Effect of Functional Task Exercises on Hand Function and Grip Strength in Patients with Lateral epicondylitis

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Abstract

Background: Tennis Elbow is the most common overuse syndrome in the elbow. It is a tendinopathy injury involving the extensor muscles of the forearm. The lateral epicondylitis is characterized by pain and tenderness at the lateral epicondyle of the humerus as there is non-specific inflammation at the origin of the extensor muscles of forearm. As there is pain and inflammation, the grip strength in decreased and hand function is affected. But there are few research done on intervention regarding same. Hence a comparative study was carried on 60 patient, 30 subjects were grouped in Group A which were given functional task exercises and Group B was given Conventional therapy. The stastical analysis showed that out of 30 subjects, mean age of group A patients was 25±6.23 and mean age of group B patients was 27.2±4.8. Grip strength in between Group A (63.5± 14.2) and Group B (60.4± 12.9) with p value 0.04, Patient rated tennis elbow evaluation scale in between Group A (44.1± 6.8) and Group B (43.8±10.6) with p value 0.002 and Michigan hand outcome measures in between Group A (62.5±14.4) and Group B (54.3±14.7) with p value 0.0005. Hence the study concluded that there is significant effect of Functional Task Exercises on Grip strength and Hand function in lateral epicondylitis.

Key words: *sphygmamometer, tennis elbow evaluation scale, Michigan hand outcome questionnaire , hand function grip strength.*

Introduction

The lateral epicondylitis is characterized by pain and tenderness at the lateral epicondyle of the humerus as there is non-specific inflammation at the origin of the extensor muscles of forearm.It is sometimes seen in tennis player , other activities such as squeezing clothes, carrying a suitcase etc are frequent responsible.[1]

The lateral epicondylitis is a chronic symptomatic degeneration of the tendons that are attached extensor muscles of the lateral epicondyle of the humerus. It is also most common cause of chronic musculoskeletal conditions affecting the elbow. The results of lateral epicondylitis is pain, disability, and leads to loss of productivity.[2]

There are some neurological symptoms, namely cervical spine diseases with radiculopathy and posterior interosseos nerve involvement and also bursitis is also associated with lateral epicondylitis .In lateral epicondylitis the pain thresholds are at lateral epicondyle with pain on palpation and with positive Millis test. The results of the resisted wrist extension reflects decreased strength.[3]The patients has pain and there is decrease in function which affects basic activities in daily life.[4]

It is also termed as tendinosis that specifically involves the origin of extensor Carpi radials brevis muscle. It is mostly work related or sport related pain syndrome of the arm. The quick and repetitive movements of the wrist and forearm can rupture the proximal attachment of the long extensor muscles also causes inflammation and pain.[5]

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There is pain on palpation of lateral epicondyle of humerus and weakness during gripping activities. The grip strength is mostly affected due the damage caused to the muscles which work in gripping activities. The grip is affected due to the repetitive activities performed in same manner for long duration. The repetitive activities such as driving for long hours, tying ,using rolling pin for making rotis, etc. Due to this repetitive activities the hand function is also affected. The hand function like turning a knod, lifting a heavy weight bag, driving a bike, etc.[6]

There has been research done that due to pain, there has been affection of grip strength and hand function. Functional task exercise is more effective in improving functional performance, and that Functional task exercise is the first exercise programme with sustainable effects. But there is little research done on effects of functional task exercises on grip strength and hand function in lateral epicondylitis, hence need of this study.

- **Methods:**

- **Study Design**: Experimental

- **Selection of subjects**: Total 75 patients were approached for the study out of which 60 patients were selected according to inclusion and exclusion criteria. The patient included were patients diagnosed with lateral epicondylitis more than 6 weeks and patient excluded were patient with bilateral involvement and with cervical radiculopathy. The patient were divided into 2 groups by convenient sampling each having 30 patients. The aim, objectives and method of study was explained to the participants. Consent was taken on the consent form.

