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Effectiveness Of Graded Motor Imagery In The Treatment Of Adhesive Capsulitis In The Geriatric: A Case Study

¹Abhishek Kumar Sandilya, ²Divya Kashayp, ³Prof. (Dr.) Reena Kumari, ⁴Dr. Mohit Bhatt,

^{1,2}Student Researcher, ³HOD, ⁴Assistant Professor, ^{3,4}Department of Physiotherapy, Sardar Bhagwan Singh University, Dehradun

*Corresponding Author: Abhishek Kumar Sandilya Student Researcher, Sardar Bhagwan Singh University, Dehradun

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Abstract

Adhesive capsulitis presents a prevalent challenge in the geriatric population characterized by debilitating pain, and restricted shoulder mobility. Geriatric Subjects with adhesive capsulitis might not be comfortable with vigorous physical therapy. Conventional treatments often fall short in providing comprehensive relief, especially in sensory-motor deficits Like Kinesio-phobia associated with adhesive capsulitis. Graded Motor Imagery, offers a non-physical scenario that works by targeting the Mirror neurons for addressing the sensorymotor deficits associated with adhesive capsulitis. The objective of the case study was to assess the effectiveness of Graded Motor Imagery (GMI) as a conservative management for adhesive capsulitis in geriatric individuals aged 60 and above. The primary objectives include exploring the impact of GMI on pain, shoulder range of motion, Fear of movement, and improved functional abilities. A 61-year-old male, presented to the Physiotherapy Outpatient Department at Sardar Bhagwan Singh University in Dehradun with a one-month history of persistent shoulder pain, restricted range of motion, and Functional Disability. Prediagnosed adhesive capsulitis was confirmed based on past clinical evaluation. He underwent a structured GMI protocol post Preintervention assessment. The intervention included laterality recognition exercises, motor imagery sessions, and mirror therapy, all tailored to his specific clinical presentation. The goal was pain relief, improved shoulder movement, and enhanced overall functional abilities. The Outcome measures or the Assessment tools used for this study were the Visual Analogue Scale (VAS) to quantify the severity of shoulder pain, the Goniometer to measure the range of motion in the shoulder joint, Shoulder Pain and Disability Index (SPADI) Measured functional limitations and pain perception, Fear Avoidance Belief Questionnaire (FABQ) Assessed the patient's beliefs and fears related to physical activity and movement. Post-GMI intervention, the Patient showed significant improvements in Pain perception and fear of movement and a slight increase in range of motion. The VAS scores demonstrated a significant reduction in pain intensity, and goniometric measurements showed improved shoulder mobility. SPADI scores reflected improvements in functional abilities, and FABQ scores indicated positive changes in the patient's beliefs and thinking toward physical activity. This case study provided encouraging evidence for the effectiveness of Graded Motor Imagery in managing adhesive capsulitis in a geriatric patient. The observed improvements in pain perception, fear of movement, shoulder mobility, and functional abilities highlight the potential of GMI as a valuable rehabilitation approach for adhesive capsulitis in the elderly.

Keywords: Adhesive Capsulitis, Frozen Shoulder, Graded Motor Imagery, Physiotherapy

Introduction

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Adhesive capsulitis is a common musculoskeletal disorder characterized by Pain, stiffness, and restricted range of motion in the shoulder joint. [1] It predominantly affects individuals in their fifth and sixth decades of life, with a higher prevalence in the geriatric population. [2]The situation substantially affects functional abilities and quality of life, particularly in older adults. [3] Traditional control adhesive capsulitis methods for consist of. corticosteroid non-steroidal injections, antiinflammatory drugs(NSAIDs), conventional physiotherapy, and in excessive cases, surgical intervention. [4]However, these treatments may have limitations in efficacy and potential adverse effects, especially in older adults who may have comorbidities or be at increased risk of complications. Graded motor imagery (GMI) is a notably novel method promising a non-physical scenario that has shown effect in the control of diverse musculoskeletal situations, such as continual pain and movement disorders. [5] GMI involves a sequence of mental exercises aimed at retraining the brain's illustration of the affected frame component, thereby decreasing pain and enhancing function. [6] Graded motor imagery has been considered a key factor for healthy aging g)Despite its growing popularity and impactful support in diverse patient populations, limited research exists on the effectiveness of GMI specifically in geriatric individuals with adhesive capsulitis. This case study aims to explore the effectiveness of GMI in treating adhesive capsulitis in geriatric individuals by utilizing validated outcome measures to assess pain, Functional disability, range of motion, and fear of movement.

