

[ORIGINAL ARTICLE]**Effect of Motor Imagery on Handgrip Strength in Recreational Badminton Players**Ms. Shraddha Jaybhaye¹, Dr. Mukta Deshpande(PT)², Pournima Pawar(PT)³¹Undergraduate Student, ²Assistant Professor, ³Associate Professor, Tilak Maharashtra Vidyapeeth, Pune**ABSTRACT :**

The purpose of the study was to study the effect of motor imagery on handgrip strength in badminton players. Total 25 recreational Badminton Players between the age group 18-25 years of both male and female were included in the study. The study was conducted over 2 weeks. Grip strength by hand dynamometer and Vividness of movement imagery questionnaire-2 were used as outcome measure. The data was analysed using Wilcoxon matched pairs signed rank test in which the two tailed P value was <0.0001. The pre and post intervention assessment showed extremely significant results for increase in hand grip strength. Along with that movement vividness pre and post intervention showed significant results as well. This concludes that motor imagery is effective on hand grip strength and vividness in Recreational badminton players.

Keywords: Mental training, sports, cognitive strategies, strengthening.

Introduction:

The operations of the human brain are very powerful. Human mind and its many functions are one of the most influential operations of the brain.⁽¹⁾ When any scary things happens in dream sudden Heart Rate and Respiratory Rate starts increasing, imagination of meeting with loved ones results in happiness and brings a smile to the face, imagination of eating a slice of sour lemon can bring a grimace to face or imagination of eating favourite food which can secrete in the mouth. Even though all are illusions, in that moment brain completely believes them as real. In accordance with the information perceived by the brain, physiological response appears in real. These responses show the power of imagination of brain.⁽²⁾ Motor imagery (MI) is a dynamic mental state in which there is a mental execution of an action is rehearsed without any motor output. Motor imagery is a type of movement representation technique where a patient mentally stimulates a movement/ action without real execution.⁽⁴⁾ In a recent experiment, cerebral blood flow was measured with positron emission

tomography in normal subjects during the mental simulation of grasping movements. The control condition from which the activation condition was subtracted consisted of the visual inspection of virtual objects (of different size, color and orientation) presented in subjects' reaching space. Significant activations were observed in areas concerned with motor behavior. At the cortical level, in the inferior part of the frontal gyrus was activated on both sides with a stronger activation in the left hemisphere (contralateral to the hand mentally involved in the task) Imagery provides cerebral blood flow especially in the areas related to movement planning.⁽⁶⁾

Several sports coaches around the world have discovered that optimum performance is possible upon "psyching-up" just as much as it is on physical preparation and technical skill. However, sport and exercise psychologists have reported that strength athletes need to undertake some form of psyching-up prior to performance, both in training and competition Cognitive strategies or psyching-up strategies are reliably associated with increased

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strength performance.⁽⁹⁾

One of the psyching up strategies is motor imagery. This psyching-up technique has been applied to (a) reduce muscle fatigue, (b) improve strength performance in sports without sensorial input, using mental training with perceptual experiences, which includes simulations of movements and specific task perceptions and (c) enhance motor recovery in patients⁽¹⁰⁾

As there has been shown a wide range of benefits of mental imagery, this study is aimed at studying the effect of motor imagery on handgrip strength in badminton players with handheld dynamometer and vividness of movement imagery questionnaire 2 as outcome measures.

Materials and Method:

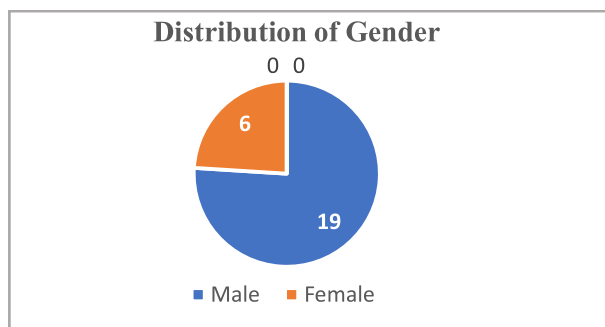
Ethical clearance was taken from Institutional Ethical Committee, Tilak Maharashtra Vidyapeeth Department of Physiotherapy, Pune.

Subjects: Total 25 recreational Badminton Players between the age group 18-25 years of both male and female were included in the study. Participants with any injury or surgery to upper limb, with or without any systemic affection were excluded from the study. Different badminton courts were approached in and around Pune. The aim, objectives and detailed methodology of study were explained to the participants. Consent was taken on consent form.

With the help of hand held dynamometer the hand grip strength was assessed. All the participants were then asked to fill out vividness of movement imagery questionnaire which was used for motor imagery.