Materials: Demographic data sheet, Consent form, scale, sphygmomanometer, paper, plastic bottle, cards, door knob, clay, cloth.

Procedure:

Ethical clearance was taken from the Institutional Ethical Committee, Tilak Maharashtra Vidyapeeth, Department of Physiotherapy, Pune. Participations were selected according to inclusion and exclusion criteria. The aim, objectives and method of study was explained to the participants. Consent was taken on the consent form. The assessment of patient was done as below.

Patient rated tennis elbow evaluation scale: In the patient rated tennis elbow evaluation scale there are three sections Pain, functional disability and usual activities. All the questions are numbered between 0-10 and the patient is asked to select on basis of the how much pain is present and affected activities.

Sphygmamometer: Grip assessment was done by the sphygmomanometer: The sphygmomanometer is rolled to cylinder and the cuff is inflated to 20 mmhg and patient is asked to press the cylinder 3 times . The highest reading among the 3 is considered and if the increments 2mmhg then the grip is affected [18].

Michigan hand outcome questionnaire: The scale contains 6 scales: (1) overall hand function (2) Activities of daily living (3) work performance (4) pain (5) anestheics (6) satisfaction with hand function. The scale score for each of 6 scales is the sum of the reading of each scales. The score is converted to a score range from 0 to 100.

Treatment protocol: Pre-training: The grip strength will be checked by sphygmamometer. The hand function can be checked by Michigan hand outcome questionnaire. The physical function,pain and disability will be checked by using patient rated tennis elbow evaluation scale.

The treatment will be divided into 2 groups : [A] Functional Task exercises

[B] Conventional therapy

45 minutes session 10 repetitions for 4 weeks.

Functional task exercises: 45 minutes session 10 repetitions for 4 weeks

Functional task exercises was given additional along with the conventional treatment.

Functional task exercises were transfer of sandbag from one hand to other hand, gripping the door knob, carrying the water bottle from one hand to other hand, turn the cards over, do typing movements, wringing the wet clothes, crumble the paper and try to spread back paper.

Post-training: The physical function , pain and disability will be checked by using patient rated tennis elbow evaluation scale. The grip strength will be checked by sphygmomanometer. The hand function can be checked by Michigan hand outcome questionnaire.

Data will be collected and statistical analysis will be

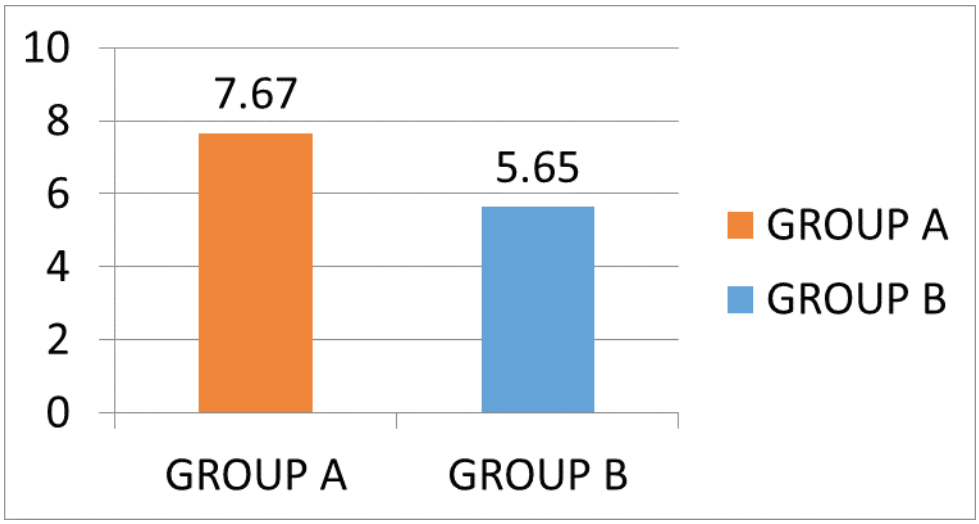
done.

