

# Effect of Physiotherapy on Writer's Cramp: A Case Study

Preeti<sup>1</sup>, Dr Shikha Singh<sup>2</sup>, Dr. Jasmine Anandabai<sup>3</sup>, Dr. Gaurav Pratap Tyagi<sup>4</sup>  
Jyotirao Phule Subharti College of Physiotherapy  
Faculty of Physiotherapy and Allied Health Sciences  
Swami Vivekananda Subharti University

## Abstract :-

**Background:** The goal of this study is to evaluate the effectiveness of eight -week therapy in a patient with writer's cramp.

**Study design:** A single case study.

**Method:** A 28-year-old adolescent who has been diagnosed with writer's cramp attends an eight-week exercise programme. VAS and ADDS were used as outcome measures in this study.

**Result:** As a result of the study, the patient demonstrated improvements in physical examination, which was evaluated before and after the intervention and included the PNF, Stretching and Task-based activities.

**Conclusion:** The results of this case suggest that the exercise program using PNF, and task based activities may improve the ability to write and do the tasks using his right hand in a patient with Writer's cramp.

**Keywords:-** *Writer's cramp, Visual Analogous Scale (VAS), Arm Dystonia Disability Scale (ADDS), Proprioceptive Neuromuscular Facilitation (PNF).*

## I. INTRODUCTION

Writer's cramp is a serious task-specific focal dystonia that develops in adults and is characterized by abnormal movements or postures of the upper limb [1]. When muscles contract improperly when writing, it causes writer's cramp [1]. Task-specific dystonias, like writer's cramp, are not fully understood, and it is widely known that a combination of individual sensitivity and environmental factors contribute to it [1].

By resemblance to common muscle cramps, the term "writer's cramp" is frequently used informally to describe pain in the hand after engaging in prolonged writing [2]. The phrase describes a task-specific, focal hand dystonia, at least among neurologists [2]. A group of illnesses collectively known as dystonia are characterized by aberrant postures and uncontrollable muscular spasms that impair motor function [2]. The most prevalent type of focal dystonias affect only one specific body component [2]. Although less frequent than eyelid or neck-focused dystonias, focal hand dystonias are nevertheless rather common (blepharospasm) [2]. A fascinating feature of writer's cramp is task specificity, which states that only writing is aberrant, and all other tasks are normal [2].

People who have been writing for a long period are more likely to experience writer's cramp [3]. A protracted period of stereotypical, repetitive behavior appears to be crucial [3]. Obviously, not everyone who writes a lot ends up with writer's cramp [3]. Thus, it is most likely that writer's cramp is caused by both a genetic predisposition and an environmental injury, as is the case with most diseases [3]. That is, only people with a genetic predisposition experience writer's cramp after writing for an extended period of time [3]. Indeed, there is evidence to support a hereditary component to the focal dystonias (DeFazio et al., 2003, DeFazio, Brancati et al., 2003). The prevalence of focal dystonias in families is rising, which shows that all of these disorders are connected [3].

An unusual handwriting disorder known as "writer's cramp" is characterized by uncontrollable muscle contractions in the upper limb [4]. Most patients assume atypical positions for their fingers and wrists when they try to write, exerting significant stresses in putting pressure on the paper while holding the pen [4]. Muscle spasms frequently worsen when writing and, in some circumstances, make it hard to continue after a few sentences [4]. This disorder was primarily seen in those whose professional tasks require them to handwrite [4]. Therefore, any ongoing impairment of this skill may result in serious disabilities, including loss of employment [4]. Surprisingly, many of these patients execute other sophisticated tasks without any mobility issues [4].

The symptoms of writer's cramp, a form of focal dystonia that typically affects the muscles of the forearm and hand, appear while carrying out particular tasks [2]. This condition affects men more frequently than women, with figures for the general population ranging from 3.8 to 80 instances per 1,000,000 people [2].

## II. CASE STUDY

A 28-year-old male who has been working as a cashier in a bank since last two years and has a one-and-a-half-year history of writer's cramp, reported having difficulty in grip related work as writing or counting the notes. His index finger would sometimes get locked in a straight position while he was writing. Because of this issue, he began using his index finger less frequently than before. As a result, his right thumb and middle finger were put under the most stress. As a result, now he experiences more trouble holding pens and performing other tasks that need the use of his right hand, especially thumb and index finger. The patient indicated that a wide range of psychological issues have arisen since the start, in part because of his inability to

communicate his writing issues to others. He listed a broad list of medical tests that never produced any abnormal findings. In particular, we found no evidence of dystonia or any other neurological impairment, such as those brought on by injury to peripheral sensory or motor nerves or corticospinal sensorimotor circuits.

Characteristic	Value
Age of the patient	28 years
Gender	Male
Occupation	Cashier in bank
Working hours	6 – 7 hours
Symptoms	Difficulty with griping
Duration of symptoms	1.5 years
Location	Right hand

Table 1: Demographic details of the patient

### III. METHODOLOGY

This study includes a patient who is facing difficulty in doing some tasks with the help of his right hand, especially thumb and index finger. The subject provided information about the symptoms from which he has been suffering for the last one and a half years. The patient displayed several of the traditional writer's cramp symptoms during the initial examination of their handwriting. The hand muscles visibly tightened as soon as the pen was picked up, and it was held very securely. As he tries to write, the wrist acquired a gradual bend that persisted through pen-lifts. The script that was written was still readable, but it was obviously strange and full of errors. (Two Parallel lines can never meet without changing their parallel paths). The patient took 44 seconds to write a test sentence, according to the recording of handwriting movements. This is significantly slower than the performance of 10 healthy people, who needed 20-26 seconds.

