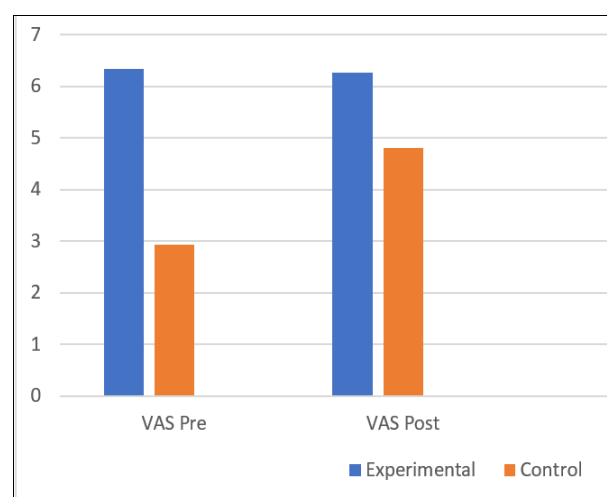


Fig 3: Comparison of the vas values for the two groups

Figure shows comparison of mean pre test and post test VAS scores of the study groups. Mean pretest score for the experimental group was 6.3333 and for the control group was 2.9333. Mean post test score for the experimental group was 6.2667 and for the control group was 4.8.

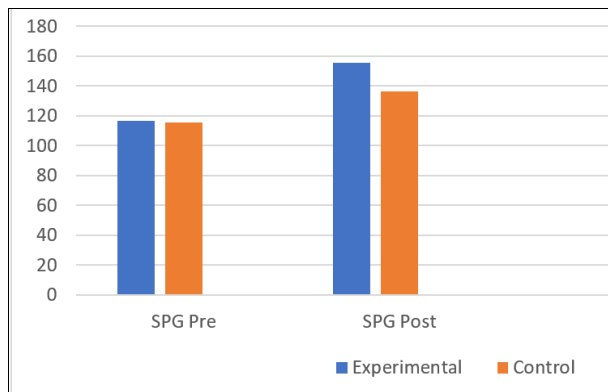


Fig 4: Comparison of the hand grip strength values for the two groups

Figure shows comparison of mean pre test and post test hand grip strength scores of the study groups. Mean pre test score for the experimental group was 116.67 and for the control group was 115.33. Mean post test score for the experimental group was 155.33 and for the control group was 136.67.

Discussion

This study is an experimental comparative research which aim out the efficacy of handmasterplus to reduce pain and improve hand grip strength in the management of rheumatoid arthritis. For this study 30 Patients with Rheumatoid arthritis were recruited from SV Hospital cherthala. From this sample of 30 Patients the subject were divided into two groups Control group and Experimental group consisting of 15 Subjects each. The control group receives conventional physiotherapy treatment which consists of ultrasound, stretching, ROM, ice massage. The experimental group groups receives Handmaster plus technique in additional to conventional physiotherapy. The total duration of the treatment was five days in a week for two week. The tools used for measuring the outcomes were VAS for pain and sphygmomanometer for hand grip strength. The outcome measuring used in this study was outcomes to administer and yield scores that are reliable and valid. The individuals with stage3 rheumatoid arthritis were selected for the study. The result of present study showed that both groups showed significant reduction in pain and improved in hand grip strength, but improvement were more in experimental group who received Handmasterplus technique along with conventional treatment. Data were analysed using paired '+' test and unpaired '+' test. Mean pre test score of VAS for control group was 6.2667 and for experimental group was 6.333. Mean pretest score of hand grip strength for control group was 115.33 and for experimental group was 116.67. After two weeks treatment program mean post test score of VAS for control group was 4.8 and for experimental group was 2.933. Mean posttest score was 136.67 in control group of handgrip strength and in case of experimental group was 155.33. The mean difference between the Pre test and Post test score of VAS in Experiment group is 3.4. The mean difference between the Pre test and Post test score of VAS in control group is 1.4667. The mean difference between the Pretest and Post test score of hand grip strength by Sphygmomanometer in Experimental group is 38.67. The mean difference between the Pre test score and Post test score of HAND GRIP STRENGTH by Sphygmomanometer in control group is 21.33. pretest evaluation of control group and experimental group shows that there is no significant difference between the groups before treatment. Post test