Stastistical Technique: Wilcoxon's test was used for within the groups not passing the normality and mann witney u test was used for between the groups not passing the normality.

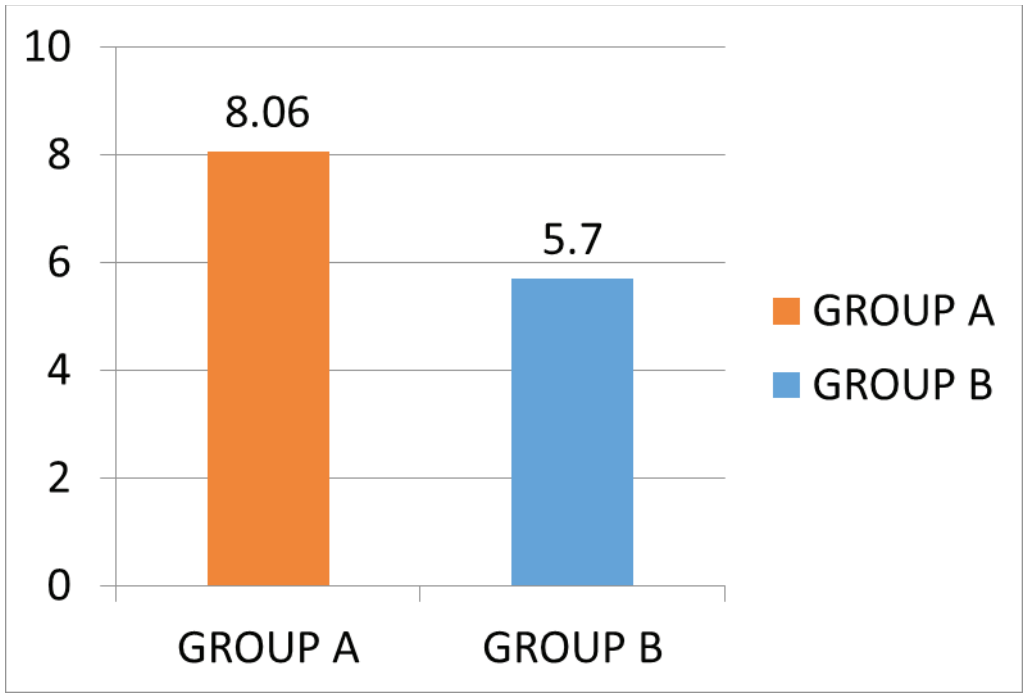
Results

Table 1 Showing Demographic Data and Comparison Between Group A (Functional Task Exercises) and Group B (Control Group) on Grip Strength, Hand Function and Physical disability.

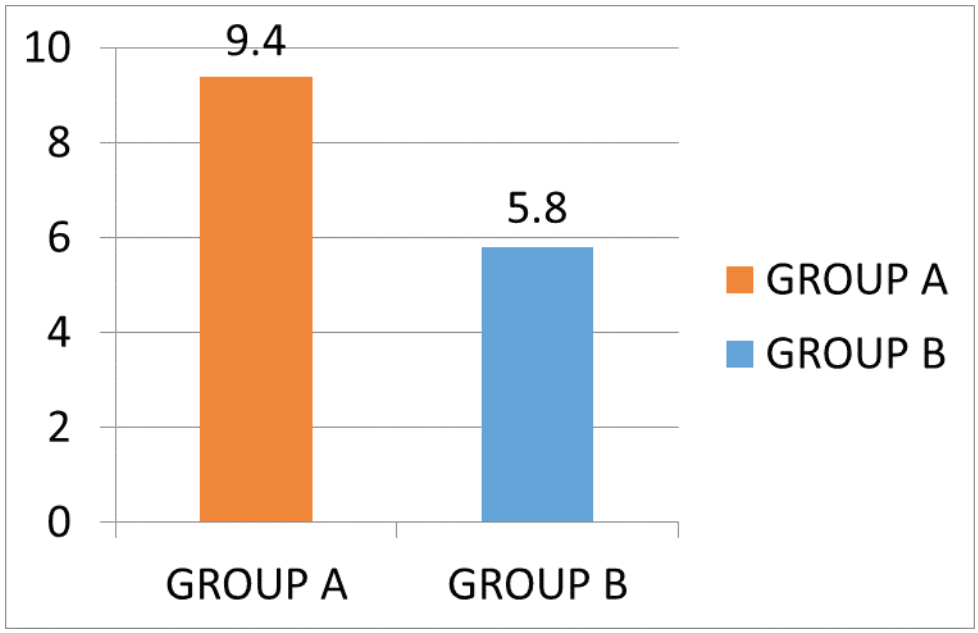
Outcome measure	Group A	Group B	P value
Age (years)	25±6.23	27.26±4.89	
Grip strength(mmHg)			
Pre	54.67± 13.5	53.7±12.82	0.04
Post	63.5±14.2	60.4±12.94	
p value	0.0001	0.0001	
PRTEE			
Pre	52.1±16.9	49.08±9.48	0.002
Post	44.1± 16.8	43.8±10.63	
p value	0.0001	0.0001	
MHOM			
Pre	71.7±14.7	63.8±14.01	
Post	62.5±14.4	54.3±14.7	0.0005
p value	0.0001	0.0001	