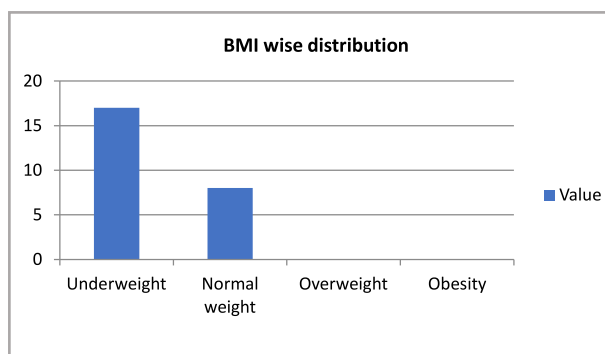
Procedure: For the intervention, The Subjects were in sitting position on chair, with back support. Both the dominant and non-dominant hands were relaxed, eyes were closed asked the subject to take a deep breath and relax muscles for two minutes. Later the subjects were asked to contract hand muscles in form of different grip strengthening exercises for 20 seconds followed by 10 sec rest in a set. During procedure made sure that there is no visible active contraction performed by subject. The exercises were taken in a pattern of ten repetition/3sets followed with a rest of 2 minutes after every exercise. Total of 14 sessions were taken. After completion of 2 weeks protocol, re-assessment was done at the end of last session.

Results:



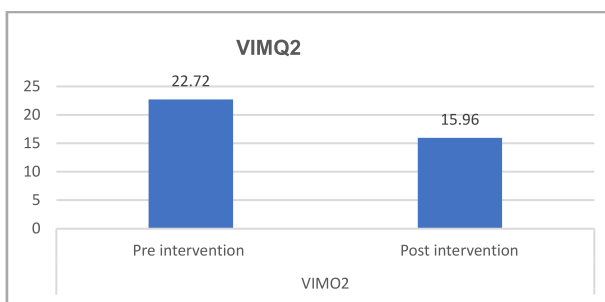
Graph 1: Distribution of Gender

Interpretation – Graph no. 1 shows that out of 25 recreational badminton players, there were 19 MALE and 6 FEMALE in total number of population.



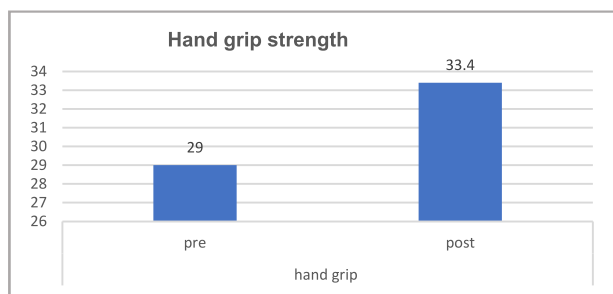
Graph 2 : BMI Wise Distribution

Interpretation:Graph 2 shows that in 25 subjects 8 subjects are in normal weight category and 17 are underweight.



Graph 3: Vividness of Movement Imagery Questionnaire 2

Interpretation: Graph no.3 shows that in total 25 subjects the mean value of pre assessment 22.7±10.780 of VIMQ2 was reduced by mean of post15.96±6.380 after the intervention and P value was <0.0001 and considered extremely significant.



Graph 4 : Hand Grip Strength

Interpretation: Graph no.4 shows that in total 25 subjects the mean of pre assessment 29 ± 12.332 of hand grip strength by mean value of post 33.4 ± 12.725 after the intervention and P value was <0.0001 and considered extremely significant.

Discussion:

Aim of the study was to study the effect of motor imagery on handgrip strength in badminton players. As during this study to use handheld dynamometer for the assessment of hand grip strength ($r=0.986$) where the mean of post assessment 33.4 ± 12.725 of hand grip strength by mean value of pre 29 ± 12.332 after the intervention and P value was <0.0001 and considered extremely significant.

Result no. 3 shows that in total 25 subjects the mean value of pre assessment 22.7 ± 10.780 of VIMQ2 was reduced by mean of post 15.96 ± 6.380 after the intervention and P value was <0.0001 and considered extremely significant. High score indicate low vividness and low score indicates high vividness. Which indicates in our study the score has reduced after the intervention which shows that vividness was increased.

We used vividness of movement imagery questionnaire 2 scale to check the ability of the imagination of the players of movement. The items of the questionnaire are designed to bring certain images to your mind. You are asked to rate the vividness of each item by reference to the 5-point scale. The analysed data showed that it was a normal distribution by using Wilcoxon matched pairs signed rank test in which the two tailed P value was <0.0001 , considered extremely significant.

Result no 5 shows that that in total 25 subjects the mean of post assessment 33.4 ± 12.725 of hand grip strength by mean value of pre 29 ± 12.332 after the intervention and P value was <0.0001 and considered extremely significant.

This result was consistent with most of the research. It has shown that with increase in strength that is seen is caused by neural training hypothesis; which says that there is activation of more motor units that lead to increase in strength and there is no actual increase in muscle.⁽⁵⁾

It is said that motor imagery influences the scheming of motor knowledge. it is considered to adjust and change the whole process of (amount of) contraction by the means of maximum mental contraction of muscle.

The analysed data showed that it was a normal distribution by using Wilcoxon matched pairs signed rank test in which the two tailed P value was <0.0001 , considered extremely significant.

Duration of MI practice is shorter than that of physical practice. Based on a meta-analysis of controlled studies of mental practice, the recommendation for treatment for people who are healthy is limited to 20 minutes. In fact, there is a negative relationship between effect and increased practice duration.⁽¹⁶⁾

Conclusion:

The present study concludes that motor imagery is effective on hand grip strength and improved movement imagery vividness in Recreational badminton players.

Limitations

- Small group of population was studied
- Only recreational badminton players included
- Short term intervention was used

Future Scope Of Study

- Different age group can be considered
- Larger sample size
- Long term intervention can be used
- Various sports can be included

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