evaluation s shows that there is significant difference between experimental group over control group in both VAS and HAND GRIP STRENGTH, thus rejecting null' hypothesis. The pain occurs in Rheumatoid arthritis is due to the result of inflammation of synovial membrane which spreads to articular cartilage and soft tissues leads to limitation of joint movement with pain and muscle spasm.

Although inflammation can be involved in stages of disease, it is inability of the tendon to heal that perpetuates pain and disability. The pain may be biochemical. Bursae and ligaments involvement leads to pain. The granulation tissues gets organizes into fibrous tissues with adhesion formation between the tendons, joint capsules and articular surfaces. The mechanism behind control group is due to the physical and mechanical effect of ultra sound. Ultra sound can alter membrane permeability to various ions like calcium which have profound effect on cell activity, reduction in inflammation, increase in tensile strength and energy absorbing capacity of tendon. The mechanical effect of ultrasound helps to reduce danger of adhesion formation. Accelerated protein synthesis occurs during ultrasound therapy which stimulates the repair of damaged tissue. These effects of ultrasound therapy might have caused healing of the tendons or might have caused reduction of inflammation present. If any which indirectly might have caused reduction in pain. Cryotherapy directly and rapidly modifies the pain sensation by gating pain transmission with activity of cutaneous thermal receptors. It can also reduce pain indirectly by alleviating the underlying cause of this symptoms such as inflammation.

In experimental group the better results obtained in reduction of pain may be due to application of Handmaster plus technique in additional to conventional therapy, which might have heiped in reducing pain and hand grip strength. Terry Zacharys defined Handmaster plus as a simple hand grip exerciser which strengths grip and muscles of hand. The aim of this technique is to elongate the scar tissue by rupturing adhesions making the area mobile and pain area.

Reduction in pain and improvement in hand grip strength were also observed in control group. This may be because ultrasound might have altered the pain transmission and perception of the condition causing the pain. The reduction in pain and the standard exercise given might have improved hand grip strength.

Thus from the results obtained in statistically analysis it is clear that Handmaster plus along with conventional physiotherapy is more effective than conventional physiotherapy in the management of Rheumatoid arthritis.

Results

The results of the present study demonstrated that

1. Handmaster plus along with conventional physiotherapy shows statistically significant reduction in pain in patients with Rheumatoid arthritis
2. Handmaster plus along with conventional physiotherapy shows statistically improvement in hand grip strength in patients with Rheumatoid arthritis
3. Handmaster plus technique is useful for relieving the pain and improving hand grip strength in patients with Rheumatoid arthritis.

Hence the discussion can be summarized as Handmaster plus technique along with conventional physiotherapy treatment is effective for relieving pain and improving hand grip strength in patients with Rheumatoid arthritis. It can be used as a

single adjunct to physical therapy in the management of Rheumatoid arthritis.

Conclusion

Pain and dysfunction caused by Rheumatoid arthritis are relatively common. The present study provides evidence that a two week program of Handmasterplus for rheumatoid arthritis is capable of relieving pain and improving handgrip strength of the arm. Supplementary rehabilitation program for patients with handmasterplus technique may be helpful in improving treatment effectively. In this context, Handmasterplus technique is more beneficial and it relieves pain and improving hand grip strength. The technique is simple one to be Utilized in clinical settings.

Significant improvement is noticed in the outcome measurement of pain and handgrip strength, following the technique in Rheumatoid arthritis patients, These results indicates that more randomized controlled trials should be undertaken to investigate the unique effects of a more intense or longer Handmasterplus technique for patients with Rheumatoid arthritis

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