Graph 1 : It shows in comparison, the group A (functional task exercises) which is significantly improved than Group B (control group) in grip strength in patients with lateral epicondylitis with p value (0.04).



Graph 2 : It shows in comparison, the group A(functional task exercises) which is significantly improved than Group B (control Group) in patient rated tennis evaluation scale in patients with lateral epicondylitis with p value (0.002).



Graph 3: This graph shows in comparison, group A (functional task exercises) which is significantly improved than group B of Michigan hand outcome questionnaire in patients with lateral epicondylitis with p value (0.005).

Discussion

In this study of the effect of functional task exercise vs conventional therapy on grip strength and hand function in patients with lateral epicondylitis. The patients are evaluated pre and post treatment for grip strength and hand function by sphygmomanometer, patient rated tennis elbow evaluation scale and Michigan hand outcome questionnaire.

The functional task exercise are related to the daily life activities and it can performed easily and things required for that are also easily available in environment. This exercise allows to patient to perform daily activities which are related daily living also declines chances of

decrease of grip strength and hand function due to lateral epicondylitis.[10]

Functional task exercises showed more beneficial because these components are practised in relevant functional positions only. Functional task exercises attempts to adapt or develop the training which allows individuals to perform activities of daily life more easily and without injuries.

The performance of functional task exercise includes the teamwork of cognitive, perceptual, and motor functional and it is also related to the individual's active environment. The functional task exercise trains the patient to perform daily life task easily by increasing the grip strength and hand function. It makes the patient functionally independent to perform daily life grips and hand function which required to perform in individual's daily life. (15)

Functional task exercises increase the upper body strength and balance and coordination. The strength of the muscles is also increased which contributes to grip strength, Thus showing positive effect on grip strength and hand function in patients with lateral epicondylitis. (15)

In functional task exercises there were wider range of exercises and performed in optimal manner. Exercises are performed in structured manner.(16) Functional Task exercises increase blood flow, prevent injury to damaged area and cause neovascularization.(16)

Literatures suggest that strengthening and stretching both are main components of exercise programme, because tendons must be flexible along with strong. Positive effects of exercise programme for tendon injuries may be attributable to lengthening of muscle tendon unit by stretching and strengthening exercise which could achieve loading effect within muscle tendon unit along with hypertrophy and increased tensile strength of the tendon.[21]

Tipton et al (1987) say that "prescribed exercises which increase the forces being transmitted to ligaments, tendons and bones will maintain and generally increase the strength and functional capacity of these structures". The same principle seems to be valid in the treatment of chronic tennis elbow syndrome. [21]

Conclusion

Hence the study concluded that there is significant improvement in hand function and grip strength with the functional task exercises in comparison with the control group.

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