Additionally, when the patient was asked to write basic letter combinations like "ll" obvious inconsistencies were discovered. Significant disruptions were seen in the component movements that were examined (repeated back and putting circles on top of one another or making forth finger gestures).

Scale	Score
VAS	8
ADDS	2.6

Table 2: Scales

[VAS: Visual Analogous Scale, ADDS : Arm Dystonia Disability Scale ]

### IV. TREATMENT

The training approach was started by interpreting the flawless motions made with the proximal joints as a preserved movement capability.

Training first concentrated on creating a strong Pen hold because a dramatic rise in muscle tension was observed when holding the pen. The patient eventually discovered

that the ideal way to hold the pen was between the second and third finger.

Writing movements were limited to the proximal joints throughout this training session. All indications of abnormal mobility returned when the patient was asked to use his fingers and wrist for writing at this point. In the same session, handwriting done with the wrist and fingers is contrasted with writing done with the proximal joints.

Using the proximal joints as a "reference," we now chose the writing motions and searched for gradual returns to standard handwriting. At first, we focused on relaxing the hand and finger muscles and limited exercises to words written in capital letters. Later, we introduced cursive handwriting and various writing instruments, and we used the muscles to lift the pen between letters.

The PNF approach was used to identify patterns for flexion, adduction, and external rotation of the lower limb, as well as extension, adduction, and internal rotation of the upper limb. Since the patient's dystonia was extensors in character, the above patterns were used to strengthen the flexor group of muscles in the upper limb. It was thought that strengthening these muscles would aid in the correction of abnormal motions and hand position while writing.

The established approach was a combination of isotonic contractions with the goal of increasing muscle strength, improving coordination, and practicing eccentric motion control. The goal of neuromobilization was to normalize neuromechanics, which is the functioning of the nervous system as an adaptation to continual variations in mechanical loads. The median, ulnar, and radial nerves were all mobilized.

A set of strengthening, agility, and precision movement exercises were created for the group of the short muscles in the hand and the front muscles of the forearm. These exercises included holding a ball in the hand, holding a ball between the thumb and fingers II to V (a lumbrical grip), and flexing the fingers and wrist while resisting the motion with a piece of tape or the phenomenon, which involves holding a ball that has been wrapped in a handkerchief in such a way that it hangs, leads to increased finger grasp in that stillposition.

Modeling clay is formed into a ball, broken, and then reformed. The thumb is opposed and the fingers II to V are touched (slowly too quickly).

Stretching exercises included stretching the major muscle groups, including the flexors and extensors of the shoulder and elbow joints, as well as the flexors and extensors of the wrist and fingers.

Sensorimotor training appears justifiable based on the premise that motor function limitations in dystonia occur from adaptive changes within the sensory and motor cortex. As a result, mirror biofeedback was used in the therapy. This entailed positioning a mirror in such a way that it reflected the healthy hand, while the busy hand was hidden behind the mirror. On each side of the mirror, sheets of

paper were laid. In each hand, the patient gripped a pen. His objective was to draw patterns, spirals, sinusoids, and loops with both hands at the same time. Because individuals suffering from dystonia frequently forget what the proper hand movement looks like when writing, a rehabilitation component was incorporated.

In this rehabilitation therapy, the patient used visual control to alert the central nervous system once more of the proper movement whenever they experience an increase in symptoms in their dystonic hand.

Kinesio Taping, a method for releasing muscular tension, was also incorporated into the therapy and applied to the muscles where the patient had experienced increasing and unpleasant tension. These muscles were the extensor

digitorum superficialis and the triceps brachii. Without stretching the tape, the tape was applied from the muscle's insertion to its origin at the position where the space between the two is the greatest. The therapy intended to calm down the muscles and restore normal muscular function.

The patient's performance after 11 training sessions is displayed. Pen movements were now made by holding the stylus between two fingers (index and middle finger) and employing the typical combination of wrist and finger movements. The speed of writing characteristics was improved. At a six-month follow-up interview, the patient confirmed the stability of the training effects.

## V. DATA ANALYSIS

Variable	Pre – treatment Score	Post – treatment Score
VAS	8	3
ADDS	2.6	0.5

[VAS: Visual Analogous Scale, ADDS: Arm Dystonia Disability Scale]

## VI. RESULTS

The patient's performance after 11 training sessions is displayed. Pen movements were now made by holding the stylus between two fingers (index and middle finger) and employing the typical combination of wrist and finger movements. The speed of writing characteristics was improved. At a six-month follow-up interview, the patient confirmed the stability of the training effects.

## VII. CONCLUSION

The advancement of occupational focal dystonia has been well-controlled by including task-based activities, PNF methods, stretching, and strengthening of the upper limb muscles. From the aforementioned study, we deduced that task-based exercises, PNF, stretching, and hand strengthening together have a positive impact on the hand's functional activities

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