Case Description

A 61-year-old male visited the Physiotherapy Outpatient Department (OPD) at Sardar Bhagwan Singh University and presented with complaints of progressive pain and restricted movement affecting his left shoulder for the past 1 month. The patient had been previously diagnosed with adhesive capsulitis at a healthcare facility he visited earlier. There was no history of trauma or significant medical conditions affecting the shoulder joint, as told by the patient. Further inspection revealed that the onset of shoulder pain and stiffness was gradual and insidious, with no associated trauma or impact event following the symptoms. The pain became more and more intense as months went by and the patient couldn't perform his daily duties and abrupt sleep became a constant problem. Despite previous attempts at conservative management, such as rest and analgesic medications, the patient didn't experience much relief from his symptoms. Collectively highlighted the chronic nature of the patient's condition calling for some intervention to relieve pain and improve the functional ability of the shoulder.

Examination and Evaluation – On examination, the patient presented with a restricted active and passive range of motion of shoulder all planes, suggestive of the classic capsular pattern of adhesive capsulitis. Palpation around the glenohumeral joint showed localized tenderness, inflammation, and sensitivity in the affected area. All the shoulder Movements such as flexion, abduction, internal rotation, and external rotation were limited and associated with significant pain, which the patient rated at 7 on the Numeric Pain Rating Scale (NPRS). These symptoms were relevant to the clinical presentation of adhesive capsulitis, where pain and stiffness typically worsen during the night and with activities involving shoulder movements. The active range of motion assessment, conducted in a sitting position using a goniometer, revealed limitations in shoulder flexion, abduction, and external rotation. The passive range of motion was further restricted due to pain, with the patient demonstrating a guarded denial during the examination. Taken together these results reflected the seriousness of the patient's condition and showed the influence of adhesive capsulitis on his shoulder function and movement.

Shoulder Range of Motion, Refer -Table 1

Outcome Measures

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1. Shoulder Pain and Disability Index (SPADI): The SPADI is a self-reported questionnaire used for assessing pain and functional disability related to shoulder conditions. It consists of 13 items that are scored on a visual analogue scale (VAS), with higher scores indicating more severe pain and disability. [8]

2. Numeric Pain Rating Scale (NPRS): The NPRS is a pain rating scale ranging from 0 to 10, where the patient has to rate their pain intensity numerically, with 0 representing no pain and 10 representing the worst pain. [9]

Volume 7, Issue 2; March-April 2024; Page No 10-15 © 2024 IJMSCR. All Rights Reserved 3. Goniometer Measurements: The range of motion of the shoulder joint flexion, abduction, internal rotation, and external rotation was assessed using a goniometer. [10]

4. Fear-Avoidance Beliefs Questionnaire (FABQ): The FABQ is a questionnaire for assessing fearavoidance beliefs related to physical activity and work. It consists of two subscales: physical activity (FABQ-PA) and work (FABQ-W), with higher scores indicating greater fear avoidance beliefs. [11]

Intervention

The intervention was induced for the patient's treatment after he signed the informed consent. For six weeks, the patient underwent a comprehensive graded motor imagery (GMI) intervention program, methodically designed and supervised by a physiotherapist to address the symptoms of adhesive capsulitis. This program consisted of three different stages, each carefully customized to focus on different aspects of sensorimotor integration and neural plasticity was implemented six days a week for optimum therapeutic benefit. During the first phase which consisted of laterality recognition, the patient was involved in daily mental imagery tasks focused on refining the ability to differentiate between left and right shoulder images. Through rhythmic practice and visualization exercises, the patient refined his cognitive skills, gradually developing improved awareness and precision in distinguishing the affected shoulder from the unaffected one. This stage was an initial step in the GMI process, finding the base for subsequent motor imagery exercises. The succeeding stage is driven by motor imagery, wherein the patient gets on a path of mental trial and visualization of specific shoulder movements. Without physically performing the patient vibrantly the imagined movements. performing actions such as flexion, abduction, internal rotation, and external rotation of the shoulder. By involving in this mental practice, the patient stirred neural pathways associated with motor planning and execution. enabling cortical and reorganization improving motor control irrespective of the physical limitations imposed by adhesive capsulitis. The final stage of the intervention is Mirror therapy, offering a unique tactic for motor rehabilitation by fitting in visual feedback with mental imagery. By using a mirror, the

patient performed symmetrical movements with the unaffected shoulder while observing the reflected image as an assumption of the affected shoulder in motion. This inventive technique provided real-time visual feedback, permitting the patient to line up their mental imagery with perceived movements, thereby emphasizing cortical reorganization and facilitating the renovation of motor function in the affected shoulder. Throughout the intervention period, the patient conscientiously engaged in each stage of the GMI program, actively participating in daily exercises and tasks under the guidance of the physiotherapist. The progressive nature of the intervention, with each stage edifice upon the previous one, ensured a comprehensive and approach to rehabilitation, structured finally contributing to significant enhancements in pain perception, functional mobility, and overall quality of life for the patient. The patient received instructions and guidance from the physiotherapist during each stage of the intervention to ensure proper technique and observance.

Outcome

Post-intervention reassessment was done before discharge. The patient reported he felt 70% improvement since the initial evaluation and reported he was able to move his arm without any fear and in a less painful manner. The patient reported significant improvement in all the outcome measures.

Pre- and post-intervention outcomes – Refer , Table 2

Discussion

The results from this case study provide esteemed insights into the effectiveness of graded motor imagery (GMI) as a therapeutic intervention for adhesive capsulitis in geriatric patients. The observed gains in pain, fear of avoidance belief, functional disability, and range of motion emphasize the potential of GMI to exert a positive effect on various aspects of the geriatric population's patient outcomes. The observed drop reductions in Shoulder Pain and Disability Index (SPADI) and Numeric Pain Rating Scale (NPRS) scores show not only a statistically significant improvement in pain intensity but also a clinically impactful reduction in pain and disability experienced by the patient. This implies that GMI can be employed as an alternative treatment to address

pain and functional impairments related to adhesive capsulitis, offering an opportunity to reduce the use of pharmacological options and invasive procedures. In addition, the observed increase in shoulder range of motion reflects enhancements in joint motion following the GMI intervention. An adequate range of motion is essential for restoring function and performing activities of daily living, pointing at the active rehabilitative nature of GMI in addressing functional impairments caused by adhesive capsulitis. The observed decreases in Fear-Avoidance Beliefs Questionnaire (FABQ) scores indicate that GMI may also employ a positive influence on psychosocial factors causative of pain and functional disability. By focusing on fear-avoidance beliefs, GMI can help patients break psychological barriers to movement and promote involvement in rehabilitative activities, ultimately enabling a more generous recovery process. The mechanisms underlying the efficiency of GMI in adhesive capsulitis are likely multi-layered and may involve neuroplastic changes within the nervous system. Through central repetitive engagement in mental imagery tasks, GMI may enable cortical reorganization and promote the development of more effective motor control strategies. Engagement of cognitive processes in GMI tasks can enhance proprioceptive awareness and sensorimotor integration and therefore derive quality and functional outcomes. The absence of a control group and the dependence on self-reported outcome measures introduce potential sources of bias and limit findings. Future research should be focused on amplifying these limitations by incorporating larger sample sizes, RCTs, and long-term follow-ups which will help in the validation of the efficacy of GMI in the management of Adhesive capsulitis in the geriatric population. In addition, finding the appropriate parameters to conduct GMI as well as including the principles like frequency intensity will make the treatment protocol more accurate and improve the quality of treatment.

Conclusion

This case study provides preliminary signs supporting the effectiveness of graded motor imagery (GMI) as a therapeutic approach for managing adhesive capsulitis in geriatric patients. Significant improvements were observed in pain, functional disability, range of motion, and Fear of movement.

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Shoulder	Right	left
Flexion	100	70
Abduction	110	60
External rotation	50	20
Internal rotation	40	20

Table 1 : Shoulder Range of Motion

Tables

Table 2 : Pre- and post-intervention outcomes

Outcome Measure	Pre- Intervention	Post - Intervention	Change
SPADI(0-100)	72	38	-34
NPRS(0-10)	9	4	-5
Flexion(Degrees)	70	90	+20
Abduction(Degrees)	60	80	+20
Internal Rotation(Degrees)	20	30	+10
External Rotation(Degrees)	20	30	+10
FABQ-PA(0-24)	18	8	-10
FABQ-W(0-42)	24	12	-12

Figures

Figure 1 : Flashcards Being Introduced to Patients for Laterality Recognition Exercise



Page.

Figure 2 : Flashcards used as GMI tool

